Executive Qualification and Firm Value

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This paper examines the effect of managerial qualifications on firm value. We study financial performance of Fortune 500 firms using annual data for 2006-2009 using univariate and multivariate methodologies. Our results indicate that companies whose managers that have MBA degrees or degrees from the prestigious schools have higher market values. We also find evidence of a U-shaped relationship between manager age and firm performance.

INTRODUCTION

Various papers examine chief executive officer and manager compensation salaries and compensation packages. Do these managers deserve the salaries and compensation packages? More importantly what kind of managers makes a difference in their companies' performance and value? Education level, a degree or diploma from a prestigious university differentiates executives from others. Do these highly qualified executives create more wealth or value for their companies? Our paper attempts to address these questions.

In the last two decades company executive compensation packages have increased tremendously. Large multinational companies compete with each other in paying higher and higher salaries and offering lucrative stock option packages to top managers. According to Murphy (1999), level of top executive compensation between 1992 and 1996 has increased 55% from $2.0 million to $3.2 million. Many researchers (Agrawal and Mandelker (1987), Agrawal and Walking (1994), Boschen and Smith (1995), Defusco, Johnson and Zorn (1990), Zhou (1990)) examined CEO and CFO compensation packages across industries and across nations. Taking into public sentiment administrators make companies disclose executive pay to the public. Although the researchers investigated effects of executive pay on shareholder wealth, the effect of managerial qualifications on long-term company value hasn't been investigated thoroughly.

Chhaochharia and Grinstein (2009) examines how new board requirements affect the CEO compensation. They find significant decrease in CEO compensation for firms that were more affected by these requirements. The results indicate that board structure requirements have a significant effect on the structure and size of CEO compensation. Existence of a large blockholder on the board reduces the effect of board structure and procedures on compensation decisions.

The influence of managerial skills on firm valuation has received limited attention from researchers. There are few studies on the issue, and the results are controversial. Shleifer and Vishny (1989) and

Bebchuk and Fried (2004) find that managers do not improve firm performance, that managerial compensation reflects political skills and entrenchment. Gottesman and Morey (2010) use a sample of 390 firms and discover no relationship between managerial qualifications and firm performance.

On the other hand, some studies do find significant results. At present we are only aware of one study by Chemmanur and Paeglis (2005) who investigate the effect of managerial quality on IPO performance. A parallel stream of studies, for example Lucas (1978), Fama and French (1995), or Maksimovic and Phillips (2002), investigates how various firm characteristics affect market valuation of firms. At the same time many studies investigate how managerial skill affects mutual fund performance. In most cases the results are mixed, for example Switzer and Huang (2007) find significant cross sectional differences in fund mutual performance that are attributed to managerial qualifications, while Philpot and Peterson (2006) find little evidence that managerial qualifications add value. Recently Chang, Dasgupta and Hilary (2010) investigate whether or not CEOs really matter. By studying the price reaction to 434 CEO departures, they conclude that cross-sectional differences in firm value and performance are related to ability differences across CEO and that CEO qualification and ability positively affect firm performance. Similarly Fan, Wong and Zhang (2007) find that CEOs affect their company performance. Their results regarding 790 newly privatized companies in China show that politically connected CEOs affect financial performance of their companies negatively.

Guner, Malmendier and Tate (2008) paper analyzed how directors with financial expertise affect corporate decisions. Their results show that financial experts exert significant influence. However this influence does not result in shareholder wealth and value. External funding increases and cash-flow sensitivity decreases, but poor investment decisions are made. This study explores whether or not managers with better education and better qualifications increase their firm value compared to their colleagues. We examine the relationship between qualifications and experiences of top management and firm market valuation using panel data for 475 companies between 2006 and 2009. We investigate how education level and prior work experience of company top executives affect Tobin's Q values for companies in our sample. We gauge the education level by identifying whether or not executives have MBA degrees, and whether they graduated from a business school in top 25 of the Financial Times ranking list of business schools.

The present study adds to this literature in the following way. We contribute to the discussion on the relationship of qualifications and experiences of firm's top managers and firm valuation for mature (non-IPO) firms. Unlike Gottesman and Morey (2010), we use panel data analysis and do find a significant relationship between qualifications and performance. The results of our empirical analysis suggest that managerial qualifications and experience indeed have a bearing on firm valuation. First, we analyze the effect of each variable on Tobin's Q values in univariate framework and discover that companies with executives that have MBA degrees and/or graduated from highly reputable business schools on average have significantly greater Tobin's Q values compared with the companies whose managers do not have such qualifications. We also find that the relationship between manager age and firm performance is nonlinear and similar to a U-shaped function.

The paper is organized as follows. The next section describes the data set and section III outlines the hypotheses and methodology. Section IV presents our findings, and is followed by the conclusion.

DATA

We collect data on firms in the Fortune 500 list during 2006-2009. Information on managerial qualification is hand collected from manager profiles available from company web pages and Reuters company information database available at http://www.reuters.com. We measure unobservable managerial team qualification with the following proxy variables. Variable TEAMSIZE shows the number of corporate officers at the Vice-President level and higher. Variable MBA presents the proportion of corporate officers with MBA degrees. Variable SCHOOL displays the proportion of corporate officers who graduated from top 20 schools which is identified in Financial Times 2009 World Ranking of business schools available from http://www.ft.com/intl/businesseducation/mba. Finally,

TABLE 1
MANAGER QUALIFICATIONS

This table presents descriptive statistics and cross correlations for measures of qualifications for managerial teams in our sample. The qualification variables include the number of managers at Vice President level and above *TEAMSIZE*, the proportion of team members holding MBA degrees *MBA*, the proportion of managerial team members who graduated from top 20 schools in Financial Times 100 business school ranking *SCHOOL*, and the proportion of team members who serve as members on various boards of trustees *BOARD*. Average age of the managerial team as of 2009 is denoted by *AGE*.

	TEAMSIZE	MBA	SCHOOL	BOARD	AGE
Mean	12.7874	0.1298	0.2006	0.2897	52.7803
Median	12	0.0667	0.1667	0.2308	52.8
Maximum	45	1.0	1.0	1.0	62.4
Minimum	3	0.0	0.0	0.0	43.1818
Std. Dev.	5.8392	0.1642	0.1993	0.2557	2.8975
Observations	475	475	475	475	429
		Correlations			
TEAMSIZE	1				
MBA	0.0259	1			
SCHOOL	0.1402	0.5321	1		
BOARD	0.1166	0.4212	0.5781	1	
AGE	0.0358	-0.0242	-0.0574	0.0859	1

TABLE 2
FIRM PERFORMANCE DATA

This table presents descriptive statistics for measures of firm performance for companies in our sample. Tobin's Q1 = (Market value of equity – Book value of equity + Total assets)/Total Assets. Tobin's Q2=(Market value of equity + Book value of Total Debt) / Total Assets. LOG(TASS) is the natural logarithm of Total Assets, where Total Assets are measured in thousands of US dollars. LOG(EMPL) is the natural logarithm of firm employees. The descriptive statistics are computed using all available data from the panel of observations.

	TOBINQ1	TOBINQ2	LOG(TASS)	LOG(EMPL)
Mean	2.1064	1.7353	15.7902	9.5549
Median	1.5358	1.2181	15.7367	9.5812
Maximum	22.8751	22.6635	21.5072	14.5575
Minimum	0.5160	0.0242	8.1951	1.0986
Std. Dev.	1.7051	1.7594	1.7622	1.4871
Observations	4253	4252	4356	4236

TABLE 3
INDUSTRY COMPOSITION OF THE SAMPLE

This table presents industry composition of our sample. Industry classification is done according to ICB INDUSTRY NAME data item obtained from the Datastream. *Count* is the number of firms in our sample, and *Percent* is the proportion of firms in the corresponding industry sector in the sample.

Industry	Count	Percent
Oil & Gas	30	6.02
Basic Materials	20	4.02
Industrials	68	13.65
Consumer Goods	65	13.05
Healthcare	48	9.64
Consumer Services	72	14.46
Telecommunications	10	2.01
Utilities	28	5.62
Financials	88	17.67
Technology	69	13.86
Total	498	100

variable BOARD shows the proportion of managers who serve on outside boards in various institutions. This variable is designed to capture outside recognition of managerial experience and qualification by other corporations, nonprofit organizations, or universities that invited the manager to serve on their boards. These variables have been used before as measures of managerial quality, for example in Chemmanur and Paeglis (2005), Rakhmayil and Yuce (2008).

Managerial qualifications are presented in TABLE 1. The average size of managerial team is 12.7874 in our dataset, while the maximum size is 45 corporate officers for General Motors Corporation and minimum of 3 officers at Vice President level and above for Clear Channel Communications, Inc., KeySpan Corporation, and Mellon Financial Corporation. The mean proportion of MBAs on managerial teams is 0.1298, with the highest proportion of 1, which mean all team members have MBA degrees, and minimum of zero. In our sample 131 companies has top managerial team members with no MBA degrees, and 16 companies with more than 50% of their team members with MBA degrees. The average for SCHOOL is 0.2006, and this variable ranges from 1 to 0. In our sample 46 firms have more than 50% team members who graduated from top 20 school in world ranking, and 73 companies where SCHOOL=0. Average BOARD is 0.2897 with maximum 1 and minimum 0. Finally, there is evidence in the literature that managerial experience is a significant factor in determining performance. We use average age of the managerial team as a proxy for experience, and present this variable as variable AGE in TABLE 1.

Financial and operating characteristics for companies in our sample are obtained from the Datastream. We measure capital K with the natural logarithm of book value of Total Assets, LOG(TASS), and labor L is measured with the natural logarithm of the number of employees LOG(EMPL). In order to measure firm valuation we use Tobin's Q. We use two measures calculated as follows. Tobin's Q1 = (Market value of equity – Book value of equity + Total assets)/Total Assets. As a robustness check we construct the second variable, Tobin's Q2=(Market value of equity + Book value of Total Debt) / Total Assets.

TABLE 4
GOVERNANCE CONTROL VARIABLES

This table shows descriptive statistics for corporate governance control variables. Variable CLASSIFIED takes value of 1 if the board is classified (director terms expire in different years) and zero otherwise. Variable OUTSIDEMAJORITY equals 1 if more than 50% of the board members are independent directors. Variable ACTIVECEOS is the proportion of directors who are also active CEOs. Variable OUTSIDE DIRECTORS is the proportion of independent directors in board composition. Variable DIRECTORS15YR denotes the proportion of board members who served over 15 years as directors for the company. Variable DIRZEROSHARES shows the proportion of board members who own no shares in the company.

	CLASSIFIED	OUTSIDE MAJORITY	ACTIVE CEOS	OUTSIDE DIRECTORS	DIRECTORS 15YR	DIR ZERO SHARES
Mean	0.5625	0.9113	0.8590	0.7297	0.1481	0.0956
Median	1	1	1	0.7692	0.1111	0
Maximum	1	1	1	1	0.8	1
Minimum	0	0	0	0	0	0
Std. Dev.	0.4966	0.2846	0.2803	0.1590	0.1589	0.1860
Observations	496	496	494	494	494	494

TABLE 5
OWNERSHIP CONTROL VARIABLES

This table shows descriptive statistics for ownership control variables. Variable INSIDERCONTROL takes the value of 1 if the firm employees own more than 50% of voting shares and zero otherwise. Variable INMAJORITY takes the value of 1 if more than 50% of shares held by outsiders are owned by financial institutions, and zero otherwise. Variable FAMILYFIRM equals 1 if a company is controlled by a family, and zero otherwise.

	INSIDERSCONTROL	INSTITUTIONALMAJORITY	FAMILYFIRM
Mean	0.0101	0.0625	0.0020
Median	0	0	0
Maximum	1	1	1
Minimum	0	0	0
Std. Dev.	0.1000	0.2423	0.0449
Observations	496	496	496

Firm performance data are presented in TABLE 2. Average Tobin's Q1 is 2.1064 and it ranges from 22.8751 for Ciena Corporation in 2000 to 0.5160 for E.W. Scripps Company in 2008. Average Tobin Q2 is 1.7353 and it ranges from 22.6635 for Ciena Corporation to 0.0242 for Circuit City Stores, Inc. in 2008. Average firm size as measured by log of Total Assets is 15.7902 and average log of employees is 9.5549. In other words, our sample includes large companies with significant assets and large number of employees. Industry composition of the companies is presented in TABLE 3, the largest number of companies belongs to Financials industry sector with 88 firms, and the smallest number of companies is in Basic Materials with 20 companies.

Literature suggests that firm performance may be affected by governance structure. In order to separate firms with difference governance configurations, we analyze corporate governance information available from corporate webpages and from Reuters company information database and create the following governance dummy variables. Variable CLASSIFIED takes value of 1 if the board is classified (director terms expire in different years) and zero otherwise. Variable OUTSIDEMAJORITY equals 1 if more than 50% of the board members are independent directors. Next, we formulate several variables which show board composition as percentage. Variable ACTIVECEOS is the proportion of directors who are also active CEOs. Variable OUTSIDE DIRECTORS is the proportion of independent directors in board composition. Variable DIRECTORS15YR denotes the proportion of board members who served over 15 years as directors for the company. Finally, variable DIRZEROSHARES shows the proportion of board members who own no shares in the company. These variables capture the relationship between corporate governance and performance, as discussed in Core, Holthausen, and Larcker (2002), Brick, Palmon, and Wald (2006), Faleye (2007), Linn and Park (2005), Ryan and Wiggins (2004).

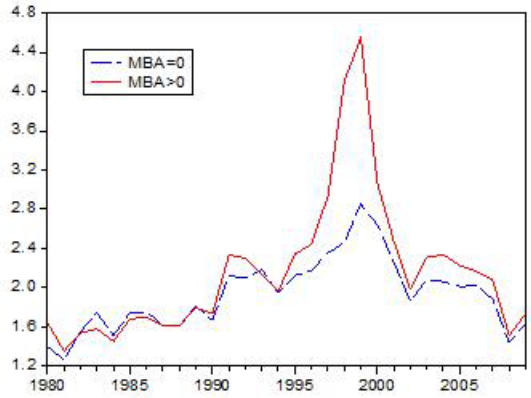
We present governance control variables in TABLE 4. The average of CLASSIFIED is 0.5625, indicating that 56.25% of companies in our sample have classified boards. The average of OUTSIDE MAJORITY is 0.9113, which means that in 91.13% of companies in our sample have more than 50% of independent directors on the board. Mean ACTIVECEOS is 0.8590, thus a significant proportion of directors are CEOs of other companies, and on average firms have the proportion of outside directors on their boards 0.7297. A relatively small proportion of directors stayed on the board for longer than 15 years, since mean DIRECTORS15YR is 0.1481, and the proportion of directors who do not have stock-based incentives as measured by mean DIRZEROSHARES is 0.0956.

We form several variables in order to differentiate firms with different ownership structures, since ownership configuration has been shown to affect corporate performance. We collect data on institutional ownership of companies from the Wall Street Journal Market Data Center, available at http://quotes.wsj.com. The data on insider ownership are collected from "Security ownership of certain beneficial owners and management" sections of proxy statements, available from company webpages or EDGAR database of the Securities and Exchange Commission.

The dummy variable INSIDERCONTROL takes the value of 1 if the firm employees own more than 50% of voting shares and zero otherwise. Next, we create dummy variable INMAJORITY which takes the value of 1 if more than 50% of shares held by outsiders are owned by financial institutions, and zero otherwise. Finally, variable FAMILYFIRM equals 1 if a company is controlled by a family, and zero otherwise. These variables are in line with current research on the effect of ownership on firm performance, for example Morck, Shleifer and Vishny (1988), Villalonga and Amit (2006), and Woidtke (2002).

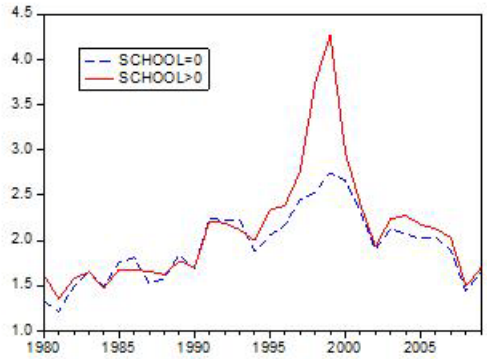
TABLE 5 presents ownership variables. The average of INSIDERSCONTROL is 0.0101, suggesting that slightly more than 1 percent of companies in our dataset are controlled by insiders. Mean INSTITUTIONALMAJORITY is 0.0625. Therefore, in 6.25% of our sample companies, institutions own more than 50% in stocks held by outsiders. Finally, average FAMILYFIRM is 0.0020.

FIGURE 1
Time line of average Tobin's Q1 for companies that have (do not have) MBAs in their managerial teams.



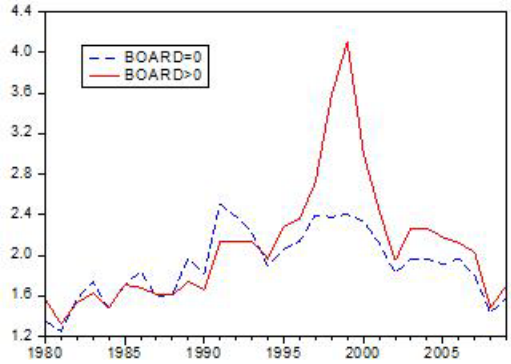
This figure shows the estimated average TOBINQ1 for a subset of companies whose managerial team members do not have MBA degrees (MBA=0) and companies where some or all managerial team members have MBA degrees (MBA>0). The annual averages are computed for 30 years, between 1980 and 2009.

FIGURE 2
Time line of average Tobin's Q1 for companies that have (do not have) members of their managerial teams graduating from top 20 business schools in Financial Times world ranking of business schools.



This figure shows the estimated average TOBINQ1 for a subset of companies whose managerial team members do not have graduates from top schools in FT100 business school ranking (SCHOOL=0) and companies where some or all managerial team members have degrees from top schools in the world (SCHOOL>0). The annual averages are computed for 30 years, between 1980 and 2009.

FIGURE 3
Time line of average Tobin's Q1 for companies that have (do not have) members of managerial teams serving on outside boards.



This figure shows the estimated average TOBINQ1 for a subset of companies whose executives do not serve as board members (BOARD=0) and companies where some or all executives do serve as board members (BOARD>0). The annual averages are computed for 30 years, between 1980 and 2009.

HYPOTHESES AND METHODOLOGY

The quality of managers can affect financial performance and subsequent market valuation of companies in a variety of ways. Higher quality managers can select better projects, and implement them more effectively. Next, higher quality managers can find a more appropriate combination of debt and equity in the firm's capital structure and thus lower company cost of capital. Finally, higher quality managers can convey (i.e. 'certify") the intrinsic value of the firm to the capital markets. See for example Allen and Faulhaber (1989), Chemmanur (1993), Welch (1989), and Chemmanur and Paeglis (2005) for the discussion of this certification effect on IPO performance. Because of all the reasons outlined above, we expect that higher quality managers improve market valuation of their firms.

We hypothesize that firms produce output in the framework of new growth theory of Romer (1986) and firm production function F has a general form:

$$Y_t = F(A_M M, L, K) \quad (1)$$

where

K is capital,
L is number of workers and technical personnel,
M is firm management team size, and
A_M denotes augmenting factors such as qualification and experience of firm managers.

In equation (1) we have $\partial F/\partial A_M>0$, $\partial F/\partial M>0$, $\partial F/\partial L>0$, and $\partial F/\partial K>0$. Therefore, we expect that companies with more qualified managers, firms with more employees, and more capital intensive firms will produce more output and will have greater market valuation.

Univariate Analysis

To examine the relationship between managerial qualifications and firm valuation we separate all companies in our sample into two groups: firms that have managerial teams with advanced qualifications

and firms that do not have such qualifications. To analyze the relationship in univariate settings, we use seemingly unrelated regressions (SUR) method to estimate the system of equations specified as follows:

$$\begin{cases} Q_{t,X=0} = c(1) + e_{t,1} \\ Q_{t,X=1} = c(2) + e_{t,2} \end{cases} \quad (2)$$

where $Q_{t,X=0}$ is average Tobin's Q for a subset of firms where X=0 or 1. X is the qualification variable, X=MBA, SCHOOL, or BOARD, c(1) and c(2) are constants, t denotes time, and $e_{t,1}$, $e_{t,2}$ are regression residuals. Next, if qualifications do not matter, there will be no difference across subgroups and therefore the null hypothesis is that c(1)=c(2). Alternatively, if qualifications are related to firm valuation and better qualifications result in higher firm valuation, then we will have $c(1) < c(2)$.

Multivariate Analysis

To further analyze the relationship between managerial qualifications and firm valuation, we estimate the following equation using panel least squares method with fixed period effects and White's correction for heteroskedasticity:

$$\begin{aligned} Q_{i,t} = {} & \beta_1 + \beta_2 TEAMSIZE_i + \beta_3 MBA_i + \beta_4 SCHOOL_i + \beta_5 BOARD_i + \\ & + \sum_{g=1}^{6} \gamma_g GCV_{g,i} + \sum_{s=1}^{3} \theta_s OCV_{s,i} + \delta_1 \ln(TA) + \delta_2 \ln(EMPL) + \\ & + \sum_{j=1}^{9} \mu_j Industry_{j,i} + \epsilon_{i,t} \end{aligned} \quad (3)$$

where $Q_{i,t}$ denotes Tobin's Q for company i in year t, $\beta, \gamma, \theta, \delta, \mu$ are regression coefficients, $GCV_{g,i}$ are governance control variables of CLASSIFIED, OUTSIDE MAJORITY, ACTIVECEOS, OUTSIDEDIRECTORS, DIRECTORS 15YR, and DIRZEROSHARES. Next, $OCV_{s,i}$ are ownership control variables INSIDERSCONTROL, INSTITUTIONALMAJORITY, and FAMILYFIRM. TA stands for Total Assets, and EMPL denotes employees. Finally, $Industry_{j,i}$ is a dummy variable which takes value of 1 if firm i belongs to industry j and zero otherwise, and $\epsilon_{i,t}$ is regression residual. In our sample i=1, 2, … , 498 and t=1989, 1990, …, 2009.

Next, literature suggests that managerial age may be a significant factor, even though evidence is mixed. We include variable AGE in our analysis and estimate the following equation:

$$\begin{aligned} Q_{i,t} = {} & \beta_1 + \beta_2 TEAMSIZE_i + \beta_3 MBA_i + \beta_4 SCHOOL_i + \beta_5 BOARD_i + \beta_6 AGE_i + \\ & + \sum_{g=1}^{6} \gamma_g GCV_{g,i} + \sum_{s=1}^{3} \theta_s OCV_{s,i} + \delta_1 \ln(TA) + \delta_2 \ln(EMPL) + \\ & + \sum_{j=1}^{9} \mu_j Industry_{j,i} + \epsilon_{i,t} \end{aligned} \quad (4)$$

Gottesman and Morey (2010) found no significant effect of age on firm performance for their full sample. We hypothesize that this result is due to nonlinearity of the age effect, and estimate a model where we allow for nonlinearity:

$$\begin{aligned} Q_{i,t} = {} & \beta_1 + \beta_2 TEAMSIZE_i + \beta_3 MBA_i + \beta_4 SCHOOL_i + \beta_5 BOARD_i + \beta_6 AGE_i + \beta_7 AGE_i^2 + \\ & + \sum_{g=1}^{6} \gamma_g GCV_{g,i} + \sum_{s=1}^{3} \theta_s OCV_{s,i} + \delta_1 \ln(TA) + \delta_2 \ln(EMPL) + \\ & + \sum_{j=1}^{9} \mu_j Industry_{j,i} + \epsilon_{i,t} \end{aligned} \quad (5)$$

EMPIRICAL RESULTS

Figure 1 shows average Tobin's Q for two subgroups. In the first group no managerial team members have MBA degree and the second group where at least one team member has MBA degree. We can see that for most years in our sample average firm valuation is higher for companies whose managerial team

members hold MBA degrees. Similarly, Figure 2 shows that in most years firms, whose corporate officers graduated from top schools, display higher average market valuation. A similar picture appears on Figure 3 for BOARD variable, except the effect is not as pronounced as for the former two variables. Thus, a casual look shows that there appears to be correspondence between manager qualification and firm value.

To formally analyze the relationship between qualification and firm value, we estimate system (2) for each of our qualification variables. The estimation and test results are presented in TABLE 6. In the regression on the mean as specified in system (2), the coefficients c(1) and c(2) will provide estimates for sample Tobin Q averages across firms that have (do not have) their team members with certain qualifications. Thus, the average Tobin's Q1 for firms with no corporate officers holding MBA degree is 1.9275 and statistically significant at 1% level, the same variable for firms with at least one or more MBA on the team is 2.1551 and significant at 1% level. The null hypothesis c(1)=c(2) is rejected at 1% level with Wald test statistic of 8.9787. Thus, we have statistically significant evidence that average firm valuations are higher for companies whose corporate officers hold MBA degrees.

Similarly, the null hypotheses of mean equality are rejected at 1% level for variables SCHOOL and BOARD. Therefore, we find evidence based on univariate tests that managerial qualification is positively related to firm valuation.

Next, we conduct multivariate analysis and estimate equation (3). The estimation results are presented in TABLE 7. We can see that all qualification coefficients are positive. The coefficient for TEAMSIZE is 0.0155 and significant at 1% level, the coefficient for MBA is 0.2695, the coefficient for SCHOOL is 0.5560 and significant at 1% level, and the coefficient for BOARD is 0.0589. This evidence provides support for our hypothesis that managerial qualifications are positively and significantly related to firm value after other factors have been controlled.

In TABLE 7 regression (1) which presents estimation results for Equation (3), two estimated qualification coefficients for MBA and BOARD are statistically insignificant. However, Table 1 shows that correlations among our qualification variables are relatively high. For example, the correlation between MBA and SCHOOL is estimated 0.5321, and the correlation between BOARD and SCHOOL is 0.5781. Thus, we suspect that our dataset suffers from a significant multicollinearity problem.

We estimate regressions with each individual qualification variable, TEAMSIZE, MBA, SCHOOL, or BOARD to find out how each individual qualification variable explains Tobin's Q, and present the results in TABLE 7s regressions (2) through (5). We can see that when each qualification variable is included individually, the estimated coefficient for that variable is positive and statistically significant. For example, the estimated coefficient for MBA variable in regression (3) is 0.6209 and highly significant. This provides additional support for our hypothesis that managerial qualifications and firm valuation are positively related.

The relationship between manager's age and firm performance is the subject of research at present. Herrmann and Datta (2005) and Tihanyi et al (2000) find that age does matter in decision making choices for executives. However, Gottesman and Morey (2010) find no significant relationship between age and performance for their full sample, but they do find statistical significance for those executives who hold MBA or law degrees. We argue that the lack of significance for the full sample in Gottesman and Morey (2010) is due to nonlinearity of the effect and our findings presented in TABLE 8 support this view. When we estimate equation (4) and the relationship between manager age and firm performance is assumed to be linear, the estimated coefficient is -0.0102 (-0.0069) and insignificant when the dependent variable is Tobin's Q2 (Tobin's Q2), as presented in columns 1 and 3 of TABLE 8. However, when we estimate equation (5) and performance is a nonlinear function of age, the coefficients for AGE squared and AGE are highly significant. For example, the coefficient for AGE squared is 0.0091 and the coefficient for AGE is -0.9831 and significant at 1% level. This indicates a U-shaped relationship between manager age and firm performance. Similar results pointing at nonlinearity were found by Mayr (2011).

We conducted a series of robustness tests. The results are presented in Appendix A. First, we estimate equation (3) for the second formulation and present the results in TABLE A.1. The results are consistent

with our earlier findings. Next, to test whether or not our results change if we include average age of managerial team members, we include this variable in the regression. Estimation results remain similar.

TABLE 6
RESULTS OF UNIVARIATE ANALYSIS FOR TOBIN'S Q. ESTIMATED SUR COEFFICIENTS AND WALD TEST OF MEAN EQUALITY BETWEEN SERIES.

This table reports the results of time series regressions for the system of equations (2) estimated jointly using SUR methodology. The dependent variable in the first regression is Tobin's Q for a subset of firms where the qualification variables equals to zero, i.e. MBA=0, SCHOOL=0, or BOARD=0. The dependent variable in the second regression is Tobin's Q for a subset of firms where the corresponding qualification variable is greater than zero, i.e. MBA>0, SCHOOL>0, or BOARD>0. In both regressions the only independent variable is the intercept, c(1) in the first equation and c(2) in the second equation. We present coefficient estimates, corresponding t-statistics, and Chi-square statistics for the Wald test with the null hypothesis that c(1)=c(2).

	Tobin's Q1			Tobin's Q2		
	MBA	SCHOOL	BOARD	MBA	SCHOOL	BOARD
C(1)	1.9275***	1.9348***	1.9099***	1.5778***	1.5887***	1.5512***
	(28.9334)	(27.4567)	(31.2220)	(23.9716)	(22.7862)	(25.7992)
C(2)	2.1551***	2.1062***	2.0829***	1.7936***	1.7451***	1.7280***
	(16.4569)	(18.1184)	(18.6657)	(13.7671)	(15.1101)	(15.5665)
Wald C(1)=C(2)	8.9787***	7.5127***	5.4698***	8.1312***	6.3849**	5.6960**

Note: *** indicates 1% significance, ** indicates 5% significance, * indicates 10% significance. t-values in parentheses.

TABLE 7
ESTIMATION RESULTS FOR TOBIN'S Q1

This table presents estimation results for equation (3). The dependent variable is Tobin's Q1. The independent variables include an intercept, qualification variables (*TEAMSIZE, MBA, SCHOOL*, and *BOARD*), and control variables. Governance control variables include *CLASSIFIED, OUTSIDE MAJORITY, ACTIVECEOS, OUTSIDEDIRECTORS, DIRECTORS 15YR*, and *DIRZEROSHARES*. Ownership control variables include *INSIDERSCONTROL*, *INSTITUTIONALMAJORITY*, and *FAMILYFIRM*. In addition, we control for firm size by using the natural log of Total Assets and natural log of the number of employees. Finally, we control for industry sector effects by using industry dummy variables that take value of 1 if the firm belongs to a given industry sector and zero otherwise. The estimation is performed using panel least squares method with fixed year effects and White's correction for heteroskedasticity. The first column presents estimation results where all qualification parameters *SIZE, MBA, SCHOOL*, and *BOARD* are used as independent variables. The second column presents estimation results with only *SIZE* as an explanatory variable related to qualifications. The third column presents estimation results with *MBA* as the only explanatory qualifications variable. Column four presents the results for *SCHOOL* only, and column five presents estimation results with only *BOARD* as an explanatory variable related to qualifications. Our sample contains 30 annual observations between 1980 and 2009 for 498 firms.

Variable	1	2	3	4	5
TEAMSIZE	0.0155***	0.0180***			
	(4.4101)	(5.1136)			
MBA	0.2695		0.6209***		
	(1.5915)		(4.0288)		
SCHOOL	0.5560***			0.8166***	
	(3.2832)			(5.4692)	
BOARD	0.0589				0.3643***
	(0.5542)				(4.4807)
BDCLASSIFIED	-0.2869***	-0.2585***	-0.2740***	-0.2705***	-0.2727***
	(-5.7573)	(-5.2320)	(-5.4961)	(-5.4293)	(-5.3983)
BDOUTSIDEMAJ	0.2758**	0.2811**	0.2883**	0.2902**	0.2785**
	(2.2064)	(2.2268)	(2.2953)	(2.3139)	(2.2267)
DIRECTORSACTIVECEOS	-0.3839**	-0.4467**	-0.3401*	-0.3868**	-0.4121**
	(-2.1387)	(-2.4671)	(-1.8810)	(-2.1365)	(-2.2866)
DIRECTORSOUTSIDE	-1.0961***	-1.0018***	-1.1258***	-1.1221***	-1.0028***
	(-4.7947)	(-4.4176)	(-4.8258)	(-4.9212)	(-4.4342)
DIRECTORSOVER15YRSTEN	0.5236***	0.4506**	0.5125***	0.5742***	0.5417***
	(2.9483)	(2.4625)	(2.8561)	(3.2852)	(3.0446)
DIRECTORSZEROSHARES	0.2580	0.2349	0.2138	0.2183	0.2420
	(1.4499)	(1.3235)	(1.2026)	(1.2329)	(1.3463)
INSIDERSCONTROL	2.9513*	3.1179*	3.0853**	2.9387**	3.0965**
	(1.9559)	(2.0135)	(2.0206)	(1.9664)	(1.9723)
INSTITUTIONALMAJORITY	-0.9435***	-0.9097***	-0.8786***	-0.9196***	-0.8780***
	(-6.6075)	(-6.2693)	(-6.1751)	(-6.4931)	(-6.1444)
FAMILYFIRM	-4.0603***	-4.3498***	-4.2339***	-4.1300***	-4.3470***
	(-2.6736)	(-2.7903)	(-2.7563)	(-2.7448)	(-2.7508)
LOG(TOTAL ASSETS)	-0.3939***	-0.3573***	-0.3594***	-0.3891***	-0.3709***
	(-10.1896)	(-9.6762)	(-9.5207)	(-9.8201)	(-9.7568)
LOG(EMPLOYEES)	0.0730**	0.0511	0.0663*	0.0841**	0.0599*
	(2.0000)	(1.4279)	(1.8174)	(2.3070)	(1.6676)
Fixed year effects	YES	YES	YES	YES	YES
Industry dummies	YES	YES	YES	YES	YES
Intercept	7.9433***	7.5874***	7.6931***	7.9620***	7.8415***
	(17.4660)	(17.2247)	(17.0841)	(17.0321)	(17.2065)
Adjusted R-squared	0.2910	0.2851	0.2848	0.2883	0.2839
F-statistic	29.4973***	30.3493***	30.3151***	30.8148***	30.1737***

Note: *** indicates 1% significance, ** indicates 5% significance, * indicates 10% significance. t-values in parentheses.

TABLE 8
ESTIMATION RESULTS FOR TOBIN'S Q1 and TOBIN'S Q2

This table presents estimation results for equations (4) and (5). The dependent variable is Tobin's Q1. The independent variables include an intercept, qualification variables (*TEAMSIZE, MBA, SCHOOL*, *BOARD,* and *AGE* or AGE^2), and control variables. Governance control variables include *CLASSIFIED, OUTSIDE MAJORITY, ACTIVECEOS, OUTSIDEDIRECTORS, DIRECTORS 15YR*, and *DIRZEROSHARES*. Ownership control variables include *INSIDERSCONTROL*, *INSTITUTIONALMAJORITY*, and *FAMILYFIRM*. In addition, we control for firm size by using the natural log of Total Assets and natural log of the number of employees. Finally, we control for industry sector effects by using industry dummy variables that take value of 1 if the firm belongs to a given industry sector and zero otherwise. The estimation is performed using panel least squares method with fixed year effects and White's correction for heteroskedasticity. The first column presents estimation results for equation (4) where all qualification parameters *AGE*, *SIZE, MBA, SCHOOL*, and *BOARD* are used as independent variables and the dependent variable is Tobin's Q1. The second column presents estimation results for equation (5) with AGE and AGE squared as explanatory variables related to qualifications, and the dependent variable is Tobin's Q1. The third column presents estimation results for equation (4) and the dependent variable Tobin's Q2. The fourth column presents results for equation (5) and the dependent variable Tobin's Q2. Our sample contains 30 annual observations between 1980 and 2009 for 412 firms.

Variable	1	2	3	4
AGE squared		0.0091***		0.0098***
		(3.3854)		(3.7098)
AGE	-0.0102	-0.9831***	-0.0069	-1.0567***
	(-1.0088)	(-3.4032)	(-0.6888)	(-3.7143)
TEAMSIZE	0.0113***	0.0134***	0.0126***	0.0149***
	(2.6860)	(3.1991)	(2.9816)	(3.5328)
MBA/TEAMSIZE	1.1723***	1.1240***	1.1665***	1.1144***
	(4.1077)	(3.9435)	(4.0918)	(3.9174)
SCHOOL/TEAMSIZE	0.5595***	0.5275***	0.5156**	0.4811**
	(2.7235)	(2.6178)	(2.4830)	(2.3642)
BOARD/TEAMSIZE	-0.1064	-0.0671	-0.1648	-0.1225
	(-0.8185)	(-0.5291)	(-1.2545)	(-0.9591)
BDCLASSIFIED	-0.3702***	-0.3699***	-0.3866***	-0.3861***
	(-6.5395)	(-6.5538)	(-6.7893)	(-6.8041)
BDOUTSIDEMAJ	0.1288	0.1757	0.0711	0.1219
	(0.9441)	(1.2762)	(0.5271)	(0.8944)
DIRECTORSACTIVECEOS	-0.5478***	-0.5394***	-0.6104***	-0.6012***
	(-2.6833)	(-2.6559)	(-2.9942)	(-2.9651)
DIRECTORSOUTSIDE	-0.4717*	-0.4693*	-0.6404**	-0.6380**
	(-1.8612)	(-1.8661)	(-2.5028)	(-2.5140)
DIRECTORSOVER15YRSTEN	0.5846***	0.6068***	0.5335***	0.5573***
	(3.0680)	(3.2138)	(2.8527)	(3.0071)
DIRECTORSZEROSHARES	0.0547	0.0101	0.0274	-0.0208
	(0.2374)	(0.0431)	(0.1163)	(-0.0868)

Variable	1	2	3	4
INSIDERSCONTROL	2.8198*	2.6381*	2.8429*	2.6470*
	(1.9449)	(1.8935)	(1.9358)	(1.8811)
INSTITUTIONALMAJORITY	-0.9349***	-0.9315***	-0.8574***	-0.8537***
	(-5.8289)	(-5.8909)	(-5.2968)	(-5.3653)
FAMILYFIRM	-3.8750***	-3.6082**	-3.9219***	-3.6341**
	(-2.6505)	(-2.5699)	(-2.6440)	(-2.5577)
LOG(TOTAL ASSETS)	-0.4704***	-0.4697***	-0.4833***	-0.4826***
	(-10.1640)	(-10.1966)	(-10.4688)	(-10.5027)
LOG(EMPLOYEES)	0.0961**	0.1025**	0.0682	0.0751*
	(2.2376)	(2.3917)	(1.5805)	(1.7444)
Fixed year effects	YES	YES	YES	YES
Industry dummies	YES	YES	YES	YES
Intercept	9.6108***	35.3838***	9.8320***	37.6402***
	(11.5432)	(4.5489)	(11.9287)	(4.9151)
Adjusted R-squared	0.2898	0.2932	0.3226	0.3263
F-statistic	22.6049***	22.5523***	26.2051***	26.1635***

Note: *** indicates 1% significance, ** indicates 5% significance, * indicates 10% significance. t-values in parentheses.

Next, we dropped financial firms (industry code 8000) from the sample, re-estimated the regressions, and obtained consistent with our initial findings. Thus, we find that our results are robust and conclude that the data in our sample support the hypothesis of positive and statistically significant relationship between firm value and managerial qualifications.

CONCLUSION

Education level, a degree or diploma from a prestigious university differentiates some executives from others. Do these qualified executives create more wealth or value for their companies? This paper attempts to respond to these questions.

This study examines the relationship between qualifications of top management and firm market valuation. We study how education and work experience of company executives affect Tobin's Q values for companies.

We find that size of the managerial team, MBA degree, reputation of the business school from which an executive graduated, and membership on an outside board are significant factors that help explain firm performance. All of the previously mentioned factors about top management team of companies increase Tobin's Q value, and therefore firm value indicating highly qualified managers increase their firm value.

We recommend companies to hire highly qualified managers for their top executive manager levels.

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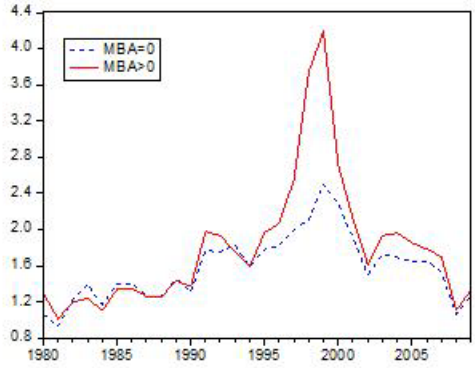
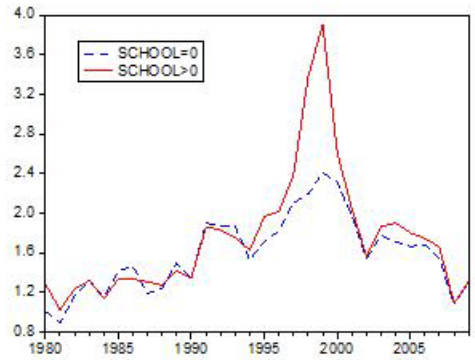
APPENDIX A

FIGURE A.1
Time line of average Tobin's Q2 for companies that have (do not have) MBAs in their managerial teams.



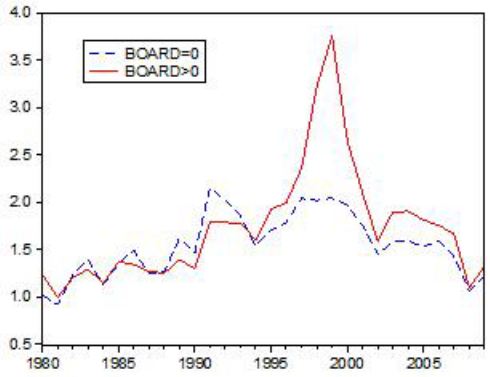
This figure shows the estimated average TOBINQ2 for a subset of companies whose managerial team members do not have MBA degrees (MBA=0) and companies where some or all managerial team members have MBA degrees (MBA>0). The annual averages are computed for 30 years, between 1980 and 2009.

FIGURE A.2
Time line of average Tobin's Q2 for companies that have (do not have) members of their managerial teams graduating from top 20 business schools in Financial Times world ranking of business schools.



This figure shows the estimated average TOBINQ2 for a subset of companies whose managerial team members do not have graduates from top schools in FT100 business school ranking (SCHOOL=0) and companies where some or all managerial team members have degrees from top schools in the world (SCHOOL>0). The annual averages are computed for 30 years, between 1980 and 2009.

FIGURE A.3
Time line of average Tobin's Q2 for companies that have (do not have) members of managerial teams serving on outside boards.



This figure shows the estimated average TOBINQ2 for a subset of companies whose executives do not serve as board members (BOARD=0) and companies where some or all executives do serve as board members (BOARD>0). The annual averages are computed for 30 years, between 1980 and 2009.

TABLE A.1
ESTIMATION RESULTS FOR TOBIN'S Q2

This table presents estimation results for equation (3). The dependent variable is Tobin's Q2. The independent variables include an intercept, qualification variables (*TEAMSIZE, MBA, SCHOOL*, and *BOARD*), and control variables. Governance control variables include *CLASSIFIED, OUTSIDE MAJORITY, ACTIVECEOS, OUTSIDEDIRECTORS, DIRECTORS 15YR*, and *DIRZEROSHARES*. Ownership control variables include *INSIDERSCONTROL*, *INSTITUTIONALMAJORITY*, and *FAMILYFIRM*. In addition, we control for firm size by using the natural log of Total Assets and natural log of the number of employees. Finally, we control for industry sector effects by using industry dummy variables that take value of 1 if the firm belongs to a given industry sector and zero otherwise. The estimation is performed using panel least squares method with fixed year effects and White's correction for heteroskedasticity. The first column presents estimation results where all qualification parameters *SIZE, MBA, SCHOOL*, and *BOARD* are used as independent variables. The second column presents estimation results with only *SIZE* as an explanatory variable related to qualifications. The third column presents estimation results with *MBA* as the only explanatory qualifications variable. Column four presents the results for *SCHOOL* only, and column five presents estimation results with only *BOARD* as an explanatory variable related to qualifications. Our sample contains 30 annual observations between 1980 and 2009 for 498 firms.

Variable	1	2	3	4	5
TEAMSIZE	0.0156***	0.0183***			
	(4.4065)	(5.1629)			
MBA/TEAMSIZE	0.3239**		0.6539***		
	(1.9099)		(4.2536)		
SCHOOL/TEAMSIZE	0.6154***			0.8419***	
	(3.6283)			(5.6753)	

Variable	1	2	3	4	5
BOARD/TEAMSIZE	-0.0251				0.3194***
	(-0.2368)				(3.9179)
BDCLASSIFIED	-0.3088***	-0.2822***	-0.2989***	-0.2948***	-0.2933***
	(-6.1576)	(-5.6776)	(-5.9662)	(-5.8806)	(-5.7734)
BDOUTSIDEMAJ	0.2303*	0.2328*	0.2398*	0.2418*	0.2321*
	(1.8500)	(1.8525)	(1.9199)	(1.9402)	(1.8663)
DIRECTORSACTIVECEOS	-0.4492**	-0.5198***	-0.4086**	-0.4585**	-0.4858***
	(-2.5101)	(-2.8766)	(-2.2675)	(-2.5426)	(-2.7002)
DIRECTORSOUTSIDE	-1.2266***	-1.1102***	-1.2392***	-1.2334***	-1.1159***
	(-5.3760)	(-4.9109)	(-5.3328)	(-5.4318)	(-4.9556)
DIRECTORSOVER15YRSTEN	0.5073***	0.4370**	0.5005***	0.5638***	0.5234***
	(2.8886)	(2.4124)	(2.8177)	(3.2594)	(2.9698)
DIRECTORSZEROSHARES	0.2281	0.2127	0.1919	0.1962	0.2138
	(1.2418)	(1.1557)	(1.0438)	(1.0737)	(1.1502)
INSIDERSCONTROL	2.9380*	3.1138**	3.0785**	2.9286*	3.0983*
	(1.9339)	(1.9833)	(1.9898)	(1.9344)	(1.9503)
INSTITUTIONALMAJORITY	-0.8966***	-0.8607***	-0.8295***	-0.8716***	-0.8274***
	(-6.2438)	(-5.9045)	(-5.7781)	(-6.0979)	(-5.7378)
FAMILYFIRM	-4.0728***	-4.3816***	-4.2565***	-4.1537***	-4.3900***
	(-2.6588)	(-2.7675)	(-2.7301)	(-2.7204)	(-2.7410)
LOG(TOTAL ASSETS)	-0.3884***	-0.3533***	-0.3559***	-0.3862***	-0.3638***
	(-10.0595)	(-9.5187)	(-9.4019)	(-9.7616)	(-9.5209)
LOG(EMPLOYEES)	0.0406	0.0166	0.0322	0.0503	0.0252
	(1.1048)	(0.4575)	(0.8737)	(1.3700)	(0.6943)
Fixed year effects	YES	YES	YES	YES	YES
Industry dummies	YES	YES	YES	YES	YES
Intercept	8.0505***	7.7177***	7.8295***	8.1040***	7.9387***
	(17.7033)	(17.4546)	(17.3717)	(17.3764)	(17.3610)
Adjusted R-squared	0.3238	0.3178	0.3178	0.3211	0.3159
F-statistic	34.2372***	35.2731***	35.2822***	35.8064***	34.9760***

Note: *** indicates 1% significance, ** indicates 5% significance, * indicates 10% significance. t-values in parentheses.