

CEO Educational Background and Firm Financial Performance

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This paper represents the first attempt to empirically examine the relationship between Chief Executive Officer (CEO) educational background and firm financial performance. Using a relatively broad sample of 390 US firms, we find no significant evidence that the type or selectivity of the education of the CEO is related to firm financial performance.

“I don’t care where someone went to school, and that never caused me to hire anyone or buy a business.”¹

■ Do better educated Chief Executive Officers (CEOs) produce better firm financial performance? According to Warren Buffet, one of the world’s most famous and successful investors, the answer is clearly no. Yet, what does the empirical evidence indicate? Surprisingly, there is no previous empirical evidence to support or counter Mr. Buffet’s claim. This paper begins to fill this void by examining the empirical relationship between CEO educational background and firm financial performance.

We think this is an interesting question for two reasons. First, shareholders and prospective investors are in constant

search of capable managers who will increase firm value. One of the few CEO characteristics that is publicly available is the CEO’s educational background. This background could be important to shareholders as it may provide insight into the thinking processes of the CEO and hence, how he/she might perform on the job. For example, a CEO with a law degree may be more concerned about litigation and may not take as many risks as without a law degree. Alternatively, a CEO who attended a more selective undergraduate school may have stronger cognitive abilities and/or stronger social ties than another CEO. In high-tech or medical fields, a technical education may allow the CEO to better manage the firm as he/she can communicate with technical experts.

Another reason why we feel this study is warranted is because it addresses the efficacy of higher education, in particular management education. Every year, universities (and particularly management schools) compete to attain high rankings from educational ranking services such as *U.S. News and World Report*. Schools spend a great deal of resources to attract star professors and stronger students, and to improve their curriculum in an effort to improve their rankings. However, do all of these efforts result in better CEOs? This is what this paper tries to answer.

To do this study, we examine all firms listed on the New York Stock Exchange (NYSE) with a CEO who has at least an undergraduate degree. Then, we examine if CEO educational background is related to Tobin’s Q, a widely used academic measure of firm financial performance. We use two methods for defining CEO educational background. First, we identify the *type* of degree held by the CEO. That is, we identify if the CEO holds a liberal arts undergraduate degree, a non-liberal arts undergraduate degree, an MBA,

¹ Warren Buffet, CEO of Berkshire Hathaway and graduate of University of Nebraska and Columbia University as stated by Hymowitz (2006), *Wall Street Journal*, September 16, 2006, p. B1.

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or a law degree. Second, we identify the *selectivity* of the CEO's undergraduate and graduate (for MBA and law) schools. To define selectivity we use an approach similar to Golec (1996), Chevalier and Ellison (1999), Palia (2000) and Gottesman and Morey (2006), in which we extract the mean SAT, GMAT, and LSAT scores of the undergraduate and graduate schools from which CEOs graduated.

The rest of this paper is organized as follows. Section I presents a brief literature review. Section II explains the hypotheses tested in this paper. Section III explains the data and Section IV describes the methodology used in the paper. Section V presents the results and we conclude with Section VI.

I. Brief Literature Review

Academic investigators have shown some interest in discerning how CEO education influences the firm. One branch of research examines the relationship between the type of education of the CEO and the behavior of the firm. For example, Tyler and Steensma (1998), Finkelstein and Hambrick (1996), and Barker and Mueller (2002) all find that the type of degree that the CEO holds has an impact on the firm's research and development funding. For example, CEOs who hold a degree in a technical field spend significantly more on research and development than do CEOs with educational backgrounds in business or law. Similarly, a recent *Wall Street Journal* article argues that CEOs with liberal arts undergraduate degrees may perform better than other CEOs because they possess an education that offers a "broader foundation to operate in an increasingly complicated, global, and fast moving business arena."² Finally, Graham and Harvey (2001, 2002) and Graham, Harvey, and Rajgopal (2005) find that CEOs and Chief Financial Officers (CFOs) holding MBAs were more likely than other executives to use techniques such as net present value (NPV) for capital budgeting and the capital asset pricing model in cost of capital calculations.

Another branch of research has investigated the relationship between the *selectivity* of the CEO's education and firm performance. Deary (2004) and Frey and Ditterman (2004) both report that entrance exam scores are strongly correlated with intelligent tests, and hence it may be that CEOs from schools with high mean entrance exam scores are more intelligent; hence, can better run the firm as they can process more information. Moreover, Belliveau, O'Reilly, and Wade

(1996) and Burt (1992) find that CEOs from more selective schools enjoy more ties to government officials, which can improve the performance of the firm. For example, a CEO with strong social linkages to politicians and policy makers can help the company receive government contracts or favorable tax treatment. Similarly, Perez-Gonzalez (2006) finds some evidence that firms with CEOs who lack an Ivy League undergraduate degree may have worse performance. Finally, Maxam, Petrov, and Spieler (2006) report outperformance by hedge fund managers with degrees from top US schools.³

Do better educated Chief Executive Officers (CEOs) produce better firm financial performance?

II. Development of the Hypotheses

In this section of the paper, we specify our hypotheses. We develop seven different hypotheses in which the null hypothesis is that the *type* of education of the CEO, or the educational *selectivity* of the CEO's education, is unrelated to firm financial performance. Throughout, we use two-tailed tests.

Hypothesis I: *The financial performance of the firm as measured by Tobin's Q is unrelated to educational background of the CEO (holding an MBA degree instead of a non-liberal arts undergraduate degree):* $H_0: \beta = 0$; $H_a: \beta \neq 0$.

$$\text{Test Equation: } Q_i = \alpha + \beta D_{ii} + \Omega_n X_n + \varepsilon_i \quad (1)$$

where, Q_i = Tobin's Q for the i th firm, $D_{ii} = 1$ if the CEO of the i th firm holds an MBA and 0 if the CEO holds a non-liberal arts undergraduate degree, and X_n = a vector of control variables, α = intercept, β = regression coefficient for dummy variable, and Ω_n = vector of regression coefficients associated with control variables. This specification uses the non-liberal arts undergraduate as the base or comparison for the dummy variable D_{ii} .

Hypothesis II: *The financial performance of the firm as measured by Tobin's Q is unrelated to educational background of the CEO (holding an MBA degree instead of a law degree).*

The regression equation and hypothesis statement are the same as equation 1 except $D_{ii} = 1$ if the CEO of the i th firm holds an MBA and 0 if the CEO holds a law degree. This

²White, E., "Future CEOs May Need to Have Broad Liberal-Arts Foundation," *Wall Street Journal*, April 12, 2005, B4.

³Another perspective on education selectivity is provided by Kamath and Meier (2006), who report that receiving a doctoral degree from a top school can increase the probability of receiving a titled professor position in finance.

specification uses the law degree as the base comparison.

Hypothesis III: *The financial performance of the firm as measured by Tobin's Q is unrelated to educational background of the CEO (holding an MBA degree instead of a liberal arts undergraduate degree).*

The regression equation and hypothesis statement are the same as equation 1 except $D_{ii}=1$ if the CEO of the i th firm holds an MBA and 0 if the CEO holds a liberal arts undergraduate degree. This specification uses the undergraduate liberal arts degree as the base comparison.

Hypothesis IV: *The financial performance of a firm as measured by Tobin's Q is unrelated to the educational background of the CEO (holding an undergraduate or graduate (MBA or law) degree from an Ivy League school).*

The regression equation and hypothesis statement are the same as Equation 1 except $D_{ii}=1$ if the CEO of the i th firm holds an undergraduate or graduate (MBA or law) degree from an Ivy League school and 0 otherwise. The comparison group is firms with non-Ivy League CEOs.

Hypothesis V: *The financial performance of the firm as measured by Tobin's Q is unrelated to the selectivity of the CEO's educational background (as indicated by the mean SAT score of the undergraduate university attended by the CEO): $H_0: \beta = 0$; $H_a: \beta \neq 0$.*

$$\text{Test Equation: } Q_i = \alpha + \beta P_{ii} + \Gamma_n Z_n + \varepsilon_i, \quad (2)$$

where, Q_i = Tobin's Q for the i th firm, P_{ii} = mean SAT score of the undergraduate university attended by the CEO, Z_n = a vector of control variables, α = intercept, β = regression coefficient for dummy variable, and Γ_n = vector of regression coefficients associated with control variables.

Hypothesis VI: *The financial performance of the firm as measured by Tobin's Q is unrelated to the selectivity of the CEO's educational background as indicated by the mean GMAT score of the graduate business school attended by the CEO.*

The regression equation and hypothesis statement are the same as equation (2) except P_{ii} = the mean GMAT of the graduate business school attended by the CEO. This test requires a sample in which every firm has a CEO that holds an MBA.

Hypothesis VII: *The financial performance of the firm as measured by Tobin's Q is unrelated to the selectivity of the CEO's educational background as indicated by the mean LSAT score of the law school attended by the CEO.*

The regression equation and hypothesis statement are the same as Equation 2 except P_{ii} = the mean LSAT of the graduate business school attended by the CEO. This test requires a sample in which every firm has a CEO who holds a law degree.

III. Data

A. CEO Selection Criteria and Firm Data

We extract CEOs from the EXECUCOMP database. We then select all CEOs with US undergraduate degrees who managed NYSE-listed firms as of January 1, 2000.⁴ For each of these CEOs, we then extract biographical information from the Register Executives publication provided by Standard and Poor's NetAdvantage database. This information includes the CEO's tenure, age, gender, and educational background. The educational background information provides the name of the educational institution where each CEO received their undergraduate and graduate degrees, and whether the graduate degree was an MBA, law, or other graduate degree.⁵ Unfortunately, information on the undergraduate field of study is unavailable.

For each of the CEOs we then identify several other education variables. First, we identify the mean composite SAT score (math and verbal combined) associated with each CEO's undergraduate school using December 2003 data from the schools. While the CEO may have graduated as many as 50 years earlier, we use the December 2003 mean

⁴We also require each firm to have three years of stock return data prior to January 1, 2000, i.e., 1997 through 1999, as we use an instrumental variables regression approach as a robustness check that requires in-sample data for the instruments. Specifically, we use the same variables as in the reported tests but also include out-of-sample annual average leverage and liquidity as endogenous variables. We then used lagged values of leverage and liquidity, specified as the 1997-1999 values of these measures, as instruments in the regression. The rationale for using this approach is that the CEO may be able to endogenously influence these variables, which then directly influence the firm performance. Since the results of the III regression produce very similar results to the reported results, the results of the III approach are not reported in the paper. They are available upon request.

⁵For CEOs, for which the graduate field of study was not easily identifiable, we performed a general internet search to identify each CEO's field of study, focusing primarily on business-oriented publications such as *Forbes.com*, biographical sketches provided by the CEO's firm, or information available through the alumni affairs departments of the CEO's alma mater.

SAT scores for his/her school. In this way, we implicitly assume that the selectivity of the school in December 2003 (as measured by SAT scores) is similar to that when the CEO graduated. While there are certainly examples of schools that have improved or receded in terms of selectivity, most schools that were considered selective years ago are still considered so today.⁶ Second, similar to the SAT extraction, for each CEO who completed an MBA, we identify the latest mean GMAT score of the graduate business school attended by the CEO. Likewise, for each CEO who completed a law degree, we identify the latest mean composite LSAT score of the law school attended by the CEO. We also identify whether the CEO's undergraduate school was a liberal arts college. The process through which we identify these educational variables can be found in Appendix A.

After selecting the CEOs and identifying their educational backgrounds, we gather two types of data over the period 1997-2003 from EXECUCOMP and COMPUSTAT databases. First, we collect annual total sales, Tobin's Q, leverage, and liquidity ratios of the firms managed by the CEOs.⁷ Second, we extract CEO-specific variables from the firm such as annual CEO compensation⁸, the percentage of

the firm's stock that is owned by the CEO, the CEO's age, and tenure as CEO.⁹

B. The Out-of-Sample Period

Our study is constructed using an out-of-sample approach. As stated in Section A., all of the CEOs are chosen as of January 1, 2000. We then evaluate the firms run by these CEOs over the out-of-sample period 2000-2003. Hence, our measure of firm financial performance, Tobin's Q, is constructed as the average annual value for the period 2000-2003. The same is true for firm sales, CEO compensation, and CEO ownership, and firm leverage and the firm liquidity ratio.

The reason we use the out-of-sample approach is that it allows us to measure performance over the relatively lengthy period of four years (2000-2003).¹⁰ If we were to instead gather all CEOs each year and examine their annual performance, we would be limiting our measure of performance to an unnecessarily small window of time that may not be long enough to accurately measure a CEO's impact on the firm.

C. Survivorship Issues

Since most of the CEOs in our sample retained their position for the entire out-of-sample period, and most firms survived the entire period, obtaining the data required to measure their out-of-sample performance is a simple

⁶The mean entrance exam test scores for both undergraduate and graduate institutions are from December 2003. One issue this creates is that the quality of some schools may have changed since the manager attended the school. To test for any possible changes in the relative quality of the schools we acquired the mean SAT test scores for all undergraduate schools as of 1983 and the mean GMAT scores for all graduate business schools from 1984 (roughly 20 years earlier than our study). We then use a Spearman-rho rank correlation test to examine whether the relative rankings, based on the mean entrance exam test scores of the schools in our sample, had significantly changed between the early 1980s and 2003. We find that the rankings of undergraduate institutions and graduate business school in the early 1980s are very similar to those in 2003. Specifically, we find a correlation coefficient of 86.15% between the 1983 and 2003 SAT rankings, and a correlation coefficient of 82.11% between the 1984 and 2003 GMAT rankings, significantly different from 0 at the 1% level. These results are very similar to the results reported by Dechev (1999), who finds that changes in *Business Week* and *U.S. News and World Report* graduate business school rankings are mostly transitory.

⁷Total sales is the net annual sales as reported by the company. Tobin's *q* is calculated for each firm using the Chung and Pruitt (1994) approximation. Leverage is calculated as the sum of total long-term debt and debt in current liabilities, divided by total assets. The liquidity ratio is calculated as cash and short-term investments divided by total assets.

⁸CEO compensation is defined as the total current compensation comprised of salary and bonus. We do not include the value of CEOs' options as part of compensation. As a robustness check, we re-estimated all our results using a CEO compensation measure that included the value of exercisable in-the-money options held by the CEO. We found the results using this compensation measure were very similar to the reported results. These results are available upon request.

⁹The percentage of a firm's stock that is owned by the CEO is the aggregate number of shares held by the named executive officer, excluding stock options, divided by the number of common shares outstanding as reported by the company. We take the average percentage over the period 2000-2003. Age and tenure are as of January 2000. The data used to calculate all of these measures are from EXECUCOMP.

¹⁰Note that our results are robust to different sample periods. For example, using our sample, we find similar results as those reported in the paper for the 2002-2003 post-internet bubble period.

Schools spend a great deal of resources to attract star professors and stronger students, and to improve their curriculum in an effort to improve their rankings. However, do all of these efforts result in better CEOs?

extraction from the databases. However, some CEOs either retired or resigned during the out-of-sample evaluation period, and some firms disappeared during this time. If we were to simply exclude these firms, it would create a survivorship bias, as we would only be including those CEOs and firms that survived throughout the entire out-of-sample period. To avoid this survivorship bias problem, we proceed in the following fashion. For CEO compensation, CEO ownership, Tobin's Q, firm sales, leverage, and the liquidity ratio, we use the average annual measure for the amount of time that the CEO is actually running the firm (these variables are defined in Section III). Hence, if a CEO ran the firm from January 2000 to December 2001, we use the 2000 and 2001 annual numbers to calculate the annual average. If a CEO drops out in the first half of a year, we only use the years previous to the drop out year to calculate the annual average.¹¹ Thus, if a CEO dropped out in June 2002, we use the annual average based on the 2000 and 2001 data. If instead the CEO managed the firm from January 2000 to July 2002, we use the 2000, 2001, and 2002 numbers to form the annual average.

IV. Methodology

Using the data described in Section III, we test Hypotheses I-VII. To test Hypothesis I, we use a sample that includes only firms with CEOs who do not hold undergraduate liberal arts degrees. We then estimate Equation (3) using ordinary least squares (OLS).

$$\begin{aligned} \text{Tobin's } Q_i = & \alpha + \beta_1 \text{MBADummy}_i + \beta_2 \text{Age}_i + \beta_3 \text{Tenure}_i + \beta_4 \log(\text{Ownership})_i \\ & + \beta_5 \log(\text{Compensation})_i + \beta_6 \log(\text{Sales})_i + \beta_7 \text{Leverage}_i \\ & + \beta_8 \text{Liquidity}_i + \varepsilon_i, \end{aligned} \quad (3)$$

where *Tobin's Q_i* is annual average Tobin's Q of firm *i* over the out-of-sample period; *MBADummy_i* is a dummy variable which equals 1 if the CEO of firm *i* has an MBA degree and 0 otherwise; *Age_i* is the age of the CEO of firm *i* (as of January 2000); *Tenure_i* is the tenure of the CEO of firm *i* (as of January 2000); *log(Ownership)_i* is the natural log of the average annual percentage of the firm *i*'s stock that is owned by the CEO over the out-of-sample period (2000-2003); *log(Compensation)_i* is the natural log of the average annual compensation of the CEO of firm *i* over the out-of-sample period (2000-2003); *log(Sales)_i* is the natural

log of the annual average sales of firm *i* over the out-of-sample period (2000-2003); *Leverage_i* is the annual average leverage (calculated as the sum of total long-term debt and debt in current liabilities, divided by total assets) of firm *i* over the out-of-sample period; and *Liquidity_i* is the annual average liquidity ratio (calculated as cash and short-term investments divided by total assets) of firm *i* over the out-of-sample period. We also use 2-digit SIC Industry Code dummies to control for industry effects (they are not reported in the tables due to lack of space).

The rationale for the control variables used in Equation 3 is as follows. We use CEO age and tenure variables to control for the presence of any age or tenure effects as older or more experienced managers may be better or worse managers, regardless of educational background. Ownership is used to control for the fact that some CEOs may have more control over the firm than others and as a result may have more influence over performance. Compensation is used to control for the possibility that more highly compensated CEOs perform differently than less well compensated CEOs. Sales are used to control for the size of the firm. Leverage and liquidity are used as controls, as these variables may also influence the firm's financial performance. Dummy variables based on the 2-digit SIC codes are used to control for any industry effects that may predominate. This is an important effect for which to control, as certain types of CEO education may have greater impact in different industries. For example an MBA may be valuable for managing a bank, but may be less valuable for managing a pharmaceutical company as specific non-MBA technical skills may be needed.

To examine Hypotheses II-III, we also estimate Equation 3 using OLS; however, for Hypothesis II, we use a sample that consists of firms with a CEO who holds either an MBA or law degree, while for Hypothesis III, we use a sample that consists of firms with a CEO who holds an undergraduate liberal arts degree.¹²

To examine Hypothesis IV, we estimate Equation 4 using OLS.

$$\begin{aligned} \text{Tobin's } Q_i = & \alpha + \beta_1 \text{IvyLeagueUndergradDummy}_i \\ & + \beta_2 \text{IvyLeagueGradDummy}_i + \beta_3 \text{Age}_i + \beta_4 \text{Tenure}_i \\ & + \beta_5 \log(\text{Ownership})_i + \beta_6 \log(\text{Compensation})_i \\ & + \beta_7 \log(\text{Sales})_i + \beta_8 \text{Leverage}_i + \beta_9 \text{Liquidity}_i + \varepsilon_i, \end{aligned} \quad (4)$$

where *IvyLeagueUndergradDummy_i* is a dummy that equals 1 if the CEO of firm *i* held an undergraduate degree from an Ivy League school and 0 otherwise; *IvyLeagueGradDummy_i* is a dummy that equals 1 if the CEO of firm *i* held a graduate

¹¹We eliminate six observations in which the firm disappeared in 2000, as no COMPUSTAT data are available for these observations for the entire period 2000-2003. Of the remaining observations, sixteen dropped out in 2001, four dropped out in 2002, and twenty-seven dropped out in 2003. Our results are robust to an alternative method in which the missing data are replaced with the average of all firms in our sample that share the same two-digit SIC industry code as the given firm.

¹²Note that we do not include industry dummies for our test of Hypothesis III as we had a relatively small sample.

degree (MBA or law) from an Ivy League school and 0 otherwise.¹³

For Hypothesis V, we estimate Equation 5 again using OLS.

$$\begin{aligned} \text{Tobin's } Q_i = & \alpha + \beta_1 \text{SAT}_i + \beta_2 \text{MBADummy}_i + \beta_3 \text{LawDummy}_i \\ & + \beta_4 \text{OtherGradDegreeDummy}_i + \beta_5 \text{Age}_i + \beta_6 \text{Tenure}_i \\ & + \beta_7 \log(\text{Ownership}_i) + \beta_8 \log(\text{Compensation}_i) + \beta_9 \log(\text{Sales}_i) \\ & + \beta_{10} \text{Leverage}_i + \beta_{11} \text{Liquidity}_i + \varepsilon_i, \end{aligned} \quad (5)$$

where SAT_i is the mean SAT score of the undergraduate intuition of the CEO of firm i ; GMAT_i is the mean GMAT score of the MBA school of the CEO of firm i ; LawDummy_i is a dummy variable that equals 1 if the CEO of firm i has a law degree and 0 otherwise; $\text{OtherGradDegreeDummy}_i$ is a dummy variable that equals 1 if the CEO of firm i had a graduate degree other than an MBA or law degree and 0 otherwise; and LSAT_i is the mean LSAT of the law school of the CEO of firm i . As in Equation 3 we also use 2-digit SIC Industry Code dummies to control for industry effects.

For hypotheses VI, we use Equation 6 and use a sample that only includes firms with CEOs who hold an MBA degree.

$$\begin{aligned} \text{Tobin's } Q_i = & \alpha + \beta_1 \text{GMAT}_i + \beta_2 \text{SAT}_i + \beta_3 \text{GMAT}_i \times \text{SAT}_i + \beta_4 \text{Age}_i \\ & + \beta_5 \text{Tenure}_i + \beta_6 \log(\text{Ownership}_i) + \beta_7 \log(\text{Compensation}_i) + \beta_8 \log(\text{Sales}_i) \\ & + \beta_9 \text{Leverage}_i + \beta_{10} \text{Liquidity}_i + \varepsilon_i, \end{aligned} \quad (6)$$

where $\text{GMAT}_i \times \text{SAT}_i$ measures the interaction between the mean GMAT and mean SAT scores. Finally, for Hypothesis VII, we also use Equation 6 except that we replace GMAT with LSAT and use a sample that only includes firms with CEOs who hold a law degree.¹⁴

V. Results

Summary statistics are presented in Table I. The table reports several noteworthy findings. The mean composite SAT score of undergraduate institutions of the CEOs is 1218.86 (out of a possible 1600). Moreover, 32.82% of firms have CEOs with MBA degrees, and the mean GMAT score of these MBA programs is 658.81 (out of a possible 800). Approximately 12.56% of firms have CEOs who hold law degrees, and the mean LSAT score of these law programs is 162.53 (out of a possible 180). Table I also reports that 11.79% of firms have

CEOs with graduate degrees other than an MBA or law, and 10% of the CEOs received their undergraduate degrees from liberal arts institutions.

Our tests of Hypotheses I-IV are presented in Tables II-V, respectively. The results show that CEO educational type is not a significant factor in terms of the firm having better or worse financial performance. Specifically, we find that firms with a CEO who holds an MBA do not have significantly different performance than firms with a CEO who holds a non-liberal arts undergraduate degree (Table II), a law degree (Table III), or an liberal arts undergraduate degree (Table IV). In Table V, we show that firms with a CEO who holds an undergraduate or graduate degree from the Ivy League also do not perform differently than other firms. We consistently find that age is a positive factor in terms of firm performance and also find that leverage and liquidity are significantly related to performance but these variables are not specifically related to CEO educational background.

Our tests of hypotheses V-VII find that the selectivity of the CEO's education is also not significant in terms of the firm having better or worse financial performance. Our test of Hypothesis V is presented in Table VI. The results in Table VI show that the coefficient on the SAT variable is statistically equivalent to zero, indicating no evidence that firms with CEOs from more selective undergraduate institutions perform any better than firms led by CEOs with educations from less selective undergraduate schools. Tests of Hypotheses VI and VII also show that the coefficients on the GMAT and LSAT variables are both statistically insignificant, indicating no relationship between the selectivity of the CEO's MBA and law schools and firm financial performance. As with Tables II-V, CEO age is consistently found to be positively and significantly related to firm performance.¹⁵ Hence, based on these results, boards of directors and investors should consider older managers rather than younger when considering who should be hired as CEO.

VI. Conclusion

In this paper, we provide empirical evidence on the relationship between CEO educational background and firm financial performance. We measure CEO educational background by examining both the type of education attained by the CEO and the selectivity of the schools from which CEOs graduated. Our results indicate that the educational background of the CEO is not related to financial performance. Specifically, we find that firms managed by

¹³The Ivy League schools are Brown, Columbia, Cornell, Dartmouth, Harvard, Princeton, University of Pennsylvania, and Yale.

¹⁴Note that we do not include industry dummies in our test of Hypothesis VII as we had a relatively small sample.

¹⁵The results of the tests of Hypotheses VI and VII are available from the authors upon request.

Table I. Summary Statistics

SAT is the mean composite SAT score of the CEO's undergraduate school. GMAT is the mean GMAT score of the CEO's MBA graduate school. LSAT is the mean LSAT score of the CEO's law school. Age is the CEO's age as of January 2000. Tenure is the tenure of the CEO at the firm as of January 2000. Ownership is the average annual percentage of the firm's stocks that the CEO holds over the period 2000-2003. Compensation is the average annual total compensation of the CEO over the period 2000-2003. Tobin's Q is the average annual Tobin's Q of the firm over the period 2000-2003. Sales is the average annual sales (in millions of dollars) of the CEO's firm over the period 2000-2003. Leverage is the annual average leverage (calculated as the sum of total long-term debt and debt in current liabilities, divided by total assets) of firm *i* over the 2000-2003 period. Liquidity is the annual average liquidity ratio (calculated as cash and short-term investments divided by total assets) of firm *i* over 2000-2003 period.

CEO Educational Dummy Variables

<i>% of the sample of CEOs that:</i>	<i>%</i>
Hold an MBA degree	32.82
Hold a law degree	12.56
Hold a liberal arts undergraduate degree	10.00
Hold a graduate degree other than MBA or law	11.79
Hold an undergraduate degree from an Ivy League university	12.56
Hold a graduate degree (MBA or law) from an Ivy League university	17.95

CEO Educational Selectivity Variables:

	Number	Mean	STD
SAT	390	1,218.86	147.20
GMAT	128	658.81	66.99
LSAT	49	162.53	6.17

Other CEO Characteristics:

Age	390	57.751	7.20
Tenure	390	6.313	6.41
Ownership	390	0.021	0.05
Compensation	390	1,497,622.00	1,266,940.00

Firm Performance:

Tobin's Q	390	1.42	1.02
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Other Firm Characteristics:

Sales (in millions)	390	6,134.22	13,675.34
Leverage	390	0.27	0.15
Liquidity	390	0.09	0.12

Table II. The Relation Between Firm Performance and Whether the CEO holds an MBA

Table III. The Relation Between Firm Performance and the Whether the CEO holds an MBA

Sample includes firms with CEOs holding non-liberal arts undergraduate degrees

Sample includes only CEOs holding an MBA or a law degree

This table presents the results of testing Hypothesis I.

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We present the results of estimating the following equation using OLS.

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$$Tobin's Q_i = \alpha + \beta_1 MBADummy_i + \beta_2 Age_i + \beta_3 Tenure + \beta_4 \log(Ownership)_i + \beta_5 \log(Compensation)_i + \beta_6 \log(Sales)_i + \beta_7 Leverage_i + \beta_8 Liquidity_i + \epsilon_i$$

$$Tobin's Q_i = \alpha + \beta_1 MBADummy_i + \beta_2 Age_i + \beta_3 Tenure + \beta_4 \log(Ownership)_i + \beta_5 \log(Compensation)_i + \beta_6 \log(Sales)_i + \beta_7 Leverage_i + \beta_8 Liquidity_i + \epsilon_i$$

This regression includes dummy variables for 2-digit SIC codes which are not reported.

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Dependent Variable is the Firm Financial Performance Measure (Tobin's Q)

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Independent Variables:	Coefficient Value
Intercept	0.0963
MBADummy	-0.1443
Age	0.0076
Tenure	0.0032
log(Ownership)	0.9862
log(Compensation)	0.0914
log(Sales)	-0.021
Leverage	-1.3658***
Liquidity	2.112***
Two Digit SIC Dummies	INCLUDED
# OBS.	351
Adj-R2	0.281

Independent Variables:	Coefficient Value
Intercept	-2.5037
MBADummy	-0.2318
Age	0.0392***
Tenure	0.0089
log(Ownership)	-4.234*
log(Compensation)	-0.0367
log(Sales)	0.1055
Leverage	-1.4184**
Liquidity	2.1034**
Two Digit SIC Dummies	INCLUDED
#OBS	177
Adj-R2	0.278

***Significant at the 0.01 level.
 **Significant at the 0.05 level.
 *Significant at the 0.10 level.

***Significant at the 0.01 level.
 **Significant at the 0.05 level.
 *Significant at the 0.10 level.

Table IV. The Relation Between Firm Performance and Whether the CEO holds an MBA

Sample includes only firms with CEOs holding liberal arts undergraduate degrees

This table presents the results of testing Hypothesis III.

The table presents of the results of estimating the following equation using OLS.

$$Tobin's Q_i = \alpha + \beta_1 MBADummy_i + \beta_2 Age_i + \beta_3 Tenure_i + \beta_4 \log(Ownership)_i + \beta_5 \log(Compensation)_i + \beta_6 \log(Sales)_i + \beta_7 Leverage_i + \beta_8 Liquidity_i + \varepsilon_i$$

This regression does not include dummy variables for 2-digit SIC codes due to its small sample size.

Dependent Variable is the Firm Financial Performance Measure (Tobin's Q)

Independent Variables:	Coefficient Value
Intercept	-8.2338**
MBADummy	0.0503
Age	0.0838***
Tenure	-0.0066
log(Ownership)	-5.5518
log(Compensation)	0.3791
log(Sales)	-0.0471
Leverage	0.6653
Liquidity	3.3478*
Two Digit SIC Dummies	EXCLUDED
# OBS.	39
Adj-R2	0.223

***Significant at the 0.01 level.

**Significant at the 0.05 level.

*Significant at the 0.10 level.

Table V. The Relation Between Firm Performance and the CEO's Ivy League Education

This table presents the results of testing Hypothesis IV.

The table presents of the results of estimating the following equation using OLS.

$$Tobin's Q_i = \alpha + \beta_1 IvyLeagueUnderGrad_i + \beta_2 IvyLeagueGrad_i + \beta_3 Age_i + \beta_4 Tenure_i + \beta_5 \log(Ownership)_i + \beta_6 \log(Compensation)_i + \beta_7 \log(Sales)_i + \beta_8 Leverage_i + \beta_9 Liquidity_i + \varepsilon_i$$

This regression includes dummy variables for 2-digit SIC codes which are not reported.

Dependent Variable is the Firm Financial Performance Measure (Tobin's Q)

Independent Variables:	Coefficient Value
Intercept	-0.7484
IvyLeagueUndergradDummy	0.1355
IvyLeagueGradDummy	0.0135
Age	0.0145**
Tenure	0.0038
log(Ownership)	0.7409
log(Compensation)	0.0742
log(Sales)	0.0072
Leverage	-1.2825***
Liquidity	2.0322***
Two Digit SIC Dummies	INCLUDED
# OBS.	390
Adj-R2	0.280

***Significant at the 0.01 level.

**Significant at the 0.05 level.

*Significant at the 0.10 level.

Table VI. The Relation Between Financial Firm Performance, the Selectivity of the CEO's Undergraduate Education, and the Level of the CEO's Education

This table presents the results of testing Hypothesis V.

The table presents of the results of estimating the following equation using OLS.

$$\begin{aligned} \text{Tobin's } Q_i = & \alpha + \beta_1 \text{SAT}_i + \beta_2 \text{MBADummy}_i + \beta_3 \text{LawDummy}_i \\ & + \beta_4 \text{OtherGradDegreeDummy}_i + \beta_5 \text{Age}_i \\ & + \beta_6 \text{Tenure} + \beta_7 \log(\text{Ownership})_i \\ & + \beta_8 \log(\text{Compensation})_i + \beta_9 \log(\text{Sales})_i \\ & + \beta_{10} \text{Leverage}_i + \beta_{11} \text{Liquidity}_i + \varepsilon_i \end{aligned}$$

This regression includes dummy variables for 2-digit SIC codes which are not reported.

Dependent Variable is the Firm Financial Performance Measure (Tobin's Q)

Independent Variables:	Coefficient Value
Intercept	-0.4177
SAT	-0.0004
MBADummy	-0.0616
LawDummy	0.0272
OtherGradDegreeDummy	-0.0682
Age	0.0149**
Tenure	0.0036
log(Ownership)	0.8788
log(Compensation)	0.0863
log(Sales)	0.008
Leverage	-1.3099***
Liquidity	1.9805***
Two Digit SIC Dummies	INCLUDED
# OBS.	390
Adj-R2	0.280

***Significant at the 0.01 level.

**Significant at the 0.05 level.

*Significant at the 0.10 level.

CEOs with MBAs perform no differently than firms with CEOs who hold non-liberal arts undergraduate degrees, law degrees, or liberal arts undergraduate degrees. We also find that firms run by CEOs from more selective schools perform no better than firms run by CEOs from less selective schools.

What are some explanations for our results? The single

best explanation for all of our results is that the amount of time between the CEO's completion of the degree(s) and the attainment of the position of CEO may be sufficiently lengthy to diminish any benefit that can arise from a certain type of education or a more selective education. Anyone who becomes a CEO of a NYSE firm likely has certain skills, developed over a lifetime, that enable his/her to achieve their position. Consequently, a CEO's educational background may have little to do with the CEO's current performance.

Next, consider our result that firms with CEOs with MBA, law, and other graduate degrees do not perform any better than firms with CEOs without graduate degrees. This suggests, in part, that the skills learned by CEOs in these programs have little impact on firm performance. Why is this the case? One possible explanation is that these programs do not provide the type of training for a CEO to produce better firm performance. Indeed, many critics have noted (Porter and McKibbin 1988, Mintzberg 1996, and Pfeffer and Fong 2002) that quantitative-based analytical techniques receive too much attention in MBA programs, while there is little attention given to developing leadership and interpersonal skills that are necessary for high-level managerial success. The sentiment that business schools do a poor job in educating CEOs is summarized by Mintzberg and Lampel (2001, p.244) when they state:

"The MBA tends to be heavy on the "B" and light on the "A," teaching business functions, yet not developing the practice of administering. These programs give students the confidence to make decisions but not the competence to deal with the messy reality in which decisions are executed. Students learn to analyze situations and propose "implementation." Unfortunately you cannot replicate true managing in the classroom. The case study is a case in point: Students with little or no management experience are presented with 20 pages on a company they do not know and told to pronounce on its strategy the next day."

In terms of the lack of a relationship between CEO educational selectivity and firm performance, another explanation may be that CEOs with less selective educations work harder or longer than CEOs with highly selective educational backgrounds. As a result, any positive effect of graduating from a selective school, i.e., better education, better social networks, etc., may be offset by a competing relation that results from CEOs from weaker schools overcompensating through superior performance. After all, completing a degree at a less selective school leaves a student at a reputation and social capital disadvantage relative to the student's competitors from better schools. This disadvantage represents a barrier to career progression, beginning with the initial job search and continuing as the individual pursues promotions. To overcome this disadvantage and eventually

achieve the position as CEO, the individual from a weaker school must demonstrate superior performance capabilities to compensate for this disadvantage. This rationale may explain why we find no evidence of any relation between educational selectivity and firm performance.

Finally, while our results are certainly not complimentary of MBA, law, other graduate degrees, and liberal arts undergraduate programs, it must be remembered that we are only

examining the relationship between CEO educational background and firm financial performance. It may well be that the firm's financial performance benefits from the fact that other employees besides the CEO have MBA and or other graduate degrees. Also, it should be noted that a survey of 2008 business school graduates reported a median salary increase of 39% over their pre-graduate degree salaries.¹⁶ Hence, while the education of a CEO

The results show that CEO educational type is not a significant factor in terms of the firm having better or worse financial performance.

We consistently find that age is a positive factor in terms of firm performance and also find that leverage and liquidity are significantly related to performance but these variables are not specifically related to CEO educational background.

may not impact firm financial performance, their education is valued in the marketplace. ■

¹⁶ According to the Graduate Management Admissions Council Alumni Perspectives Survey (2008), which tracks graduates of all program types.

Appendix : Further Description of CEO Education Variables.

SAT

We obtain up-to-date SAT scores for the undergraduate schools through initially searching *Collegeboard.com* for the SAT I Verbal and SAT I Math test score ranges for the middle 50% of first-year students.¹⁷ The mean values of the verbal and math score ranges are calculated, and the average of the verbal and math scores is calculated to identify a single SAT score for each school. For all schools for which SAT scores were not identified on *Collegeboard.com*, we then search the *Princeton Guide to Colleges (2004)* for mean SAT scores. For a select few schools, while SAT scores are unavailable, ACT scores are reported. In these cases, the ACT scores are converted into SAT scores using the SAT – ACT score comparisons provided on *Collegeboard.com*.¹⁸

GMAT

We obtain GMAT scores for the MBA schools through initially searching *MBA.com* for the mean GMAT score of new entrants.¹⁹ For all schools for which GMAT scores are not identified on *MBA.com*, we then search *Businessweek.com's 2003 Full-Time MBA Profiles* for the mean GMAT scores. For all schools for which GMAT scores are not identified on either of the above two sources, we search *Peterson's Guide to MBA Programs (2004)* for the mean GMAT scores.²⁰

LSAT

We obtain LSAT scores for the law schools through searching *LSAT.org* for test score ranges for the middle 50% of first-year students.²¹ The mean values of these ranges are calculated to identify a single LSAT score for each law school.

Liberal Arts

Using *USnews.com's 2004* list of liberal arts colleges, we determine whether the CEO's undergraduate institution is a liberal arts college or not. We choose this variable since many educators argue that the individual attention given to students at liberal arts schools is superior to that in larger, research-oriented institutions.

¹⁷ *Collegeboard.com* is the website of the College Board, the organization that administers the SAT tests, among other activities. The search was performed December 2003.

¹⁸ For a few of the CEOs, the undergraduate school reported is actually a system of schools. In these cases, the SAT score identified is the average of the SAT scores for the schools within the system for which SAT scores are reported on *Collegeboard.com*.

¹⁹ *MBA.com* is the website of the Graduate Management Admission Council, the organization that administers the GMAT tests. The search was performed December 2003.

²⁰ As for the SAT scores extraction, the graduate school reported is occasionally a system of schools. In these cases, we proceeded in an identical fashion as described above for SAT scores.

²¹ *LSAT.com* is the website of the Law School Admission Council, the organization that administers the LSAT tests, among other activities. The search was performed December 2003.

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