

CEO Education, CEO Turnover, and Firm Performance

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Abstract

This paper analyzes the relationship between CEO education, CEO turnover and firm performance. Our primary interest is on the role that CEO education plays in a firm's decision to replace its current CEO, the role that it plays in selecting a new CEO, and on whether CEO education significantly affects performance. We use six main measures of CEO education: whether or not the CEO attended a Top-20 undergraduate school, whether or not the CEO has an MBA, law or masters' degree, and whether or not the MBA or law degree is from a Top-20 program. Our study includes more than 14,500 CEO-years and more than 2,600 cases of CEO turnover from 1993-2007.

Our results show that CEO education does not play a large role in the decision by a firm to replace its current CEO; poorly performing CEOs are replaced, regardless of their education. Education, however, does play a significant role in the selection of the replacement CEO; there is a significantly positive correlation between the education levels of new CEOs and those of the CEOs they replace. Further, hiring new CEOs with MBA degrees leads to short-term improvements in operating performance. We, however, do not find a significant systematic relationship between CEO education and long-term firm performance. CEO education does not seem to be an appropriate proxy for CEO ability. Our results lead to the puzzling implication that, while CEO education appears to play an important role in the hiring of CEOs, it does not affect the long-term performance of firms.

1. Introduction

One of the primary roles of a corporate board is to hire a chief executive officer (CEO) with superior ability. CEO ability is the composition of observable and quantifiable characteristics such as education and work experience, as well as unobservable and potentially non-quantifiable characteristics such as leadership and team-building skills. The identification and measurement of CEO ability is a difficult, imprecise and expensive process as evidenced by the growing “executive search” industry, and the considerable resources that are expended in the CEO search process. Despite this costly search process, sometimes newly hired CEOs are let-go or ‘fired’ shortly after they are hired.¹

Given the difficulty of evaluating CEO ability, objective and easily measurable characteristics such as education would be expected to play an important role in the CEO hiring process. Indeed, the large literature on “human capital” as a driver of production and economic growth highlights the importance of education as a determinant of human capital. Consequently, education is often used as a proxy for human capital in empirical studies (see Barro and Lee, 2010). The potential importance of education in the specific context of managers is further evidenced by the rapid increase in the costs of obtaining professional management degrees such as the MBA. In light of this evidence, an important and pertinent question from both positive and normative standpoints is whether, and to what extent, education matters in affecting CEO performance.

We construct a unique and comprehensive dataset on CEO educational backgrounds to examine the effects of CEO education on CEO hiring and turnover decisions as well as firm performance. Our results suggest that CEO education does significantly affect CEO hiring

¹ Our data shows that 13% of CEOs are fired within 3 years of becoming CEO.

decisions. We, however, find no evidence of a systematic relationship between CEO education and long-term firm performance. Overall, our findings suggest that education may not be an appropriate empirical proxy for CEO ability and suggest an empirical puzzle: CEO education plays a significant role in CEO hiring decisions even though it does not significantly affect firm performance.

CEO education potentially impacts CEO ability in three mutually non-exclusive ways. First, education could potentially contribute to the CEO's knowledge, perspective and ability to understand technical and abstract concepts. Second, higher education could be a signal of the CEO's intellect and ability to persevere on challenging intellectual activities. Finally, the social networks acquired in college and graduate school can be quite helpful professionally in the future. As discussed above, however, CEO education is just one of the determinants of CEO ability. Hence, it is a priori unclear how much impact CEO education has on firm performance.

This study attempts to shed light on the relative importance of CEO education by analyzing the relationship between CEO education, CEO turnover, and firm performance. In particular, we address the following three questions. (1) What is the role that a CEO's education plays in determining whether or not a CEO retires, leaves voluntarily or is fired? (2) What is the role that CEO education plays in the characteristics of the new CEO? (3) If CEO education is perceived to be a proxy for CEO ability, does it ultimately lead to superior firm performance following the CEO turnover? We give special attention to the unique situation of CEO turnover because it allows us to focus on the role that CEO education may play in how a corporate board goes about identifying and/or measuring managerial ability. CEO education may be one of the more objective pieces of information that the board has, and so it may be of greater significance

in situations of CEO turnover. The event of CEO turnover also allows us to more conveniently assess any potential causal effects of CEO education on firm performance.

Our unique dataset contains nearly 15,000 years of CEO education data and more than 2,600 cases of CEO turnover. We construct up to 22 different measures of education based on the types of degrees received and perceived qualities of the programs. Our analysis identifies several unique findings. First, CEO education does play an important role in the CEO turnover process. CEOs with law degrees from Top-20 programs appear to be *less* likely to be fired overall, while CEOs with undergraduate degrees from Top-20 schools appear to be *more* likely to be fired following poor performance. CEOs with MBA degrees are *more* likely to experience non-disciplinary turnover, that is, they leave on their own, while CEOs with Top-20 undergraduate degrees and non-MBA master degrees are *less* likely to leave on their own. Hiring a new CEO with an MBA leads to short-term improvements in operating performance following cases of disciplinary turnover, while bringing in a new CEO with a non-MBA master degree leads to short-term declines in operating performance.

Next, we examine the characteristics of new CEOs and compare them with those of the CEOs they replace. We find significant evidence that the new CEO has a similar educational background to the replaced CEO following cases of disciplinary turnover. For example, after firing a CEO with an MBA, the firm typically hires an individual with an MBA to replace her; after firing a CEO with a master's degree, the firm typically hires an individual with a master's degree to replace him. However, this does not hold following non-disciplinary turnover. In these cases, there is generally no relationship between the former CEO's education and the new CEO's education: at firms where a CEO with a Top-20 undergraduate degree decides to retire, the firm does not necessarily replace her with an individual with a Top-20 undergraduate degree.

Finally, we examine whether CEO education has an impact on long-term firm performance. We find virtually no evidence of a systematic relationship between CEO education and long-term firm performance, suggesting that CEO education may be a poor proxy for CEO ability. We consider six primary measures of CEO education and the full sample of firms. There is weak evidence that a CEO having an MBA from a Top-20 program is associated with superior Return on Assets or Tobin's Q , and weak evidence that that a CEO having a law degree is associated with superior stock returns. However, these results are not significant at a 5% confidence level, and they are the only significant relationships we observe between CEO education and firm performance. Overall, this seems to demonstrate that there is not a systematic relationship between CEO education and firm performance. These findings suggest that both boards and researchers should use caution in placing too much emphasis on an individual's education when trying to assess their ability to lead the company and maximize shareholder value. Our findings on the effects of CEO education on CEO turnover and firm performance suggest an empirical puzzle. While CEO education does matter in the decisions to hire CEOs, it does not significantly affect firm performance.

We contribute to the literature by carrying out a relatively comprehensive empirical analysis of how CEO education impacts hiring and turnover decisions, as well as performance. Using a small sample of approximately 500 firms from the year 2002, Gottesman and Morey (2006) find that school quality is not systematically related to firm performance. They also find that a CEO having a law degree or an MBA is not associated with better firm performance, but they do find limited evidence that a CEO having a non-MBA master's degree is associated with superior operating performance. Jalbert, Rao and Jalbert (2002) utilize a larger sample of firms from the *Forbes 800* list from 1987-1996, and find limited and mixed evidence of a relationship

between CEO education and firm performance. They show that the quality of a CEO's graduate school is weakly negatively related to return on assets, but positively related to Tobin's Q . This limited work on the relationship between CEO education and firm performance shows that the two are, at best, weakly correlated – although the type of degree may be of importance. The relatively small sample sizes used in these studies makes it unclear whether the absence of statistical significance of the coefficients of CEO education arises from the lack of statistical power or that CEO education, indeed, has no effect on firm performance. Further, these studies do not examine the effects of education on CEO turnover.

Bertrand and Schoar (2003) consider managerial style more generally and find that CEO specific fixed effects are important determinants of firm decisions and firm performance, as measured by Return on Assets and Tobin's Q . Bertrand and Schoar (2003) consider a dummy variable for whether or not the CEO has an MBA. In further tests, they find that CEOs who have an MBA degree are associated with Return on Assets levels on the order of 1% higher than for non-MBA graduates, and that CEOs with an MBA are, in general, more aggressive managers. Palia (2001), however, shows that there is not a significant relationship between a high quality degree and Tobin's Q . While Bertrand and Schoar (2003) consider a dummy variable for whether or not the CEO has an MBA, Palia (2001) identifies the 'top' undergraduate, engineering and business schools, and uses a dummy variable if the CEO has a degree from any of these programs. We initially construct 22 unique measures of CEO education that represent more comprehensive information on undergraduate and advanced degrees, including professional degrees in business and law. Apart from constructing and using more extensive data on CEOs and their educational attainments, we contribute to the literature by examining not only the effects of education on firm performance, but also its effects on turnover decisions. Our

empirical findings lead to a puzzle: CEO education *does* significantly affect turnover decisions, but *does not* affect long-term firm performance.

The CEO turnover literature has largely focused on the relationship between turnover and firm performance, giving limited attention to specific CEO characteristics. Denis and Denis (1995) show that disciplinary turnover is usually the result of significantly poor operating performance and that this does lead to significant improvements in performance. Huson, Parrino and Starks (2001) show that firm performance prior to the CEO turnover is the most important factor leading to a forced CEO turnover. Consistent with the expectations of the board, Huson, Malatesta and Parrino (2004) show that operating performance improves following forced CEO turnover. Bhagat and Bolton (2008) further confirm prior results, and suggest that the likelihood of disciplinary turnover following poor firm performance is greater in firms with stronger corporate governance environments. While firm performance seems to be the overriding factor in leading to disciplinary CEO turnover, little attention has been given to the role that individual CEO characteristics play in the board's decision to replace the CEO.

However, some work has focused on the inputs the board uses to select the new CEO. Kaplan, Klebanov and Sorensen (2008) describe qualitative characteristics that search firms consider, focusing on the importance of factors such as motivational, interpersonal and leadership skills. Eisfeldt and Kuhnen (2010) develop a competitive assignment model that shows that firms and CEOs are matched based on unique characteristics. They empirically show that CEO turnover decisions are correlated with firm performance relative to the industry and by the unique skills of the manager. Terviö (2008) also uses an assignment model to analyze the differences that CEOs make at large firms. He shows that CEO ability has only a very small

impact on the value of the firm. However, he does show that the matching of CEOs with firms does play an important role in determining the future course of the firm.²

2. Data

A. Data sources

Our sample of firms comprises of the largest 1,500 U.S. firms, the Standard & Poor's Super-Composite 1,500. We obtain all available information on chief executive officers (CEOs) from Compustat's Execucomp database from 1992 to 2007, including ownership, compensation, age, and tenure. From this sample of CEOs, we manually collect CEO education information from each firm's annual proxy, annual report, 10-k and other publicly available information. The disclosures about education differ across CEOs in the sample. Some disclosures include specific information about school, type of degree, major and year; others provide just the name of the school. We collect as much education information as thoroughly and systematically as possible. We collect information on each educational degree according to degree type (undergraduate, MBA, law, master or doctoral), and we record each school by name, recognizing differences within schools (for example, University of Texas at Austin is coded differently from the University of Texas at Dallas). We do not have consistent information on specific individual majors (e.g. engineering, liberal arts, or business). We have a total sample of 14,596 CEO-years with CEO education data.³

² Li, Sun and Ettredge (2010) focus on chief financial officer (CFO) turnover surrounding Sarbanes-Oxley 404 internal control weakness assessments. They measure a CFO's qualifications by their years of work experience, whether or not they are a CPA, and whether or not they have public accounting firm experience. They find that firms with CFOs with weaker qualifications are more likely to receive a negative SOX 404 opinion and that these firms do experience a greater degree of CFO turnover. In response, firms that experience CFO turnover do tend to hire more qualified new CFOs. The firms that hire replacements with superior qualifications than the replaced CFO do receive better SOX 404 opinions in the following year.

³ A CEO with 5 years of experience represents 5 observations in our sample. If the CEO obtains a degree during his/her tenure as CEO, we do not distinguish this as there are very few CEOs in this situation. We do control by firm and by CEO in all empirical analyses.

We merge data on CEO education with firm financial data from Compustat, stock market information from the Center for Research in Security Prices (CRSP), and corporate governance information from RiskMetrics (formerly IRRC). The data on CEO turnover are obtained from Execucomp where we identify a turnover event by a change in CEO from one year to the next. We identify the *type* of CEO turnover---voluntary or forced---by manually collecting information from firm press releases regarding the turnover.

B. Variable descriptions

CEO education variables: The main variable of interest is CEO education. There are many different ways to measure and distinguish a CEO's education. We initially construct the 22 measures of CEO education that are described in Appendix A. We begin by identifying the CEO's undergraduate school. As suggested above, not all firms provide information about specific majors so we do not attempt to differentiate between different undergraduate degree majors. We do, however, differentiate between the schools using *U.S. News & World Report's* 2008 rankings of national universities. Each school is given a score and a ranking based on a variety of factors, including peer assessment, retention, faculty resources, student selectivity, financial resources, graduation rate and alumni giving rate.⁴ Based on these rankings, we categorize all schools as being Top-10, Top-20, Top-50 or Top-100 with dummy variables. We do the same for MBA programs and law schools (*USNWR* only ranked 65 MBA programs in 2008), and we also include dummy variables for whether or not the CEO obtained an MBA or law degree. The *USNWR* rankings are presented in Appendix C. We also include a dummy variable for whether or not the CEO obtained a non-MBA, non-law master degree. As with undergraduate degrees, we do not have consistent information on different majors so we do not distinguish between different master's degree majors.

⁴ See <http://colleges.usnews.rankingsandreviews.com/college> for complete methodology and rankings.

Although we have carried out tests for 22 unique measures of CEO education, we only report the results for the following six measures for conciseness: (1) *UG-Top20*, a dummy equal to one if the CEO attended a Top-20 undergraduate school, (2) *MBA*, a dummy equal to one if the CEO has an MBA degree, (3) *MBA-TOP20*, a dummy equal to one if the CEO attended a Top-20 MBA program, (4) *LAW*, a dummy equal to one if the CEO has a law school degree, (5) *LAW-TOP20*, a dummy equal to one if the CEO attended a Top-20 law school, and (6) *MASTER*, a dummy equal to one if the CEO has a non-MBA master degree.

CEO turnover variables: In this study, we are interested not only in whether or not a CEO turnover occurred, but the conditions under which that turnover occurred. We first identify all incidences where there is a change in CEO from year-to-year using the Execucomp database. We then manually collect information on the type of turnover by reviewing relevant press releases about the change in CEO, plus any other necessary information. We characterize all turnovers as either *disciplinary* or *non-disciplinary* depending on the nature of the change. *Disciplinary turnovers* are those where the CEO is fired, resigns for personal reasons, or if no information is given. *Non-disciplinary turnovers* are those where the CEO stays on as board chair for an extended period, the CEO is older than 63 years old, there is a structured succession plan, or the CEO dies.

Performance variables: We use operating performance as the primary measure of firm performance. We measure *Return on Assets (ROA)* is measured as operating income before depreciation divided by assets. Following Barber and Lyon (1996), accounting measures of performance generally have superior attributes in assessing longer-term performance.⁵ We also perform some analyses using *Tobin's Q* and *Stock Return* as measures of firm performance. It is

⁵ Results using operating income after depreciation are qualitatively similar to those using operating income before depreciation in calculating *Return on Assets*.

important to mention here that the use of stock returns as a measure of firm performance presumes that information about CEO characteristics is not completely impounded in stock prices (see Barber and Lyon (1996), Core, Guay and Rusticus (2007), and Bhagat and Bolton (2008)). *Past stock return (PastReturn)* is also used in our CEO turnover analyses, as we consider the impact that past performance has on the likelihood of a CEO facing disciplinary turnover. Since firing or replacing the CEO is a form of market discipline imposed by the board of directors, it is most appropriate to use a market measure of performance in this analysis. This variable is measured as the compound two-year return in years $t-2$ to $t-1$. Finally, measures of *Industry Performance* include the average relevant performance measure for all firms in the sample firm's 4-digit SIC code, excluding the sample firm.

Control variables: We use additional control variables in most of our analyses whose choices are guided by the particular relationship we examine and/or the extant literature. *Leverage* is calculated as the simple ratio of long term debt to total assets at the end of the fiscal year. We measure *Size* as the natural log of total assets for the fiscal year. The measure of *Growth Expenses* is calculated as the ratio of advertising plus research and development expenses to assets. If a firm does not have data for either advertising or research and development expenses, we assume the value to be zero. *CEO-Own* is the percentage of stock, including options, owned by the CEO. *CEO-Age* is the age of the CEO at the end of the fiscal year. *CEO-Tenure* is the number of years that the CEO has been the CEO of the sample firm.⁶ *Risk* is the standard deviation of the sample firm's monthly stock return over the previous 60 months. Finally, we include a number of *industry controls* for several variables (e.g.

⁶ We also consider the number of years that the CEO has been with the sample firm as a measure of *CEO-Tenure*. The results are qualitatively unchanged with this alternate measure.

performance, leverage). We calculate the average value for all firms in the sample firm's 4-digit SIC code, excluding the sample firm, to use as our *industry control* variable.

C. Descriptive statistics

Table 1 presents the sample averages for select variables. Panel A shows the statistics for the full sample, as well as the sub-samples of only those CEOs with MBA degrees and only those with law degrees. Panel B shows the statistics for all firms that experienced CEO turnover, distinguishing between cases of disciplinary turnover and non-disciplinary turnover. In Panel A, we note that about 15% of the CEOs received undergraduate degrees from schools ranked in the Top-20, while that the other 85% attended a broad range of schools. 15% of the MBAs attended Top-20 undergraduate programs. Slightly less than 39% of the sample did receive an MBA, comparable to the 40% in Bertrand and Schoar's (2003) sample. Of these MBAs, 63% attended a Top-20 MBA program. About 15% of the CEOs in the sample have a law degree; 44% of these degrees are from Top-20 law schools. Less than 1% of the CEOs in the sample have both an MBA and a law degree. About 14% of the CEOs earned a non-MBA, non-law master's degree; about 5% earned both a master's and an MBA or law degree. In Panel B, we note the differences between the disciplinary turnover and non-disciplinary turnover subsamples.

Looking at the firm and CEO characteristics across sub-samples, there do not appear to be too many substantial differences. The average CEO age is 56 years old, with MBAs slightly less and law degrees slightly more. The average CEO tenure is 8.4 years, again with MBAs slightly less and law degrees slightly more. *Return on Assets* and *Stock Return* are similar across the sub-samples. Interestingly, firms with CEOs with law degrees have lower Tobin's Q and are larger than other firms. Leverage for all three groups is around 20%. In any year, about 10% of all CEOs experience some kind of turnover; about 11% of MBAs experience turnover while only

about 9% of law degree experience turnover. Overall, despite some small differences between the sub-samples, the make-up of the three sub-samples sorted on the type of education are very similar to each other and to samples used in prior research.

Panels C and D provide CEO education backgrounds in different industries. CEOs with law degrees are rare in the business equipment industry but over-represented in utilities. MBAs from a top-20 program are most frequently observed as CEOs in the consumer durables industry, and least-likely in utilities.

3. Methodology

We first focus on the relationship between CEO turnover and CEO education. We investigate whether there is a systematic relationship between a CEO's education and the likelihood of that CEO experiencing either disciplinary or non-disciplinary turnover. Specifically, we want to determine if, given poor firm performance, CEOs with different types of education are more or less likely to experience disciplinary CEO turnover. Using the full sample of firms, we utilize a multinomial logit model to allow for different categories of CEO turnover. The *CEO Turnover* variable takes a value of 0 if there is no turnover, a value of 1 if there is disciplinary turnover, and a value of 2 if there is non-disciplinary or voluntary turnover. We consider the following specification:

$$(1) \quad CEO\ Turnover_t = CEO-Education_t + PastReturn_t + (CEO-Education_t \times PastReturn_t) + IndustryPastReturn_t + CEO-Own_t + FirmSize_t + CEO-Age_t + CEO-Tenure_t$$

All CEO-specific explanatory variables are associated with the CEO who was replaced. We also include an intercept term, year dummy variables and industry dummy variables in all specifications. In this model, the explanatory variable of interest is not simply *CEO-Education*, but also the $(CEO-Education_t \times PastReturn_t)$ interactive term. It is not just a CEO's education

independent of firm performance that might lead to disciplinary turnover, but, rather, it is the education *given* poor performance that might lead to disciplinary turnover. If a firm is performing well, we wouldn't expect to see the CEO replaced, regardless of their education. The interactive term allows us to isolate the effects of CEO education on disciplinary turnover when the firm is not performing well. This analysis produces two sets of results: one for non-disciplinary turnover and one for disciplinary turnover.

Consistent with Huson, Parrino and Starks (2001) and Bhagat and Bolton (2008), we would not expect CEO education and/or firm performance to have a significant effect on whether or not a CEO voluntarily steps down. Factors such as ownership stake, age and tenure are more likely to affect this decision by the CEO. However, disciplinary turnover is a decision made by the board of directors. As such, we expect the coefficient on $PastReturn_t$ to be negative and the coefficient on $IndustryPastReturn_t$ to be positive, suggesting disciplinary turnover occurs when the firm is underperforming. A priori, it is unclear if CEOs with higher quality education are more or less likely to face disciplinary turnover, after controlling for firm performance. If CEOs with higher quality educations are more likely to be disciplined following poor performance, we will see a negative coefficient on $(CEO-Education_t \times PastReturn_t)$; if CEOs with higher quality education are less likely to be disciplined following poor performance, we will see a positive coefficient on $(CEO-Education_t \times PastReturn_t)$. We perform this analysis considering the six primary measures of *CEO-Education* described in Section 3B.

Once we establish the general relationship between CEO turnover and CEO education, we want to better understand the characteristics and consequences of those turnover decisions, as they relate to a CEO's education. To do this, we focus on only the subsample of firm-years in which a case of CEO turnover occurred.

The first analysis using the CEO turnover subset considers whether or not hiring a new CEO with a certain education background leads to positive changes in performance following the CEO turnover. We use the following ordinary least squares model and each of the six different measures of *CEO-Education* for this analysis:

$$(2) \quad \Delta Performance_{t \text{ to } t+1} = CEO-Education_t + \Delta Industry-Performance_{t \text{ to } t+1} + FirmSize_t + Leverage_t + GrowthExpenses_t + CEO-Own_t + CEO-Age_t + CEO-Tenure_t + Risk_t$$

We perform this analysis on the subsample of all disciplinary turnover cases and the subsample of all non-disciplinary turnover cases.

The next analysis considers the behavior of firms in their choices of hiring a new CEO following CEO turnover. Specifically, we want to identify whether or not firms hire new CEOs who have the same education background as the former CEO. We use the following logit model and each of the six different measures of *CEO-Education* for this analysis:

$$(3) \quad CEO-Education_t = CEO-Education_{t-2} + PastReturn_t + PastIndustryReturn_t + FirmSize_t + Leverage_t + CEO-Own_t + FirmSize_t + CEO-Age_t + CEO-Tenure_t + Risk_t$$

The key variable in this analysis is the lagged CEO education variable, *CEO-Education*_{t-2}. We use a two-year lag in case there are any timing or coding errors in our identification of CEO turnover, in order to be certain we are analyzing two different individuals.⁷ Again, we perform this analysis on the subsample of all disciplinary turnover cases and on the subsample of all non-disciplinary turnover cases.⁸ While we might expect to see firms hiring similar types of CEOs in the full sample, we might expect firms to take a different direction in the types of CEOs they hire following disciplinary turnover.

⁷ Using a two-year lag also allows us to capture the true nature of the change in leadership when an interim CEO is in place for an intervening year. Using a one-year lag produces qualitatively similar results.

⁸ Using a sample of all turnover cases produces results similar to the subsample of all cases of non-disciplinary turnover.

Finally, we take a step back and look at the broader relationship between CEO education and firm performance. As mentioned before, a number of papers have studied this relationship using smaller samples and broader characterizations of CEO education. In general, these studies have not found a consistent relationship between CEO education and firm performance. We follow this prior work and consider the effect that each of our six different types of CEO education has on firm performance. Using the full sample of firms, we estimate the following ordinary least squares model:

$$(4) \text{ Performance}_t = \text{CEO-Education}_t + \text{FirmSize}_t + \text{IndustryPerformance}_t + \text{Leverage}_t + \text{GrowthExpenses}_t + \text{CEO-Own}_t + \text{CEO-Age}_t + \text{CEO-Tenure}_t + \text{FirmVolatility}_t$$

If different types of CEO education are associated with better (or worse) overall firm performance, then we would observe a positive (or negative) coefficient on the *CEO-Education* variable in the above equation.

4. Empirical Results

We begin by presenting the results of estimating specification (1) in Section 3. We consider whether a CEO's education background makes him/her more or less likely to experience disciplinary turnover following poor firm performance. We expect that the decision to replace the CEO is based primarily on the firm's performance and is independent of the CEO's education, as well as most other firm and CEO characteristics. Table 3 presents the reasons for CEO turnover from 1993-2007. During these fifteen years, we identified 2,615 cases of CEO turnover; of these, 34% were disciplinary and 63% were non-disciplinary turnovers (the other 3% were for special cases, such as corporate control events). For this analysis, equation (1) includes an interactive term made up of CEO education and the firm's past 2 years of stock returns. This is necessary because we are concerned about whether or not CEO education

matters given poor performance, not necessarily whether it matters independent of firm performance.⁹ The empirical results from estimating the effects of CEO education on CEO turnover are presented in Table 4. Panel A presents the results on disciplinary turnover and Panel B presents the results on non-disciplinary turnover.

In Panel A, the baseline equation without any CEO education variables shows that CEOs experience disciplinary turnover when the firm has performed poorly, when the industry has performed well, when the CEO is older, when the CEO is less tenured, and when the CEO owns less stock. These relationships are consistent with the prior literature, and these relationships persist when we include the CEO education and interaction terms in the model. When we include CEO education in the model, it rarely has any effect on disciplinary turnover. Independent of firm performance, a CEO with a Top-20 law degree is less likely to experience disciplinary turnover. This is the only significant relationship we find.

When we focus on the interactive term, we find a significant relationship: the negative coefficient on the *UG-Top20* education variable suggests that, given poor performance, firms are more likely to fire a CEO with a high quality undergraduate education. While statistically somewhat less significant, we find that, given poor performance, firms are more likely to fire a CEO with a law education, and less likely to fire a CEO with a Top-20 MBA education.

In Panel B, the baseline equation shows that performance is not a consistent determinant of non-disciplinary CEO turnover. Older CEOs are more likely to leave and CEOs with greater stock ownership are less likely to leave. We do, however, see several cases where CEOs with certain types of education are involved in a non-disciplinary turnover. Independent of firm performance, CEOs with an MBA are *more* likely to be involved in a non-disciplinary turnover,

⁹ Even though our primary concern is with whether or not CEO education matters given firm performance, we did estimate similar models without the interactive term, looking at only CEO education. CEO education by itself has no consistent significant relationship with the probability of disciplinary or non-disciplinary CEO turnover.

while CEOs with master's degrees and Top-20 undergraduate degrees are *less* likely to be involved in a non-disciplinary turnover. Further, the positive coefficient on the interactive term in the *UG-Top20* analysis shows that, given poor performance, CEOs with a Top-20 undergraduate degree are still *less* likely to be involved in a non-disciplinary turnover; alternatively, it could be that, given strong performance, they are *more* likely to be involved in a non-disciplinary turnover.

Given these CEO turnover decisions, it is important to understand what happens to firm performance *after* the appointment of a new CEO. The analysis in Table 5 considers the relationship between the education of the new CEO and performance changes following their appointment. We estimate specification (2) in Section 4. Panel A presents the results following disciplinary turnover and Panel B presents the results following all cases of CEO turnover. In Panel A, both of the MBA-related variables have positive coefficients; that is, following cases of disciplinary turnover, hiring a CEO with an MBA or an MBA from a Top-20 business school leads to superior improvements in operating performance in the year following CEO replacement. We also notice that hiring a new CEO with a master's degree actually leads to significantly poorer operating performance in the year following CEO replacement. This shows that firms benefit more when they replace a fired CEO with a new CEO with an MBA but not with a master degree. None of the other CEO education variables show a significant relationship with post-turnover changes in operating performance. In Panel B, we consider operating performance subsequent to non-disciplinary turnover. In this analysis, none of the CEO education variables are associated with superior short-term changes in operating performance

Having analyzed the performance-related issues surrounding CEO education and CEO turnover, we now focus on the actual hiring decision. In this analysis, we consider the

relationship between the *new* CEO's education background and the *former* CEO's educational background. We estimate specification (3) in Section 4. The results are presented in Table 6. In Panel A we present the results for cases of disciplinary turnover, and in Panel B we present the results for cases of non-disciplinary CEO turnover.

In five of the six specifications presented in Panel A, firms bring in a new CEO with the same type of education background as the former CEO following disciplinary turnover. The lone exception is the *LAW-TOP20* variable; firms that fire CEOs with law degrees do look to replace them with a new CEO who also has a law degree, but they do not seem to focus on the quality of that law degree. These results suggest that firms do not necessarily consider a CEO's education to be related to the decision to fire a CEO; in fact, they consider it to be independent because they tend to hire a new CEO with the same type education. Boards may consider the education of a firm's CEO to be something of a fixed criteria; the characteristics of the firm itself determine that the CEO must have a certain type of degree.¹⁰ Turning to the results in Panel B – unlike the disciplinary turnover results firms do not bring in a new CEO with the same type of education background as the former CEO following a non-disciplinary turnover; the two exceptions are when the new CEO has a top-20 law degree or a master's degree. Interestingly, following a non-disciplinary turnover - firms growing slowly and less risky are more likely to hire a CEO with a law degree. Finally, smaller and less leveraged companies tend to hire MBAs during a non-disciplinary turnover situation.

Given these behaviors by firms, it is important to understand the larger context of the CEO turnover-related decisions. Specifically, what is the larger role that CEO education plays

¹⁰ In untabulated results, we analyze if there is a systematic relationship between *any* of the CEO education variables for the former CEO and *any* of the CEO education variables for the new CEO. For example, if the former CEO had an MBA, is the new CEO more likely to have a law degree. This equates to $6 \times 6 = 36$ different specifications. While there were a few significant results, the strongest results were between the former CEO and the new CEO having the same educational background.

with respect to the overall performance of firms? The results in Table 4 show that decisions to fire CEOs are not largely related to their education. However, the results in Table 6 show that firms do look to hire CEOs of a certain education background, which indicates that they believe that education background is important for the firm or to the position. To analyze this, we focus on the full sample of firms. We estimate specification (4) in Section 4. The results are presented in Table 7. Panel A presents the results considering *Return on Assets* as the performance variable; Panel B presents the results considering *Stock Return* as the performance variable; and, Panel C presents the results considering *Tobin's Q* as the performance variable.

In general, the results do not show strong evidence of a relationship between CEO education and firm performance. In Panel A, we see a weak positive relationship between a CEO having an MBA from a Top-20 business school and operating performance. This result is somewhat consistent with the results in Table 5 that showed that new CEOs with MBAs lead to higher changes in operating performance following disciplinary turnover. However, none of the other five measures of CEO education presented in Table 7 show a significant relationship with operating performance. In Panel B we see that having a *LAW* degree is weakly related to superior *Stock Return*; this is the only one of the six measures that is significantly related to *Stock Return*. And, in Panel C, we again see that having an MBA from a Top-20 business school is weakly associated with higher levels of *Tobin's Q*, and that this is the only measure of education that is significantly related to *Tobin's Q*. Thus, while there is some consistent evidence that having an MBA from a Top-20 program is positively associated with firm performance, this evidence is statistically weak. Further, none of the other measures of CEO

education appear to be systematically associated with superior firm performance, regardless of the measure of performance.¹¹

5. Discussion

We find little evidence that CEO education matters with respect to firm performance. While firms may enjoy some short-lived improvements in operating performance by hiring a new CEO with an MBA after firing the previous CEO, and firms may suffer some short-lived operating performance weakness by hiring a new CEO with a master degree after firing the previous CEO, these relationships do not seem to generalize to all firms nor to other measures of CEO education. However, boards do appear to use a CEO's education in assessing current or potential executives. Our findings, therefore, lead to the puzzling implication that, while education does play an important role in CEO hiring decisions, it does not affect long-term firm performance. If CEO education does not lead to superior firm performance, then why would boards consider it at all in their evaluation processes? It is perhaps due to the fact that they have few other identifiable and measurable criteria to use. All else being equal, they rely on what they believe to be the observable pedigrees of the executive. Of course, all else is rarely equal, especially when dealing with something as nebulous and potentially unobservable as managerial talent. Interpersonal skills, leadership ability and strategic vision are among the traits that CEOs should possess; these can be difficult to identify and even more difficult to measure. As a result, boards rely on those characteristics which they may be able to observe: work experience, track record, and education.

We note the following caveats to this study. First, we only consider the education of the CEO. We do not consider the entire management team, including other managers or board

¹¹ In results not presented, we considered all 22 measures of CEO education shown in Appendix A in this analysis. In total, we run $22 \times 3 = 66$ different specifications. Of these 66 analyses, the CEO education is statistically significant in only five of the specifications (7.6% of the cases). Three of these five are presented in Table 7.

members. It is possible that a firm with a management team with an overall high quality education will outperform firms with less well educated management teams. Second, we do not distinguish between types of degree within the undergraduate and master's categories. Unfortunately, we cannot reliably distinguish between types of undergraduate or master's degrees for some CEOs because the information disclosed does not always specify the undergraduate field. Third, we do not distinguish between U.S.-based degrees and international degrees. In our sample, the number of CEOs with non-U.S. degrees is very small, so we chose to not distinguish them in our analysis. Finally, we rely on the *U.S. News & World Report* rankings of undergraduate, business and law schools in some of our analyses. In these tests, we are relying on these rankings as being valid measures of educational quality. While we can never be sure if these rankings are indeed correlated with educational quality, there is some anecdotal evidence that suggests they are at least related with *perceived* educational quality. In Appendix B we present the number of CEOs represented by each undergraduate, MBA and law program; in Appendix C we present the *USNWR* rankings for each type of program. There is a very high correlation between these two lists. Also, we chose to use *USNWR* rather than other rankings because it has the most complete rankings, covering the greatest number of schools across the three different types of programs. In comparing the *USNWR* rankings to other rankings, such as the *BusinessWeek* MBA rankings, there is a very high correlation between the lists.

Understanding a concept as nuanced as managerial ability is not straightforward. These results suggest that CEO education does not play a distinguishing role in determining a CEO's ability related to enhancing firm performance. It is certainly possible that the CEO's education does have a critical influence in determining whether or not the individual becomes a CEO (or, even earlier, whether or not the individual gets hired into positions that may lead to becoming a

CEO). Nevertheless, it is still rather puzzling (at least to us) that education affects CEO hiring decisions even though it has little effect on long-term firm performance. Our findings strongly suggest that educational attainment is a poor proxy for CEO ability.

7. Conclusion

We analyze the relationships between CEO education, CEO turnover and firm performance using a relatively comprehensive dataset on CEO educational characteristics. We show that CEO education is not significantly related to firm performance. Our results suggest that education is a poor proxy for CEO ability. Nevertheless education does play an important role in CEO hiring decisions; boards still use educational qualifications as criteria in evaluating potential CEOs. We considered 6 primary measures of CEO education (22 in total), for the largest 1,500 U.S. firms during 1993-2007. The results show that firm performance is the dominant factor in determining disciplinary CEO turnover; however, CEO education might play a role. CEOs with a Top-20 law degree are *less* likely to experience disciplinary turnover, and, given poor performance, CEOs with a Top-20 undergraduate degree are *more* likely to experience disciplinary turnover. Interestingly, firms look to replace a CEO with a new CEO who has the same education-type background as the former CEO – especially following disciplinary turnover. This suggests that boards believe that the individual's educational pedigree is an important qualification for meeting the requirements of being CEO at their firm, but that they don't necessarily believe that the former CEO's education is at all responsible for his/her failures (or else they would have looked to hire a new CEO with a different education).

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Appendix A – Methodology for CEO Education Variables

We rely on the U.S. News & World Report (USNWR) 2008 rankings for our school scores and rankings because it is the most extensive. The rankings, scores, and methodology are available at <http://colleges.usnews.rankingsandreviews.com/college>. USNWR provides rankings and scores for over 100 “national” universities, 65 MBA programs, and 100 law schools. According to USNWR, the national universities “offer a full range of undergraduate majors, master’s and doctoral degrees.” We use this as our measure of undergraduate education. We recognize that restricting our study to this measure of undergraduate education excludes two potentially very important categories of schools: (1) liberal arts colleges, such as Davidson College or Williams College; and, (2) international schools, such as University of Oxford or Indian Institute of Technology. While this may be a perceived deficiency of this study, it is not likely to be a significant concern as relatively few of the CEOs in our sample attended schools in these categories. (As some evidence, out of 14,596 CEO-years with undergraduate information, 33 went to Davidson College, 68 went to Williams College, 20 went to Claremont College, 8 went to Oxford, and 14 went to the Indian Institute of Technology.) In addition to the raw data, we use the *USNWR* scores for ranked schools to create the following variables:

- (1) *UG-Top10* – Equal to 1 if the CEO received an undergraduate degree from a school ranked in the USNWR Top-10 national universities, and equal to 0 otherwise.
- (2) *UG-Top20* – Equal to 1 if the CEO received an undergraduate degree from a school ranked in the USNWR Top-20 national universities, and equal to 0 otherwise.
- (3) *UG-Top50* – Equal to 1 if the CEO received an undergraduate degree from a school ranked in the USNWR Top-50 national universities, and equal to 0 otherwise.
- (4) *UG-Top100* – Equal to 1 if the CEO received an undergraduate degree from a school ranked in the USNWR Top-100 national universities, and equal to 0 otherwise.
- (5) *MBA* – Equal to 1 if the CEO received an MBA, and equal to 0 otherwise.

- (6) *MBA-TOP10* – Equal to 1 if the CEO received an MBA from a school ranked in the USNWR Top-10 business schools, and equal to 0 otherwise.
- (7) *MBA-TOP20* – Equal to 1 if the CEO received an MBA from a school ranked in the USNWR Top-20 business schools, and equal to 0 otherwise.
- (8) *MBA-TOP50* – Equal to 1 if the CEO received an MBA from a school ranked in the USNWR Top-50 business schools, and equal to 0 otherwise.
- (9) *MBA-TOP100* – Equal to 1 if the CEO received an MBA from a school ranked in the USNWR Top-100 business schools, and equal to 0 otherwise.
- (10) *LAW* – Equal to 1 if the CEO received a Law degree (JD, LL.D or other), and equal to 0 otherwise.
- (11) *LAW-TOP10* – Equal to 1 if the CEO received a Law degree from a school ranked in the USNWR Top-10 law schools, and equal to 0 otherwise.
- (12) *LAW-TOP20* – Equal to 1 if the CEO received a Law degree from a school ranked in the USNWR Top-20 law schools, and equal to 0 otherwise.
- (13) *LAW-TOP50* – Equal to 1 if the CEO received a Law degree from a school ranked in the USNWR Top-50 law schools, and equal to 0 otherwise.
- (14) *LAW-TOP100* – Equal to 1 if the CEO received a Law degree from a school ranked in the USNWR Top-100 law schools, and equal to 0 otherwise.
- (15) *MBALAW* – Equal to 1 if the CEO received both an MBA and a Law degree, and equal to 0 otherwise.
- (16) *UnderScore* – Equal to the USNWR score for the CEO's undergraduate school, and equal to 0 if the CEO's undergraduate school does not have a score. The range is 0 to 100.
- (17) *MBA Score* – Equal to the USNWR score for the CEO's MBA program, and equal to 0 if the CEO's MBA program does not have a score or if the CEO did not receive an MBA. The range is 0 to 100.
- (18) *LAW Score* – Equal to the USNWR score for the CEO's Law school, and equal to 0 if the CEO's Law school does not have a score or if the CEO did not receive a Law degree. The range is 0 to 100.
- (19) *AllScore* – Equal to the sum of *UnderScore*, *MBA Score* and *LAW Score*. The range is 0 to 300.
- (20) *MASTER* – Equal to 1 if the CEO received any master degree other than an MBA or Law degree, and equal to 0 otherwise.
- (21) *Harvard* – Equal to 1 if the CEO received any degree – undergraduate, MBA, Law or master – from Harvard, and equal to 0 otherwise.
- (22) *HarvardMBA* – Equal to 1 if the CEO received an MBA from Harvard, and 0 otherwise.

Appendix B – CEO Representation by School

The following lists show the number of CEO-years by school in the sample for the Top-30 schools for each program type.

National Universities (<i>n=14,596</i>)		MBA Programs (<i>n=5,678</i>)		Law Schools (<i>n=2,119</i>)	
Harvard	330	Harvard	1,521	Harvard	228
Princeton	287	Pennsylvania	340	Columbia	95
Pennsylvania	266	Stanford	334	Michigan	94
Cornell	253	Chicago	310	Yale	78
Yale	251	Columbia	175	NYU	70
Stanford	236	Northwestern	124	SMU	55
Purdue	177	NYU	113	Boston University	52
Wisconsin	176	Virginia	110	Oklahoma	47
Texas	167	Dartmouth	109	Virginia	46
Illinois	155	Indiana	100	Wisconsin	43
NYU	154	Michigan	94	Fordham	41
MIT	145	Cornell	62	Minnesota	41
Michigan	139	Texas	61	Pennsylvania	41
Oklahoma	137	Wisconsin	60	Villanova	41
Northwestern	128	MIT	59	Georgetown	36
Dartmouth	122	Boston University	56	Cornell	35
Notre Dame	121	Case Western	56	DePaul	32
Georgia Tech	118	UC Berkeley	45	University of Idaho	29
CCNY	114	Rochester	44	Texas	28
Rutgers	106	Pace University	42	Stanford	24
UNC	105	USC	42	UC Berkeley	24
UC Berkeley	98	Xavier	41	Florida	23
Minnesota	98	Georgia State	39	University of Denver	23
Missouri	95	SMU	39	Indiana	22
US Naval Academy	94	UCLA	38	Nebraska	22
University of Washington	93	Washington University	37	University of Washington	22
Ohio State	93	Utah	36	Brooklyn Law School	21
LSU	89	Michigan State	32	Northwestern	20
Utah	88	Pepperdine	31	Pepperdine	20
USC	86	University of Louisville	30	Baylor	19

Appendix C – U.S. News & World Report Rankings

The following lists show the 2008 rankings and scores by *U.S. News & World Report* for the Top-30 schools of each program type.

National Universities		Score	MBA Programs		Score	Law Schools		Score
(1)	Harvard	100	(1)	Harvard	100	(1)	Yale	100
(2)	Princeton	99	(1)	Stanford	100	(2)	Harvard	91
(3)	Yale	98	(3)	Pennsylvania	95	(2)	Stanford	91
(4)	MIT	94	(4)	MIT	93	(4)	Columbia	88
(4)	Stanford	94	(4)	Northwestern	93	(5)	NYU	85
(6)	Cal Tech	93	(4)	Chicago	93	(6)	UC Berkeley	81
(6)	Pennsylvania	93	(7)	Dartmouth	89	(7)	Chicago	80
(8)	Columbia	90	(7)	UC Berkeley	89	(7)	Pennsylvania	80
(8)	Duke	90	(9)	Columbia	88	(9)	Northwestern	79
(8)	Chicago	90	(10)	NYU	84	(9)	Michigan	79
(11)	Dartmouth	89	(11)	UCLA	83	(9)	Virginia	79
(12)	Northwestern	87	(12)	Michigan	82	(12)	Cornell	77
(12)	Washington University	87	(13)	Yale	80	(12)	Duke	77
(14)	Cornell	86	(14)	Cornell	79	(14)	Georgetown	74
(15)	Johns Hopkins	85	(14)	Duke	79	(15)	Vanderbilt	72
(16)	Brown	84	(14)	Virginia	79	(16)	UCLA	71
(17)	Rice	80	(17)	Carnegie Mellon	77	(16)	Texas	71
(18)	Emory	79	(18)	Texas	74	(18)	USC	68
(18)	Notre Dame	79	(19)	UNC	72	(19)	Washington University	67
(18)	Vanderbilt	79	(20)	Indiana	71	(20)	George Washington	65
(21)	UC Berkeley	77	(21)	USC	70	(21)	Boston University	64
(22)	Carnegie Mellon	75	(22)	Arizona State	69	(22)	Emory	63
(23)	Georgetown	74	(22)	Georgetown	69	(22)	Minnesota	63
(23)	Virginia	74	(24)	Emory	68	(22)	Notre Dame	63
(25)	UCLA	73	(25)	Rochester	66	(25)	Washington & Lee	62
(26)	Michigan	72	(25)	Washington University	66	(26)	Boston College	61
(27)	USC	71	(27)	Ohio State	65	(27)	Fordham	60
(28)	Tufts	70	(27)	Minnesota	65	(27)	Illinois	60
(28)	Wake Forest	70	(29)	BYU	64	(27)	Iowa	60
(30)	UNC	69	(29)	Georgia Tech	64	(30)	William & Mary	59

Table 1
Descriptive Statistics

This table presents the mean values of the primary CEO education, performance, compensation, capital structure, corporate governance and CEO turnover variables. Variables are presented for three different samples: all CEOs with available CEO education data, only those CEOs with an MBA degree, and only those CEOs with a law degree. Panel A presents the results for the full samples; Panel B presents the statistics for only firms that experienced CEO turnover; Panel C presents the statistics for the year 2007 only, for the full sample and for the three most concentrated industries in our sample – manufacturing, business services and finance – based on the Fama & French (1993) 12 industries; Panel D presents the statistics for the other industries.

Panel A: All firms

	All Available CEOs <i>(n=14,596)</i>	MBA Sub- Sample <i>(n=5,678)</i>	LAW Sub- Sample <i>(n=2,119)</i>
<u>CEO Education Variables:</u>			
<i>UG-Top20</i>	15.26%	14.85%	20.88%
<i>UG-Other</i>	84.74%	85.15%	89.12%
<i>MBA dummy</i>	38.90%	100.00%	4.51%
<i>MBA-Top20</i>	26.82%	63.12%	1.82%
<i>MBA-Other</i>	12.07%	36.88%	2.69%
<i>LAW dummy</i>	14.52%	1.52%	100.00%
<i>LAW-Top20</i>	6.36%	0.56%	44.19%
<i>LAW-Other</i>	8.16%	0.96%	55.81%
<i>Master</i>	13.82%	4.61%	4.59%
<u>Explanatory Variables</u>			
<i>Return on Assets</i>	13.08%	13.32%	12.88%
<i>Stock Return</i>	16.87%	17.01%	16.20%
<i>Tobin's Q</i>	2.10	2.20	1.79
<i>CEO Salary (000s)</i>	\$754.95	\$733.39	\$833.37
<i>CEO Ownership (%)</i>	1.54%	1.01%	1.36%
<i>LT Debt-to-Assets</i>	19.38%	19.34%	22.81%
<i>CEO Turnover</i>	9.95%	10.72%	9.15%
<u>Control Variables:</u>			
<i>Assets, millions</i>	\$15,844	\$15,741	\$23,024
<i>Revenues, millions</i>	\$6,366	\$6,342	\$7,339
<i>Market Value, millions</i>	\$9,484	\$9,070	\$12,057
<i>Market-Book ratio</i>	3.70	3.40	2.75
<i>CEO Age</i>	56.05	55.04	57.75
<i>CEO Tenure</i>	8.37	7.22	8.60
<i>Volatility</i>	10.69%	10.68%	9.24%

Panel B: CEO Turnover firms

	All CEO Turnover Firms (<i>n</i> =2,072)	Non- Disciplinary Turnover (<i>n</i> =1,488)	Disciplinary Turnover (<i>n</i> =584)
<u>CEO Education Variables:</u>			
<i>UG-Top20</i>	14.10%	12.62%	17.81%
<i>UG-Other</i>	85.90%	87.38%	82.19%
<i>MBA dummy</i>	43.00%	42.94%	43.15%
<i>MBA-Top20</i>	24.68%	24.97%	23.97%
<i>MBA-Other</i>	18.32%	17.97%	19.18%
<i>LAW dummy</i>	14.20%	14.95%	12.33%
<i>LAW-Top20</i>	6.46%	7.54%	3.77%
<i>LAW-Other</i>	7.74%	7.41%	8.56%
<i>Master</i>	13.22%	13.72%	11.99%
<u>Explanatory Variables</u>			
<i>Return on Assets</i>	12.78%	13.41%	11.21%
<i>Stock Return</i>	11.61%	12.75%	9.28%
<i>Tobin's Q</i>	1.92	1.99	1.73
<i>CEO Salary (000s)</i>	\$647.04	\$676.49	\$573.52
<i>CEO Ownership (%)</i>	0.53%	0.53%	0.55%
<i>LT Debt-to-Assets</i>	18.54%	18.20%	19.42%
<u>Other Variables:</u>			
<i>Assets, millions</i>	\$21,383	\$21,189	\$21,867
<i>Revenues, millions</i>	\$7,843	\$8,260	\$6,780
<i>Market Value, millions</i>	\$11,717	\$12,782	\$8,945
<i>Market-Book ratio</i>	3.28	3.46	2.82
<i>CEO Age</i>	55.89	59.66	50.77
<i>CEO Tenure</i>	8.08	8.68	6.63
<i>Volatility</i>	10.87%	10.15%	12.74%

Panel C – 2007 only, with primary industries

	2007 - All Available CEOs	Manufacturing	Business Equipment	Finance
Number of Observations	968	119	136	133
<u>CEO Education Variables:</u>				
<i>UG-Top20</i>	13.71%	14.91%	13.18%	18.25%
<i>UG-Other</i>	86.29%	85.09%	86.82%	81.75%
<i>MBA dummy</i>	46.54%	45.61%	40.31%	42.86%
<i>MBA-Top20</i>	28.11%	26.32%	22.48%	29.37%
<i>MBA-Other</i>	18.43%	19.29%	17.83%	13.49%
<i>LAW dummy</i>	15.09%	17.54%	7.75%	22.22%
<i>LAW-Top20</i>	6.57%	5.26%	3.88%	8.73%
<i>LAW-Other</i>	8.52%	12.28%	3.87%	13.49%
<i>Master</i>	11.98%	14.04%	20.16%	11.90%
<u>Explanatory Variables</u>				
<i>Return on Assets</i>	13.61%	15.33%	10.28%	6.36%
<i>Stock Return</i>	16.09%	20.62%	11.36%	16.18%
<i>Tobin's Q</i>	1.97	1.86	2.34	1.66
<i>CEO Salary (000s)</i>	850.93	861.39	689.10	810.49
<i>CEO Ownership (%)</i>	1.84%	0.82%	1.67%	2.91%
<i>LT Debt-to-Assets</i>	18.96%	19.00%	14.60%	15.38%
<i>CEO Turnover</i>	10.76%	10.71%	12.40%	7.14%
<u>Control Variables:</u>				
<i>Assets, millions</i>	\$24,952	\$6,722	\$6,913	\$102,065
<i>Revenues, millions</i>	\$9,202	\$6,867	\$5,834	\$11,326
<i>Market Value, millions</i>	\$13,082	\$7,646	\$12,747	\$19,519
<i>Market-Book ratio</i>	3.40	2.64	2.65	2.78
<i>CEO Age</i>	56.09	56.90	54.48	57.85
<i>CEO Tenure</i>	8.17	6.79	8.91	9.16
<i>Volatility</i>	7.52%	8.06%	9.10%	5.21%

Panel D – All other industries, 2007

	Consumer Non- Durables	Consumer Durables	Energy	Chemicals	Telecom	Utilities	Shops	Healthcare	Other
Number of Observations	66	27	41	23	21	55	5	63	279
<u>CEO Education Variables:</u>									
<i>UG-Top20</i>	14.75%	14.29%	17.50%	13.64%	5.26%	12.96%	20.00%	17.24%	9.59%
<i>UG-Other</i>	85.25%	85.71%	82.50%	86.36%	94.74%	87.04%	80.00%	82.76%	90.41%
<i>MBA dummy</i>	57.38%	57.14%	52.50%	59.09%	57.89%	27.78%	60.00%	58.62%	46.58%
<i>MBA-Top20</i>	39.34%	47.62%	32.50%	27.27%	31.58%	3.70%	60.00%	39.66%	27.85%
<i>MBA-Other</i>	18.03%	9.52%	20.00%	31.82%	26.32%	24.07%	0.00%	18.97%	18.72%
<i>LAW dummy</i>	11.48%	4.76%	15.00%	4.55%	5.26%	38.89%	0.00%	17.24%	11.87%
<i>LAW-Top20</i>	4.92%	4.76%	7.50%	4.55%	5.26%	14.81%	0.00%	10.34%	5.48%
<i>LAW-Other</i>	6.56%	0.00%	7.50%	0.00%	0.00%	24.07%	0.00%	6.90%	6.39%
<i>Master</i>	9.84%	0.00%	7.50%	9.09%	5.26%	18.52%	0.00%	8.62%	9.13%
<u>Explanatory Variables</u>									
<i>Return on Assets</i>	17.01%	14.69%	20.74%	16.12%	12.92%	9.54%	9.77%	15.19%	15.81%
<i>Stock Return</i>	19.49%	15.99%	6.86%	30.58%	28.92%	24.74%	16.94%	6.10%	15.22%
<i>Tobin's Q</i>	2.11	1.79	1.56	1.96	1.59	1.19	1.23	2.62	2.09
<i>CEO Salary (000s)</i>	982.34	827.35	885.03	900.74	1,581.04	852.03	718.82	867.54	856.63
<i>CEO Ownership (%)</i>	156.32%	340.81%	143.43%	30.14%	324.79%	51.74%	0.00%	142.05%	2.39%
<i>LT Debt-to-Assets</i>	19.62%	17.48%	21.12%	22.56%	33.07%	29.98%	19.75%	17.89%	17.93%
<i>CEO Turnover</i>	14.75%	4.76%	10.00%	4.55%	10.53%	13.21%	0.00%	17.24%	10.09%
<u>Control Variables:</u>									
<i>Assets, millions</i>	\$8,552	\$12,947	\$22,710	\$6,402	\$43,715	\$16,486	\$4,100	\$7,885	\$14,149
<i>Revenues, millions</i>	\$7,501	\$14,911	\$26,209	\$6,612	\$16,029	\$6,584	\$1,901	\$4,589	\$9,702
<i>Market Value, millions</i>	\$13,798	\$4,785	\$27,045	\$8,820	\$33,999	\$9,037	\$2,581	\$15,520	\$9,660
<i>Market-Book ratio</i>	5.67	2.54	2.46	4.82	(2.80)	2.10	2.38	4.31	4.73
<i>CEO Age</i>	56.28	55.05	57.65	55.00	53.05	57.20	52.40	55.51	55.70
<i>CEO Tenure</i>	7.15	6.86	9.60	5.50	10.16	6.13	5.20	8.71	8.57
<i>Volatility</i>	6.41%	8.18%	9.92%	6.40%	5.87%	4.06%	6.47%	7.84%	8.53%

Table 2
Correlation Coefficients

This table presents the Spearman rank correlation coefficients for the primary CEO education, performance, compensation, capital structure, CEO turnover, and control variables.

	<i>UG-Top20</i>	<i>MBA dummy</i>	<i>MBA-Top20</i>	<i>LAW dummy</i>	<i>LAW-Top20</i>	<i>Master</i>
<i>Return on Assets</i>	0.00	0.01	0.03	-0.03	-0.02	-0.02
<i>Stock Return</i>	0.00	0.01	0.01	0.02	0.01	0.00
<i>Tobin's Q</i>	0.00	0.03	0.06	-0.12	-0.07	0.04
<i>CEO Salary</i>	0.02	-0.06	-0.05	0.07	0.03	0.01
<i>CEO Ownership</i>	0.01	-0.04	0.02	0.00	0.02	-0.03
<i>LT Debt-to-Assets</i>	0.02	-0.01	-0.02	0.09	0.06	-0.02
<i>CEO Turnover</i>	-0.01	0.02	-0.01	-0.01	0.00	-0.02
<i>Assets</i>	0.06	-0.05	-0.06	0.08	0.03	0.02
<i>CEO Age</i>	0.02	-0.11	-0.03	0.09	0.10	0.05
<i>CEO Tenure</i>	0.03	-0.10	-0.05	0.02	0.02	0.01
<i>Volatility</i>	-0.01	-0.01	0.00	-0.10	-0.04	0.02

Table 3
Reasons for CEO turnover

This table presents the classifications for reasons why CEO turnover occurred in a specific year between 1993-2007. CEO turnover data was obtained from Compustat's Execucomp database. Lexis-Nexis archives were reviewed to determine the stated reason for why a CEO left the firm. CEO Turnover is classified as "Non-Disciplinary" if the CEO died, if the CEO was older than 63, if the change was the result of an announced transition plan, or if the CEO stayed on as chairman of the board. CEO Turnover is classified as "Disciplinary" if the CEO resigned to pursue other interests, if the CEO was fired, or if no specific reason is given. CEO Turnover is classified as "Other" if it was the result of corporate control or other reasons.

Reasons for CEO Turnover: 1993 - 2007				
	Disciplinary	Non-Disciplinary	Other	Total
1993	15	20	0	35
1994	26	87	2	115
1995	56	116	4	176
1996	44	113	8	165
1997	54	113	6	173
1998	65	118	18	201
1999	66	127	5	198
2000	92	143	9	244
2001	86	162	7	255
2002	81	100	1	182
2003	82	94	3	179
2004	49	122	3	174
2005	73	135	2	210
2006	61	126	0	187
2007	46	73	2	121
Total	896	1,649	70	2,615
% of Total	34.3%	63.1%	2.7%	

Table 5
CEO Education and performance changes following CEO turnover

This table presents the ordinary least squares results for estimating equation (2) on the relationship between CEO education and changes in firm performance following incidents of CEO turnover. Panel A includes changes in Return on Assets following disciplinary turnover. Panel B includes changes in Return on Assets following non-disciplinary turnover. Panel C includes changes in Return on Assets following all turnover cases. The 6 CEO education variables presented are *UG-Top20*, *MBA*, *MBA-Top20*, *LAW*, *LAW-Top20*, and *Master*. Intercepts, year dummy variables and industry dummy variables are included in the estimation but not presented. Standard errors are corrected for clustering by firm and year. Coefficients are presented with chi-square statistics below in italics. Significance at the 10% level is denoted by *, at the 5% level by ** and at the 1% level by ***.

Panel A – Disciplinary Turnover, Return on Assets:

Dependent Variable: $\Delta ROA_{t \text{ to } t+1}$						
	<i>UG-Top20</i>	<i>MBA</i>	<i>MBA-Top20</i>	<i>LAW</i>	<i>LAW-Top20</i>	<i>Master</i>
<i>CEO Education_t</i>	-0.0177 (0.97)	0.0361 ** (2.59)	0.0403 ** (2.47)	-0.0248 (1.20)	-0.018 (0.47)	-0.0703 *** (3.29)
Δ Industry Return _{t to t+1}	0.3015 (1.62)	0.2679 (1.46)	0.3129 (1.70)	0.3151 (1.69)	0.2996 (1.60)	0.2699 (1.49)
<i>Size (Assets)_t</i>	-0.0054 (0.99)	-0.0073 (1.39)	-0.0075 (1.41)	-0.0069 (1.29)	-0.0065 (1.21)	-0.0033 (0.61)
<i>Industry Size (Assets)_t</i>	0.0081 (1.26)	0.0109 (1.72)	0.0102 (1.62)	0.0087 (1.36)	0.0087 (1.36)	0.0067 (1.07)
<i>Leverage_t</i>	0.0712 (1.85)	0.0766 ** (2.02)	0.0789 ** (2.08)	0.07 (1.82)	0.0733 (1.90)	0.0677 (1.81)
<i>Growth Expenses_t</i>	0.089 (0.83)	0.1027 (0.98)	0.0843 (0.80)	0.0769 (0.72)	0.0914 (0.86)	0.094 (0.91)
<i>CEO Ownership_t</i>	0.0005 (0.25)	0.0004 (0.17)	0.000 (0.01)	0.0004 (0.19)	0.0003 (0.12)	0.0002 (0.12)
<i>CEO Age_t</i>	0.0003 (0.30)	0.0007 (0.76)	0.0003 (0.36)	0.0003 (0.38)	0.0003 (0.34)	0.0003 (0.38)
<i>CEO Tenure_t</i>	0.0002 (0.08)	0.0003 (0.10)	0.0003 (0.10)	-0.0002 (0.06)	-0.0002 (0.06)	-0.0006 (0.19)
<i>Risk_t</i>	-0.0143 (0.16)	-0.0367 (0.42)	-0.0329 (0.38)	-0.0184 (0.21)	-0.0139 (0.16)	-0.0202 (0.24)
Economic Significance of $\beta_{CEO \text{ Education}}$	-0.02%	0.12%	0.07%	-0.02%	-0.01%	-0.06%
# of Observations	481	481	481	481	481	481
R-Squared	0.052	0.084	0.080	0.055	0.047	0.106

Panel B – Non-disciplinary CEO turnover, Return on Assets:

Dependent Variable: $\Delta ROA_{t-1 to t}$						
	<i>UG-Top20</i>	<i>MBA</i>	<i>MBA-Top20</i>	<i>LAW</i>	<i>LAW-Top20</i>	<i>Master</i>
<i>CEO Education_t</i>	-0.0006 (1.27)	-0.0141 (1.08)	-0.0143 (1.02)	0.0008 (0.71)	0.0034 (1.25)	-0.0136** (2.06)
Δ Industry Return _{t to t+1}	0.3310*** (3.42)	0.3338*** (3.38)	0.3332*** (3.39)	0.3309*** (3.42)	0.3308*** (3.42)	0.3254*** (3.49)
<i>Size (Assets)_t</i>	0.0044* (1.61)	0.0043* (1.60)	0.0042 (1.56)	0.0043* (1.61)	0.0043* (1.61)	0.0045* (1.68)
<i>Industry Size (Assets)_t</i>	0.0201 (0.73)	0.0205 (0.88)	0.0203 (0.82)	0.0201 (0.73)	0.0201 (0.74)	0.0201 (0.75)
<i>Leverage_t</i>	-0.0239 (0.53)	-0.0226 (0.47)	-0.0236 (0.52)	-0.0239 (0.53)	-0.0239 (0.53)	-0.0232 (0.50)
<i>Growth Expenses_t</i>	0.0122 (0.53)	0.0124 (0.58)	0.0124 (0.58)	0.0122 (0.53)	0.0122 (0.54)	0.0125 (0.60)
<i>CEO Ownership_t</i>	-0.0013 (0.75)	-0.0014 (0.80)	-0.0012 (0.70)	-0.0013 (0.75)	-0.0013 (0.74)	-0.0014 (0.80)
<i>CEO Age_t</i>	-0.0004 (0.88)	-0.0004 (0.92)	-0.0004 (0.93)	-0.0004 (0.88)	-0.0004 (0.88)	-0.0004 (0.84)
<i>CEO Tenure_t</i>	0.0006 (0.73)	0.0005 (0.84)	0.0005 (0.77)	0.0006 (0.73)	0.0005 (0.74)	0.0005 (0.81)
<i>Risk_t</i>	-0.1534*** (3.42)	-0.1539*** (3.45)	-0.1558*** (3.48)	-0.1534*** (3.42)	-0.1531*** (3.41)	-0.1522*** (3.41)
# of Observations	907	907	907	907	907	907
R-Squared	0.059	0.078	0.074	0.059	0.057	0.084

Table 6
New CEO Education and former CEO education following CEO turnover

This table presents the logit results for estimating equation (3) on the relationship between the education of the new CEO and of the former CEO following incidents of CEO turnover. Panel A considers disciplinary turnover, Panel B considers non-disciplinary turnover and Panel C considers all turnover cases. Panels D, E and F present 6 x 6 matrices showing the relationship between all 6 possible types of new CEO education and all 6 possible types of former CEO education; Panel D considers disciplinary turnover, Panel E considers non-disciplinary turnover and Panel F considers all turnover cases. For conciseness, only the coefficient on the former CEO education variable is presented. The 6 CEO education variables presented are *UG-Top20*, *MBA*, *MBA-Top20*, *LAW*, *LAW-Top20*, and *Master*. Panels G, H and I present the distributions of former CEO education, by each class of new CEO education. Year dummy variables, industry dummy variables and intercepts are included in the estimation but not presented. Coefficients are shown with chi-square statistics below in italics. Significance at the 10% level is denoted by *, at the 5% level by ** and at the 1% level by ***.

Panel A – Disciplinary Turnover:

Dependent Variable: Type of New CEO Education						
	<i>UG-Top20</i>	<i>MBA</i>	<i>MBA-Top20</i>	<i>LAW</i>	<i>LAW-Top20</i>	<i>Master</i>
<i>CEO Education</i> _{t-2}	1.0646 ** (5.78)	1.0615 *** (10.41)	0.8361 ** (5.70)	1.2774 ** (5.12)	0.9595 (1.00)	1.0634 ** (4.42)
<i>Last 2 Years' Return</i> _t	0.0075 (0.00)	-0.4239 (0.62)	0.0692 (0.01)	-0.5098 (0.27)	-1.3376 (0.72)	-0.1864 (0.04)
<i>Last 2 Years' Industry Return</i> _t	0.2075 (0.06)	0.0973 (0.02)	-0.1756 (0.05)	0.3402 (0.08)	2.2706 (1.53)	-0.7354 (0.43)
<i>Size (Assets)</i> _t	0.1887 (2.87)	-0.0554 (0.34)	0.0593 (0.33)	-0.2441 (2.69)	-0.2668 (1.21)	0.2703 (3.74)
<i>Leverage</i> _t	-0.1706 (0.03)	-0.4177 (0.22)	-0.6494 (0.43)	-1.0211 (0.40)	0.5344 (0.06)	-0.4788 (0.11)
<i>Growth Expenses</i> _t	0.1973 (0.01)	-5.0392 (2.81)	-0.7146 (0.06)	-12.0471 (3.63)	-18.985 (2.07)	6.31 (3.07)
<i>CEO Ownership</i> _t	0.0792 (1.23)	-0.0018 (0.00)	0.0398 (0.46)	-0.3134 (1.06)	-0.4915 (0.65)	-0.009 (0.01)
<i>CEO Age</i> _t	-0.0127 (0.28)	-0.0575 *** (7.99)	-0.012 (0.31)	0.0376 (1.43)	0.0896 (3.19)	0.0061 (0.04)
<i>CEO Tenure</i> _t	0.1056 (2.20)	-0.255 (1.90)	-0.0867 (0.55)	-0.0265 (0.04)	-0.4852 (0.47)	-0.2487 (1.43)
<i>Risk</i> _t	2.8442 (1.67)	1.4068 (0.49)	1.5867 (0.61)	1.5958 (0.23)	4.3076 (1.00)	-2.2906 (0.48)
Economic Significance of $\beta_{CEO\ Education)t-2}$	1.04%	1.03%	0.86%	1.24%	1.02%	1.12%
# of Observations	472	472	472	472	472	472

Panel B – Non-disciplinary CEO Turnover:

Dependent Variable: Type of New CEO Education						
	<i>UG-Top20</i>	<i>MBA</i>	<i>MBA-Top20</i>	<i>LAW</i>	<i>LAW-Top20</i>	<i>Master</i>
<i>CEO Education</i> _{t-2}	0.2887 (0.93)	0.2776 (2.37)	0.1200 (0.36)	0.3800 (1.34)	0.7873* (3.80)	0.5542* (3.47)
<i>Last 2 Years' Return</i> _t	0.9950** (4.88)	0.0656 (0.04)	-0.1178 (0.10)	0.5731 (1.24)	0.0970 (0.02)	0.3200 (0.41)
<i>Last 2 Years' Industry Return</i> _t	-0.7040 (1.16)	0.2140 (0.27)	-0.1668 (0.13)	-0.3864 (0.35)	-0.1884 (0.05)	-0.7577 (1.25)
<i>Size (Assets)</i> _t	0.0463 (0.33)	-0.1197** (4.65)	-0.1036* (2.72)	0.0951 (1.54)	0.1258 (1.49)	0.0691 (0.77)
<i>Leverage</i> _t	0.0169 (0.00)	-1.0775* (3.05)	-0.2875 (0.18)	0.3121 (0.13)	0.5875 (0.26)	0.0765 (0.01)
<i>Growth Expenses</i> _t	2.3057 (1.54)	0.9229 (0.40)	0.4238 (0.07)	-8.9335** (5.84)	-5.7567 (1.60)	-0.4577 (0.04)
<i>CEO Ownership</i> _t	-0.0299 (0.24)	-0.0292 (0.87)	0.0135 (0.21)	0.0098 (0.04)	0.0248 (0.23)	-0.4976 (2.08)
<i>CEO Age</i> _t	-0.0023 (0.01)	-0.0188 (1.72)	-0.0210 (1.80)	0.0052 (0.06)	0.0328 (1.32)	0.0259 (1.48)
<i>CEO Tenure</i> _t	-0.0136 (0.11)	-0.0328 (0.97)	-0.0277 (0.52)	0.0293 (1.21)	0.0435 (2.25)	-0.0785 (0.96)
<i>Risk</i> _t	-0.1351 (0.00)	1.8545 (1.49)	0.9802 (0.36)	-4.9745* (3.30)	0.5531 (0.04)	-1.2328 (0.26)
# of Observations	916	916	916	916	916	916

Panel C – 6 x 6 Matrix, disciplinary CEO turnover:

Dependent Variable: Type of New CEO Education		<i>UG-Top20</i>	<i>MBA</i>	<i>MBA-Top20</i>	<i>LAW</i>	<i>LAW-Top20</i>	<i>Master</i>
Explanatory Variable: Type of Former CEO Education	<i>UG-Top20_{t-2}</i>	1.0646 ** (5.78)	0.2058 (0.24)	-0.0326 (0.00)	0.3536 (0.34)	1.7491 ** (4.01)	-0.3191 (0.22)
	<i>MBA_{t-2}</i>	0.5150 (1.73)	1.0615 *** (10.41)	0.9232 ** (5.21)	-1.2775 * (3.75)	-0.6773 (0.52)	-0.0990 (0.04)
	<i>MBA-Top20_{t-2}</i>	0.6857 (2.60)	1.4559 *** (13.42)	0.8361 ** (5.70)	-0.6542 (0.96)	-0.1291 (0.02)	-0.3566 (0.35)
	<i>LAW_{t-2}</i>	-0.7100 (1.15)	-0.6261 (1.87)	-0.3844 (0.51)	1.2774 ** (5.12)	1.1604 (0.98)	-1.2793 (1.45)
	<i>LAW-Top20_{t-2}</i>	-0.2710 (0.18)	-1.7529 (2.37)	-1.3480 (0.00)	2.055 ** (4.66)	0.9595 (1.00)	-1.1770 (0.98)
	<i>Master_{t-2}</i>	-0.6655 (1.52)	-0.0820 (0.05)	-0.4581 (1.05)	0.1731 (0.09)	0.8855 (1.15)	1.0634 ** (4.42)
# of Observations		472	472	472	472	472	472

Panel D – 6 x 6 Matrix, non-disciplinary CEO turnover:

Dependent Variable: Type of New CEO Education		<i>UG-Top20</i>	<i>MBA</i>	<i>MBA-Top20</i>	<i>LAW</i>	<i>LAW-Top20</i>	<i>Master</i>
Explanatory Variable: Type of Former CEO Education	<i>UG-Top20_{t-2}</i>	0.2887 (0.93)	0.2611 (1.42)	0.5615 ** (5.87)	-0.1522 (0.22)	-0.3878 (1.03)	0.0422 (0.02)
	<i>MBA_{t-2}</i>	-0.3319 (1.46)	0.2776 (2.37)	0.2675 (1.43)	-0.2869 (1.29)	-0.0664 (0.03)	-0.2393 (0.80)
	<i>MBA-Top20_{t-2}</i>	-0.0370 (0.02)	0.1585 (0.59)	0.1200 (0.36)	0.3722 (1.80)	0.7873 (1.49)	-0.3357 (1.15)
	<i>LAW_{t-2}</i>	0.2794 (0.64)	0.0183 (0.00)	0.0232 (0.01)	0.3800 (1.34)	1.4303 *** (10.09)	-0.4178 (0.97)
	<i>LAW-Top20_{t-2}</i>	0.3838 (0.72)	-0.1256 (0.12)	0.2404 (0.40)	0.7774 * (3.76)	0.7873 * (3.80)	-0.0411 (0.01)
	<i>Master_{t-2}</i>	0.2965 (0.87)	-0.2594 (1.18)	-0.3063 (1.23)	-0.4063 (1.22)	-0.3266 (0.43)	0.5542 * (3.47)
# of Observations		916	916	916	916	916	916

Table 7
CEO Education and Firm Performance

This table presents the Ordinary Least Squares results for estimating equation (4) on the relationship between CEO education and firm performance. Three different performance variables are considered as the dependent variable: Panel A considers Return on Assets, Panel B considers Stock Return, and Panel C considers Tobin's Q. The 6 CEO education variables presented are *UG-Top20*, *MBA*, *MBA-Top20*, *LAW*, *LAW-Top20*, and *Master*. Intercepts, year dummy variables and industry dummy variables are included in the estimation but not presented. Standard errors are corrected for clustering by firm and year. Coefficients are presented with t-statistics below in italics. Significance at the 10% level is denoted by *, at the 5% level by ** and at the 1% level by ***.

Panel A – Return on Assets:

Dependent Variable: ROA_t						
	<i>UG-Top20</i>	<i>MBA</i>	<i>MBA-Top20</i>	<i>LAW</i>	<i>LAW-Top20</i>	<i>MASTER</i>
<i>CEO Education_t</i>	-0.0041 (0.77)	0.0055 (1.37)	0.0079 * (1.78)	-0.003 (0.58)	0.0005 (0.06)	-0.0038 (0.82)
<i>Size (Assets)_t</i>	-0.0076 *** (3.72)	-0.0076 *** (3.67)	-0.0075 *** (3.67)	-0.0076 *** (3.76)	-0.0076 *** (3.75)	-0.0076 *** (3.75)
<i>Industry Performance_t</i>	0.6068 *** (5.85)	0.6074 *** (5.83)	0.6072 *** (5.83)	0.6062 *** (5.83)	0.6068 *** (5.84)	0.6064 *** (5.84)
<i>Leverage_t</i>	-0.0523 *** (2.95)	-0.0526 *** (2.97)	-0.0523 *** (2.95)	-0.052 *** (2.94)	-0.0524 *** (2.96)	-0.0527 *** (2.97)
<i>Growth Expenses_t</i>	-0.0573 (0.93)	-0.0605 (0.98)	-0.0599 (0.97)	-0.0596 (0.96)	-0.0585 (0.94)	-0.0575 (0.92)
<i>CEO Ownership_t</i>	0.0002 (0.54)	0.0002 (0.60)	0.0002 (0.57)	0.0002 (0.53)	0.0002 (0.53)	0.0002 (0.50)
<i>CEO Age_t</i>	0.000 (0.02)	0.000 (0.05)	0.000 (0.01)	0.000 (0.01)	0.000 (0.03)	0.000 (0.01)
<i>CEO Tenure_t</i>	0.0002 (0.76)	0.0002 (0.81)	0.0002 (0.80)	0.0002 (0.73)	0.0002 (0.73)	0.0002 (0.73)
<i>Volatility_t</i>	-0.299 *** (11.10)	-0.2978 *** (11.14)	-0.2977 *** (11.14)	-0.2996 *** (11.15)	-0.2988 *** (11.11)	-0.298 *** (11.11)
# of Observations	8,676	8,676	8,676	8,676	8,676	8,676
R-Squared	0.249	0.250	0.250	0.249	0.249	0.249

Panel C – Tobin's Q :

Dependent Variable: Tobin's Q_t						
	<i>UG-Top20</i>	<i>MBA</i>	<i>MBA-Top20</i>	<i>LAW</i>	<i>LAW-Top20</i>	<i>MASTER</i>
<i>CEO Education_t</i>	-0.0886 (0.97)	0.0291 (0.38)	0.1658 * (1.94)	-0.0221 (0.21)	0.0161 (0.12)	0.0552 (0.52)
<i>Size (Assets)_t</i>	-0.0369 (1.47)	-0.0377 (1.51)	-0.0348 (1.39)	-0.0383 (1.54)	-0.0384 (1.55)	-0.039 (1.56)
<i>Industry Performance_t</i>	0.0116 * (1.66)	0.0117 * (1.68)	0.0115 (1.64)	0.0117 * (1.67)	0.0118 * (1.69)	0.0118 * (1.69)
<i>Leverage_t</i>	-1.5577 *** (5.60)	-1.5636 *** (5.60)	-1.5665 *** (5.60)	-1.5596 *** (5.55)	-1.5641 *** (5.57)	-1.5587 *** (5.60)
<i>Growth Expenses_t</i>	8.1261 *** (8.33)	8.0939 *** (8.34)	8.0814 *** (8.41)	8.0925 *** (8.30)	8.1038 *** (8.35)	8.0852 *** (8.32)
<i>CEO Ownership_t</i>	0.004 (0.55)	0.0041 (0.55)	0.0042 (0.58)	0.0039 (0.54)	0.0039 (0.53)	0.0041 (0.56)
<i>CEO Age_t</i>	-0.0156 *** (2.87)	-0.0155 *** (2.85)	-0.0155 *** (2.88)	-0.0156 *** (2.88)	-0.0157 *** (2.91)	-0.0158 *** (2.90)
<i>CEO Tenure_t</i>	0.0102 ** (2.02)	0.0102 ** (2.00)	0.0105 ** (2.09)	0.01 ** (1.98)	0.0101 ** (1.99)	0.01 ** (1.98)
<i>Volatility_t</i>	1.0724 (1.56)	1.0838 (1.58)	1.0985 (1.60)	1.0751 (1.57)	1.0803 (1.58)	1.07 (1.58)
# of Observations	7,415	7,415	7,415	7,415	7,415	7,415
R-Squared	0.153	0.152	0.154	0.152	0.152	0.152