DO EDUCATED MANAGERS MATTER?

by

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Abstract

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The paper studies whether the CEO's level of education and background matters for the firm's performance. We estimate the influence of different educational levels on performance in a sample of publicly traded companies, whose stocks are listed at international stock exchanges, controlling for industry and regional effects and country specific cultural elements. Besides estimating the influence of education, we also explore whether this influence of education depends on the cultural environment, measured by Geert Hofstede Cultural Dimensions, in which the companies and the CEOs operate.

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GLOSSARY

Chief Executive Officer (CEO). The executive director, general manager, top managing position in the enterprise.

Bachelor of Arts/Bachelor of Science (BA/BS). The primary scientific degree.

Master of Arts/Master of science (MA/MS). An academic degree granted to individuals who attained certain level of knowledge and graduated.

Doctor of Philosophy (PhD). A postgraduate academic degree awarded by universities.

Power Distance (PDI). The dimension express the degree to which the less powerful members of society accept and expect that power is distributed unequally.

Individualism versus collectivism (IDV). A society position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "We"

Masculinity versus femininity (MAS). The masculinity side represents preference in society for achievement, heroism, assertiveness and material reward for success. The femininity side represents preference for cooperation, modesty, caring for the weak and quality of the life.

Uncertainty avoidance (UAI). The degree to which the members of society feel uncomfortable with uncertainty and ambiguity.[1]

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[1] The terms PDI, IDV, MAS, UAI are developed by Geert Hofstede

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INTRODUCTION

CEO's attract a lot of attention from both researchers and the public at large. This should not come as a surprise, as they are considered as people who drive the companies forward, and determine how the future of the company and its employees will look like. What makes CEOs qualified to have such influence and gives them the power to manage people and capital? One of the possible explanations, supported by the claims of different educational institutions, is that the CEO's education allows them to take competent decisions that guide the company in the right direction. In this paper I will test to what extent a CEO's education affects his/her firm's performance. We will concentrate on one industry (in particular – commercial banks), since effects of CEO's education on firm's performance may differ over industries.

Our research question should be of interest to shareholders and boards of directors, who take the decision of which CEO fits better to their needs. It is important to realize whether CEO's education is among the list of drivers that lead company and shareholders to better results in terms of shareholders wealth. Another group for whom this research should be of interest is students who are planning their career path. It is important to understand whether it is worth getting an additional level of education and whether education gives some real effect on CEO performance. Is it crucial to get a PhD to be able to successfully manage a company or is an MBA the main engine that drives the best-performing CEO's?

In this paper we research what impact have different types of education on firm's performance through the prism of cultural measurements. Doing so we hypothesize that the impact of education can be different in different cultures.

A number of aspects of the relation between CEO's characteristics and firm's parameters have being investigated in the academic literature already. Papadakis and Barwise (2002) look how firm's strategic decision making is related to top-management and their team characteristics. Ryan and Wang (2011) look at the effect of experience, as measured by the employment history on firm characteristics. Falato and Li (2010) look at the effect of a CEO's 'talent' as measured by a combination of several characteristics on firm performance and CEO's reward.

In prior researches different CEO's characteristics were investigated, however no research team focused on the influence of education on firm's performance and how this depends on culture (as measured by Geert Hofstede)[2]. If we looking at different cultures, we can observe different patterns that prevail in decision making. This is clear from the comparison of two quite different management models of behavior in Japan and the USA, for example. This leads to the difference in the CEO's role in decision making and as a consequence, the role of CEO's educational level in determining firms performance. Further we discuss the reasons for the existence of the difference in education effect dependent on the cultural measurements, in particular IDV and UAI measures.

We apply cultural measurements in order to capture the difference in the nature of influence over the size of certain cultural components. In order to test whether educational impact interacts with levels of cultural measurements in the

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[2] http://geert-hofstede.com/dimensions.html

research we look at the culture in which CEO operates (cultural measurements for the country of head-office location).

The research is organized in a following way: In the second chapter we look at literature review, in the third – methodology. We develop a general approach to tackle the problem of capturing the effect of CEO's educational level on firm's performance. Further, in the fourth chapter, we describe the principles of data collection, sources of information and the data characteristics. In the fifth chapter we perform the analysis of the models, estimate the size and significance of the influence on firm's returns of parameters of interest. Then we discuss the results, possible reasoning and shortcomings of our research. Then we summarize our findings in the final conclusion.

Chapter 2

LITERATURE REVIEW

The review is organized in three main sections. In the first part we discover main links that constitute CEO characteristics that influence a firm's performance. Then we develop a list of the main external factors that we should take into account while explaining a firm's performance. Then we get to interrelations of CEO's characteristics that are closely related to their abilities, like CEO's talent, with firm's performance. Finally we zoom in on the effect of the CEO's level of education.

Strategic decision making is a crucial process in the firm's existence, as it determines the direction where the whole enterprise is going to move, policies and rules that are implemented. CEOs take the main role in strategic decision making and that is the way how CEO's characteristics may influence firm's performance. The correct firm strategy, chosen by the company management determines the whole set of actions that the firm takes on the market and is one of the main factors that determine whether firm will succeed.

Addressing this question, Papadakis and Barwise (2002), for example, explore the influence of Top-managers and their team characteristics (like 'aggressiveness' measured by the attitude to innovation, commitment to meet competition and enter new segments, level of bearable business risks) on firms strategic decision making. They used the data obtained from the firm survey with detailed questionnaire for Top-managers and their teams. It was found that both the characteristics of Top-managers and of their teams do matter for strategic decision making, but they exert different influence on different types

of decisions. These findings may be very useful in determining the composition of Top-manager's team or the CEO, who matches the existing team for better decision making, depending on the strategic goals of the company. For example, more aggressive goals, like expanding to other markets or restructuring and acquisition may require fast decisions that are more probable to be observed when there is an authoritarian CEO, who is able to react on market conditions and take decisions quite fast.

Papadakis and Barwise (2002) show that the firm's goals and needs on the market may influence the choice of CEO. If we search for other characteristics that may be important in choosing the right CEO paying attention to their characteristics, we should pay attention to research of Ryan and Wang (2011). They explore the influence of a CEO employment history on firm characteristics, including performance. They found that CEOs working for more employers showed a better performance if there was any need to change the direction of the firm's development.

But taking decisions regarding change of CEO, if the firm objectives change, one should for sure take into account the influence on the company of the process of CEO dismissal and hiring on firm's performance. Targeting this point, the research of CEO turnover influence on firm performance and estimating CEO effects is done by Talavera (2009), who discusses how in the case of Ukraine management characteristics influence different enterprises activity areas, such as employment, firm's performance vs. management turnover. The research suggests negative correlation between the probability of turnover and enterprise past performance. This supports the idea that in emerging markets (in particular in Ukraine) the markets are efficient and bad CEO's performance is punished by shareholders. So CEO's have motivation to work well and to deliver the best results they are able to deliver. This rules out

the question of market efficiency and managers with higher ability to derive results do have the incentives to derive them. That suggests that if there is the effect of education on the CEO's ability to manage the company, it will be reflected in firm performance.

Taking decision of change in CEO we should not only take account of possible effects of the changing process, but we should also determine precisely, what CEO's characteristics fit better the enterprise goals.

So we get to the group of researches that are closer related to such CEO's characteristic as education and firm performance. Managerial education is supposed to have some impact on enterprise performance, in line with other measurements of abilities, like talent, skills and competence.

Kaplan, Klebanov and Sorensen (2007) address the question of managerial characteristics and their influence on different firm measures. They conducted a study of what kind of characteristics and abilities influence hiring, investment decision and firm performance, estimating a wide variety of management characteristics, which not surprisingly are found to be highly correlated. We observe the expected results that talents are highly paid and appreciated by investors (which is expressed through salaries and other benefits), but skills and talents are not obviously related to higher success.

In their research Falato and Li (2010) also investigate the influence of CEO talent (measured by multiple proxies based on key characteristics that board of directors look at CV's of potential CEOs, which include reputation, career record and according to our expectations, educational background) on firm's performance. The got the result which suggests that researched CEO's characteristics appeared to be highly significant for both returns for shareholders, manager's salary and benefits. In this way Falato and Li (2010)

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implicitly establish the linkage between CEO's educational level and firm's performance.

Turning directly to researches that look at the question of educational background and its influence on different measures of performance we get to the paper of Besley, Montalvo, Reynal-Querol (2011). We can get some insight from the analogy of a country as a huge enterprise and its leader – as CEO of a company. They conduct the investigation on how a politician's level of education affects his performance, which is the rate of economic growth of the country, estimating changes after the unexpected death of a politician. They also measure how different leader's levels of education influence the performance in different public orders in the country. Under authoritarianism an unexpected death of a leader shows rather a small positive effect on economic growth, while under democratic style it proved to be negative. However, the leader's level of education in both cases improves economic growth (analogous to firm growth, which reflects performance) in the country. This point may lead us to think that education of CEO's is also going to improve the growth of the company.

Now we move our attention from different variables that are linked with the influence of education level on enterprise performance, towards the research of CEO characteristics influence firms performance by Bennedsen, Perez-Gonzalez and Wolfenzon (2007). They look into the change in managerial performance after CEO experience death of their close relatives, which is expected to worsen their efforts supplied to manage as effective as before. It is shown that the death of CEO's close relative worsens the firm performance for 2-3 years with dwindling negative effect of a personal shock on managerial performance. Another testing is the effect of change in CEO due to unexpected death. There are different approaches to capture the effect of CEO's

characteristics, including turnover of CEO's. In this paper authors restrict the data in sample to be to higher extent exogenous. They treat the change of CEO due to death as an unexpected event and due to that logic it is exogenous and reduces bias in sample. Some part of the turnovers in CEO are predetermined by firm's performance and anticipated by the market, while unexpected change in management leads to random and unbiased sample of change in management. Various effects were estimated, such as death of a CEO's male spouse showed to cause higher decline in firm performance by 3 percentage points than death of female one, both being statistically significant. The only family shock that gives non-negative (though insignificant) effect is mother-in-law death. All the shocks are assumed to lower efforts supplied (abilities are assumed to be constant) by CEO to the working process in decision making (up to zero in case of CEO's unexpected death). The research clearly shows a negative effect of lower efforts supplied by the manager on firm performance. From this result we could say that CEO's of the companies at least have certain effect on the company, since lower efforts supplied lower firm performance. Efforts supplied may depend on the quantity (working hours) and quality (ability to generate right decisions) of efforts. Better education may be treated as an improvement factor for the quality of efforts supplied. If these assumptions are valid, then the results of Bennedsen, Perez-Gonzalez and Wolfenzon (2007) may suggest the presence of some effect of CEO's education on firm performance.

So, in the prior researches we clearly trace the existence of CEO's impact on the firm performance through their characteristics, different measures of abilities and prior experience on a sample of local firms.

The book by Geert Hofstede, "Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations" provides the analysis

of cross-cultural values, work motivations and organizational dynamics. In the book author argues that throughout childhood, education process and working experience people gain "mental programs" that are culture specific and are expressed in the peoples values and attitude to environment, society, decision making. In the book four major cultural dimensions are discussed: PDI, UAI, IDV, MAS. Geert Hofstede discusses their potential impact on the people decision making. We use these cultural measurements in our research. Since "mental programs" are gained during the education process and differs around cultures, we expect the effect of education to differ also with respect to cultural measurements.

In our research we trace the impact of CEO's educational level over the sample of companies from different countries and cultures over the world, concentrating on one specific industry (banking business). This should give us a better insight on the existence and magnitude of the impact of a CEO's education on firm's performance and the way this effect differs around different cultures. All together we test the hypothesis that managers with higher levels of education should manage companies better, than ones with lower levels. This should be reflected in the performance of management – taking better decisions, which should lead to higher performance of the enterprise.

METHODOLOGY

So, the topic of managerial characteristics influence on firm's performance is studied in various dimensions over the recent past years. However, in our research we examine this question in a new context. As far as we know, all researches made are based on local country data sets, analyzing the effects in the environment of one-two countries in the limits of one prevailing culture. The question whether these effects differ in different countries under the number of cultural measures has not ever been arisen in existing researches. We suppose that in different countries with various cultural characteristics the effect of the level of education on firm performance may differ in size. The motivation behind introduction of cultural measurements is that in the different cultural environment, traditions and types of values educational level may have quite a different effect. For example, in highly individualistic and masculinity countries like the USA the decisions, strategies and the direction of the firm development are more likely to be taken or determined by company leaders. In contrast, in the highly collectivistic and feminine countries like China the decision making process might be quite different and less influenced by sole CEO vision. In this case the impact of CEO's education may appear to be less influential than in countries like the USA. That is why, we expect to observe different effect of CEO's education under different cultural measurements In cultures with high uncertainty avoidance measure, the degree of risk aversion is high. This means that people are more willing to rely on educated and reliable decisions with low risks. In this case education should play an important role for determining firm performance. In contract, in countries with low

uncertainty avoidance measure people are willing to take more risks, take decisions intuitively or just taking risk in a hope to succeed. That implies lower effect of education in such cultures on the final outcomes of enterprises. Coming from the Geert's Hofstede discussion of cultural dimensions potential impact on the people decision making we come to interpretation in terms of attitude to risk in decision making. When people are not concerned about their relatives and people that surround (highly individualistic cultures) they are more willing to gamble and take risks for higher potential profits, taking into account impact on their personal interests only. In this case the risky decisions drive the main results of companies. In this case relying only on education makes companies less successful compared to those that took risky decision and succeeded. Therefore education in highly individualistic countries may have negative or insignificant effect. While in collectivistic countries in decision-taking process people are more likely to take into account interests of other people in the group, which implies higher risk avoidance. In this case managers will take more weighted and reliable decisions, which are less risky and are grounded on theoretical justification more. Therefore companies are more confident in the results of activity and these results depend more on education. We argue that better education affords better theoretical justification for decisions and in collectivistic cultures better theoretical justification should drive companies to better results.

We estimate the cultural heterogeneity of the effect of education from the difference in effects through different countries, weighted by the Geert Hofstede Cultural Dimensions.

The market estimation of firm performance is given by the evolution of the stock price and should incorporate the estimation of CEO's characteristics and managing decisions. In contrast to the market estimations, accounting

estimators (like ROE and ROC) may reflect consequences of decisions far later than decisions are taken. If a company, for example, takes financing mix decision or accepts some projects, invest significantly in R&D, the results may show up far later on. However investors are able to estimate the quality of these decisions, their consequences and reflect them in their expectations and market price for the stock. Also accounting measures of dependent variable may have the weakness of distortion for taxation purposes. In some countries it may appear to be a profitable strategy to hide share of taxable earnings, or to minimize it legally. This would show lower accounting measurements of performance, however managing decision are correct and may be rewarded by investors by higher expectations of future revenues and increase stock price.

In this paper a notable contribution is going to be made to the existing research on the managerial influence on firm's performance by looking at the difference of CEO's education effect due to differences in the cultural environment in head office. We start our regression analysis with estimating the type of regression model to be used and fit the data. We choose between the two model specifications: Fixed Effect and Random Effect models, since from the theoretical expectations there may be firm or country fixed effects. First, we test Random Effect model, which determines the influence on error variance of time and group errors, with the Breusch and Pagan Lagrange-multiplier test for random effects. Then, we estimate the Fixed Effect model and perform F-test for the correctness of the model specification. Finally, we perform the Hausman specification test (which tests whether group fixed effects are uncorrelated with other regression explanatory variables) for the model specification: Fixed versus Random Effect models. Based on this approach we choose to use the Fixed Effect model specification.

Based on the outcomes of the tests for the model specification, we choose the following structure for data analysis. The below is the general specification that is then used to do all the tests:

$$y_{it} = \alpha + X'_{it}\beta + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + ...\beta_n D_n + u_{it} \quad (1)$$

$$u_{it} = \mu_i + v_{it} \quad\quad (2)$$

$$i = 1,...,N; t = 1,...,T_i \quad\quad (3)$$

Where y – firm performance expressed in returns to the previous period; X' is the matrix of explanatory variable, including different levels of CEO's education, the i'th component describes the nested group (in our case it is bank, which has in its historical data different CEOs leading the company). In the data analysis we use dummy variables intensively to capture the managerial characteristics, such as presence of awards or different types of education. D_n is dummy for such managerial characteristics. For example, if CEO is a graduate of PhD program, dummy takes value of 1. Otherwise – 0; μ stands for the firm specific fixed effect of i'th company and ν remains for the remainder of the disturbance. The residual elements of u_{it} are mutually independent. The part of μ_i is the fixed effect that varies between groups, but remains fixed over time. It should capture the fixed effect of unobservable group-specific factors, which do not change over time. The part v_{it} is the conventional error term.

We run the Wald test to check the joint significance of variables of interest. In particular, we are interested whether education overall has any effect that is significantly different from zero on firm performance.

Further, we check the model for heteroschedasticity employing modified Wald statistic for groupwise heteroskedasticity in the residuals of the fixed effect. Since we identify the presence of heteroscedasticity in residual terms, we perform the robust standard error estimation. Then, we check a different model specification in terms of explanatory variables.

To discover some additional insight into the data interrelations and the nature of influences on firm returns, we also perform an alternative model. We use the probit model in order to look how having a certain level of education affects the probability of observing a positive movement in a firm's returns, and how the effect of education differs under different cultural measurements. If return is greater than zero, new variable "effect" (direction of return dynamics), takes value 1, otherwise its value is zero (which includes zero and negative values). This rules out the cases of illiquid assets, when there is no changes in stock prices and returns respectively only due to the absence of trade. Because of high volatility of returns and huge number of factors that influence firm performance in different way, using Probit regression can give an additional understanding of how the characteristics of interest are related to firm's performance in terms of probability of observing positive returns due to these factors and to capture the relative size of influence. For example, we are able to estimate how attaining of MBA contributes to the probability of observing positive dynamics of returns over the long run period on average. We suppose that getting better education should increase probability of taking right decisions and, therefore, increase the probability of the positive movement of firm's returns. This kind of result may be interesting for investors, who are averse to the probability of loss.

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DATA DISCRIPTION

In order to extract the influence of CEO's education on firm performance we are to develop measurements of both variables and other controls for market and industry effects. The level of education is measured by dummy variables for presence of BA/BS, MA/MS, PhD degrees, MBA education (where presence of this type of education is 1, absence – 0). Additional parameters include the age of CEO. The latter variable allows to test the hypothesis that older CEOs have different experience and therefore may differ in the way they take decisions. This may be reflected in enterprise performance. Also we control for the influence of different firm sizes, introducing two additional variables that measure the number of employees and market capitalization of the bank (measured by capitalization in dollar terms). We hypothesize that large firms may be more efficient in producing goods and services or in gaining higher market power to negotiate better conditions due to economies of scale effect (in our case of banking institution that may also include cheaper sources of financing). That is why we should include firm's size control variable. However, Bennedsen, Perez-Gonzalez and Wolfenzon (2007) find that CEO's shocks (death of close relatives, like children or spouses, or death of CEO himself) have similar effects, irrespective of the size quartile that the company belongs to.

There are two main measures of firm performance – accounting and market. Accounting measurements, like Returns on Asset, Return on Capital, Price/Earnings ratios are frequently used, but cause controversy because these indicators can be manipulated by the CEO's team, including agent problem, if

CEO's bonus depends on certain accounting measurements of values affected by them. For example, such representatives of technology firms like Intel and Microsoft in 1990's were able to beat analyst estimates for 39/40 quarters, according to Damodaran (2009). Accounting measures of performance may be misleading in this case. Also enterprises may synthetically manipulate some accounting measurements of performance measurements. Company may increase its revenues, selling in credit or manipulate profits, increasing warehouse stock (for that period fixed costs will be lower per unit of goods). Surely, some of manipulations are temporary, but, if stock markets are efficient, it is fair to assume that stock price reflects investors' estimations of decisions including these manipulations (we don't count here for falsification of enterprise reports data, since investors are not informed correctly in this case and base their decisions only on the available information) and discounts the price by investors' estimation of their effects. In addition, accounting data are available only on a quarterly or annually basis. Those are the main reasons of measuring the dependent variable of firm's performance through market estimators (banks' returns in percentage change to previous period.

To control for the overall economy, market movements and investors mood (the factors that influence all the market and do not depend on the company decisions), we will use local stock exchange indices like S&P500 or global banking index like S&P Banking index depending on where the bank is located. Making use of it we tend to isolate the overall market effect. The industry composite index should also be an explanatory variable in order to absorb industry-specific influences that affect stock prices.

We have only the official date of enrollment and dismissal of a new CEO, while this information may be known for some time in advance by the public and may be reflected in stock prices, we can miss market reaction of the

announcement effect and misleadingly assign market reaction of observing new CEO's characteristics to the Previous CEO. In order to reduce this, additional variable for the number of years in charge of the enterprise over the working period of the manager is introduced. This reflects the idea of the CEO career path. We check whether these effects differ between different periods of being in charge of the organization. So, we test whether the effect of CEO's educational level in the first quarter differs from the one in the tenth quarter, for example. So we introduce additional variable to control for interaction of education and CEO's years in charge. We expect that the more years the CEO is in charge, the more competent he will be to influence the path of the company. That is why, controlling for the number of years in charge should give some significant effects for later periods. This will give us additional advantage to see, whether the CEO's effect differs on different stages of his carrier in the company.

In our analysis we use a self-collected database, as far as there is no unified source of such information. The stock ratings are collected from Yahoo Finance and are already adjusted to splits and dividends. We transform stock prices into percentage returns per period. The absolute majority of stock prices are taken from developed countries stock exchanges with quotation in stable currencies. We assume the effect of currency exchange rate variation for the country of company residence on the company's value is incorporated in investors pricing of the stock. These operations and assumptions make growth rates over different countries comparable. Combining mainly Yahoo Finance and Bloomberg sources of information we get the estimation of the number of employees working in the company and its market capitalization in dollar terms at the current point of time (time of snapshot of the company characteristics). The collected sample of companies is not a random sample, since choice of companies is limited to the ones being available with all required information,

with the intention to cover different countries (in order to get the variation in cultural measure terms).

The overall trends in the economy are determined by local stock exchange indices and S&P Banking Index and transform them into percentage returns terms. In the analysis we have collected information for 100 banks from 24 countries: USA, China, Turkey, Ireland, India, Australia, Germany, Brazil, Spain, Portugal, Argentina, Indonesia, Malaysia., Canada, Nigeria, Switzerland, United Kindom, Czech Republic, Russia, Greece, Lebanon, Chile, Israel, Honduras. For each bank we got on average 2 Chief Executive Officers who ran these companies, which leads us to 200 observations for CEO's educational level influencing firm's performance. For each enterprise we determine the location of the Head Office and prescribe corresponding indexes, according to Geert Hofstede measurements of Cultural Dimensions. We use 4 main cultural measurements, determined by Geert Hofstede, that include Power Distance (PDI), Individualism versus Collectivism (IDV), Masculinity versus Femininity, Uncertainty avoidance. These cultural measurements are assumed (in the research as well as by Geert Hofstede) to be fixed over time.

Table 1: Descriptive statistics of cultural measurements

Variable	Mean	Std. Dev.	Min	Max	World average
PDI	45.35	14.63	13	104	64.79
IDV	76.72	23.05	14	91	37.92
MAS	59.01	7.55	28	70	48.55
UAI	51.25	15.39	35	112	64.43

As can be seen from the descriptive statics (Table 1), the cultural measurements MAS has little variation in our sample. PDI parameter is also lower than the world average and is quite centered around the mean. Countries in the sample on average are more of individualistic cultures. In countries where measurements of collectivism are low, intuitively the decisions made should depend more on the Top-manager team characteristics rather than due to CEO's own characteristics only. We test in our analysis whether the difference in effect between cultures is statistically significant.

Further, we collect managerial characteristics from numerous sources of information that include Bloomberg, Routers, Forbes, Corporate web-sites, mass-media publications, social networks…We estimate for the years when the particular CEO was in power, his or her age, gender, compensation and educational level. Educational level is split into four main categories: Bachelor's degree, Master's degree, MBA, PhD. Some specific degrees, like JD (Juris Doctorate) or other professional doctorates are first professional degrees and treated as Masters degrees, while such categories like Doctor of Juridical Science and similar ones are treated as PhD educational levels. Honorary degrees, as well as other significant honors, are treated as awards and represent another category for the analysis. We get the number of years on the CEO position from the information when a particular CEO was appointed and the timing of his or her dismissal. We also generate the time trend and dummies for countries in order to get rid of some fixed effects that may be captured. For each enterprise we generate a unique firm identification number, in order to be able to capture some firm-specific fixed over time effects. For the data collected we compute descriptive statistics (Table 2).

Table 2: CEO's and firm's descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Daily returns	.001	.0926	-.99	34.99
Number of quarters CEO is in power	22.11	19.268	0	91
CEO's age	60.52	5.836	38	78
CEO being in Top-CEO ratings	.121	.326	0	1
CEO's awards	.375	.484	0	1
Masters degree	.449	.497	0	1
MBA degree	.339	.473	0	1
Doctor of Philosophy degree	.09	.286	0	1

As can be seen from the sample descriptive statistics, average CEO is 60,5 years old and takes his position for 22 quarters (5,5 years); 45% have masters degree, 34% have the MBA education background and only 9% have the PhD degree. In the Top-CEO ratings are 12% of Top-managers and 37,5% have different awards for their activities, which are mainly related to their extracurricular activity. The companies have on average 0,1% of daily returns and are quite centered around that number. The maximum value here is a clear outlier and on average such outliers are related to illiquid assets that observe jumps in prices when are rarely traded through individual deals.

Data are combined in an unbalanced panel data set, which covers mainly the period since year 2000, in order to make the external conditions in which companies operate more or less stable. Based on this sample we create additional interaction terms for CEO's levels of education (MA, MBA, PhD)

with four main cultural measurements (PDI, IDV, MAS, UAI) in order to capture the difference in the impact that education has in different cultural environments.

EMPIRICAL RESULTS

This section is organized as follows. The first part is concentrated on the estimation results obtained from the regression analysis done according to the methodology proposed in chapter 4. The second part is focused on the discussion and interpretation of the results obtained.

5.1 Estimation results

To estimate the effect of CEO educational level on the firm's performance we employ two main models: Panel data regression and Probit analysis. The former is estimated with two methods: the Fixed Effect unbalanced panel regression with bank-specific fixed effect, Random Effect unbalanced panel regression.

We start with estimating Random Effect model. The regression results clearly suggest that from the Breusch and Pagan Lagrange-multiplier test which examines whether the variance of groups is zero for random effects, we should prefer FE specification since we fail to reject the null hypothesis. Therefore, we should stick to the pooled regression model (Fixed Effect model).

Further, we run the Fixed Effect model. F-test supports the choice of the model specification. Finally, we perform Hausman specification test procedure. Based on the test output we can reject the null hypothesis in favor of using Fixed Effect model.

In Fixed Effect specification we assume that there are unobservable firm specific characteristics that influence performance and do not vary significantly

over time. We conduct initial Fixed Effect regressions with different specifications (Appendix B). By employing modified Wald statistics for groupwise heteroskedasticity in the residuals of Fixed Effect we conclude presence of heteroscedasticity in residual terms. Basing on this result we perform the robust standard error estimation of the Fixed Effect model. Further, we test different model specifications in terms of explanatory variables (Table 3).

The dependent variable in the regression is Y_{it} – a firm's i return in period t. As explanatory variables we choose: ma – if CEO has a master's degree, mba - if CEO has finished MBA program, Phd - if CEO has a PhD degree, age – CEO's age in full years, q_in_power – quantity of quarters that CEO is working on that position in the bank, topceo – if the CEO is in a list of top-CEOs, volume – number of shares traded in a time period, employees – number of people employed in the organization (proxy for size). The nonlinear terms (powers of time, age at al.) appeared to be insignificant and were not included in the explanatory variables. Also we include interaction terms of education (MA, MBA, PhD) with cultural dimensions (IDV, UAI, MAS, PDI) and with variable that reflects number of quarters the CEO is in power (q).

Running this type of analysis gives us the estimation of CEO's educational characteristics that influence on firm's performance. In the regression inclusion of interaction terms of education with cultural and timing factors proposed earlier exhausts the influence of education, which is split between interaction terms that we decide to include by theoretical expectations. The education variable is dropped due to collinearity in the model specification that includes interaction terms (while we do not include other cultural measures developed by Geert Hofstede and cultural measurements do not split all the cultural effect between them).

We start with the Fixed Effect (1) model with robust standard errors which includes as explanatory variables the education terms, CEO's age, the variable that reflects presence of CEO in Top-CEO ratings, controls for volumes of trade, number of employees and local stock exchange quotation effects. In other model specifications we preserve these variables in the model (except of fifth model where we exclude Top-CEO rating variable). Then we gradually add interactions with culture to see whethereffect of education is culture specific. We add interaction terms of education level with one cultural measurement, IDV in the Fixed Effect (2) model with robust standard errors. Further we estimate the Fixed Effect (3) model with robust standard errors, where we include interaction of education with two cultural measurements, IDV, UAI and with number of quarters the CEO is in power. In the fourth regression the Fixed Effect (4) model with robust standard errors we include interactions of education levels with all four cultural measurements IDV, UAI, PDI, MAS and with number of quarters the CEO is in power. In the fifth model we change the fourth model specification by excluding Top-CEO variable. In the table we present only limited number of explanatory variables, concentrating on the variables of interest.

Table 3: Fixed Effect robust and Random Effect regressions

Variable	FE(1) robust	FE(2) robust	FE(3) robust	FE(4) robust	FE(5) robust
ma	-0.0005	0.006**	0.009***		
	(0.0006)	(0.003)	(0.003)		
mba	0.0002	-0.008**			
	(0.0003)	(0.003)			
phd	-0.003**	0.013***	-0.024***		
	(0.002)	(0.005)	(0.007)		
ma*idv		-0.00008**	-0.0003***	-0.0002***	-0.00006**
		(0.00004)	(0.00006)	(0.00004)	(0.00002)
mba*idv		0.0001**	-0.00005	-0,00005	0.00009**
		(0.00004)	(0.00003)	(0.00003)	(0.00004)
phd*idv		-0.0002***	-0.00004	-0.0002***	-0.0001*
		(0.00007)	(0.00006)	(0.00005)	(0.00007)
Ma*uai			0.0003***	0.00035***	0.0002**
			(0.00004)	(0.00005)	(0.00006)
Mba*uai			0.00008	0,00008	-0.0002**
			(0.00006)	(0.00006)	(0.00008)
Phd*uai			0.0005***	0.0002***	0,0001
			(0.0001)	(0.00007)	(0.0001)
Ma*quarter in power			-0.00008*	-0.00008**	-0.00008**
			(0.00003)	(0.00003)	(0.00003)
Mba*quarter in power			-0.000007	-0,000007	-0,000008
			(0.00002)	(0.00002)	(0.00002)
Phd*quarter in power			0.00006	0,00006	0,00006
			(0.00006)	(0.00006)	(0.00006)
Presence in topceo rating	0.00061	0.0032**	0.0045***	0.0045***	
	(0.001)	(0.001)	(0.001)	(0.001)	
№ gr.	69	69	69	69	70
R-sq.	0.0448	0.0438	0.0453	0.0393	0,0441

*, **, *** respectively indicate significance levels at 10%, 5% and 1% levels

In the alternative model - Probit regression, we estimate how different factors influence the probability of observing positive returns.

5.2 Discussion of the results

According to the test results for the model specification we treat as the main working model the Fixed Effect model with robust standard errors (Table 3). In this type of regressions the sample of 100 companies has been restricted to 69 due to merging and restriction imposed by regression (including the restriction on the time period used).

We start from the basic model specification with no interaction terms of education neither with cultural elements, nor with quarters in power variable. We observe insignificant coefficients for education, except of PhD variable that is significant and negative. Further, we start gradually to introduce the interaction with culture variables. In Fixed Effect (2) robust model (Table 3) we add interaction terms of education level with one cultural measurement, IDV. This leads to the increase in significance of coefficients in front of variables for CEO's education levels. This effect may be explained through assigning the part of cultural effects to different education levels in previous model and controlling for this culture specific effect of education in this model. So, with this hypothesis we proceed to increase the interaction terms that are introduced into the model. In the third model we include interaction terms with two cultural measurements IDV, UAI and with quarters in power variable. The coefficients of interaction are significant, negative for interaction with IDV and positive for interaction with UAI. The education is also significant.

The most complete from theoretical point of view is the Fixed Effect (4) robust model. It includes all the interaction terms with culture and quarters that CEO is on the managing position. Though the education is omitted, it influences

through interaction with cultural measurements. Interaction terms show clear pattern, since interaction with each cultural measurement have consistent direction of effect for different levels of education.

In the fifth regression we exclude the Top-CEO ratings variable in order to observe the variables that are affected the most by such proxy for acknowledge of good managerial performance. The exclusion of the variable responsible for the presence or absence in Top-CEO ratings in the Fixed Effect (5) robust model (Table 3) leads to the increase in the coefficient for the variable responsible for interaction of CEO's MBA variable with cultural measurements IDV and UAI. Other interaction terms of MBA with PDI and MAS are dropped due to collinearity. This increase may be explained by the fact that CEOs in Top ratings most often have the MBA degree and the change of sign in the second regression is due to the effect of CEO's talent expressed through presence in Top-CEO ratings. That is why, we believe that Top-CEO variable should be in regression. The fourth regression is better approximation to real interrelation of education with firm's returns since it controls for the effect of CEO's presence in Top-CEO ratings.

So, if we aggregate the effect of CEO's education over countries that makes it insignificant. Our explanation of this fact is that the influence of CEO's educational level differs over cultures and in different countries may have negative sign. That leads to ambiguous effect of CEO's education if aggregated over countries. The final result for the estimation of education effect on firm performance will depend quite significant on the sample of companies that we include. If we take more companies from certain country, its quite obvious that the effect of education will be replicating to certain extent the effect for this country. That is why disaggregating the education effect into cultural segments

of this effect should be a good strategy and affords to capture the real education effect on firm performance.

We argue that the fourth model specification (the Fixed Effect (4) robust model) is the correct one. The fourth model showed some insignificant effects of CEO's education level on firm's performance. However if we disaggregate that effect in different cultural measurements, we are able to capture the real educational influence on firm's performance.

Applying the interaction coefficients to cultural measurements specific for each country we can calculate the country specific (being more precise, which would be culture specific) influence of CEO's education on firm's performance through aggregated effect of education over the cultural measurements..

For example, if we do that for Russia, multiplying precise coefficients of interaction terms with culture measurements by the corresponding cultural measures (PDI, IDV, MAS, UAI) and summing up over the types of education (Figure 1) we get the net effect of CEO's education influence for Russia. We see that Masters degree obtained by CEO overall has positive effect of 0,018; MBA degree attained should improve firm performance by 0,00543 and PhD degree of CEO should add 0,015 to the firm performance. Overall each of three types of education should have positive effect on firm's performance for Russia. This is applicable in the same way for the countries where the cultural measurements are available. In such a way we are able to derive the actual effect of CEO's education level for the required country that may serve as reasoning for answering the questions brought up in this thesis.

$$\begin{bmatrix} PDI & IDV & MAS & UAI \end{bmatrix} * \begin{bmatrix} MA\_PDI & MBA\_PDI & PhD\_PDI \\ MA\_IDV & MBA\_IDV & PhD\_IDV \\ MA\_MAS & MBA\_MAS & PhD\_MAS \\ MA\_UAI & MBA\_UAI & PhD\_UAI \end{bmatrix} = \begin{bmatrix} MA\,effect & MBA\,effect & PhD\,effect \end{bmatrix}$$

$$\begin{bmatrix} 93 & 39 & 36 & 95 \end{bmatrix} * \begin{bmatrix} -0{,}0001151 & 0 & 0 \\ -0{,}0002096 & -0{,}0000468 & -0{,}0002027 \\ 0{,}0000915 & 0 & 0 \\ 0{,}0003536 & 0{,}0000764 & 0{,}0002426 \end{bmatrix} = \begin{bmatrix} 0{,}0180073 & 0{,}0054328 & 0{,}0151417 \end{bmatrix}$$

Figure F1: Calculation of CEO's education effect on firm's performance for Russia

From the Probit regression we observe that awards have negative influence on the probability of observing positive returns. Such effect may suggest the idea that awards serve as a sign of CEO's shirking, placing some amount of efforts to other activities than managing the company, which goes in line with the negative sign for awards that we meet in Fixed effect regressions. However, that is not the main variable of interest. We observe both positive and significant influence of MBA and Top-CEO variables on the probability of positive returns, which is coherent with intuitive expectations.

CONCLUSION

In this research we analyzed the effect of education on firm performance through the prism of cultural measurements. We found the effect of CEO's education in banking sector, if not disaggregated on cultural subcomponents, being insignificant or ambiguous and quite sensitive to the choice of countries for the sample of enterprises. The supporting point for this finding is the result of Kaplan, Klebanov and Sorensen (2007), who find that business-skills of CEO are not obviously related to greater success of the company.

However, coming from the results obtained in the empirical part we may conclude that the data collected suggests presence of cultural effects impact on the effect of CEO's education on firm's performance. The aggregated effect of different types of CEO's education levels differs in different cultures and may be calculated through cultural measures and interaction coefficients from the regression analysis. From the results we see that CEO's education is a minor factor in determining firm's performance and varies depending on the type of cultural environment. Other CEO characteristics – Top-CEO variable also possess rather small but significant positive impact. If treating the presence of CEO in Top-CEO list as a measure of talent, the finding that we get from the data analysis is coherent with the finding of Falato and Li (2010). In their research they also find both positive and significant effect of CEO talent on returns for shareholders (stock returns that measure our dependent variable are equivalent).

For the case of Russia from the analysis performed we may conclude some positive effect of CEO's education level on firm's performance with different magnitude at different educational levels (the highest positive effect is attached to the master degree). This result is based on the statistically significant effect of interaction terms of education with cultural measurements. It suggests that rational investors and shareholders should value additional levels of CEO's education. Shareholders should take this information into account when taking hiring decision in line with other factors. For those who have intensions of taking CEO position in future, attaining higher levels of education should be perceived as an additional benefit. Using the proposed approach the interested side may calculate the impact of the different CEO's educational level on firm's performance and make corresponding justification.

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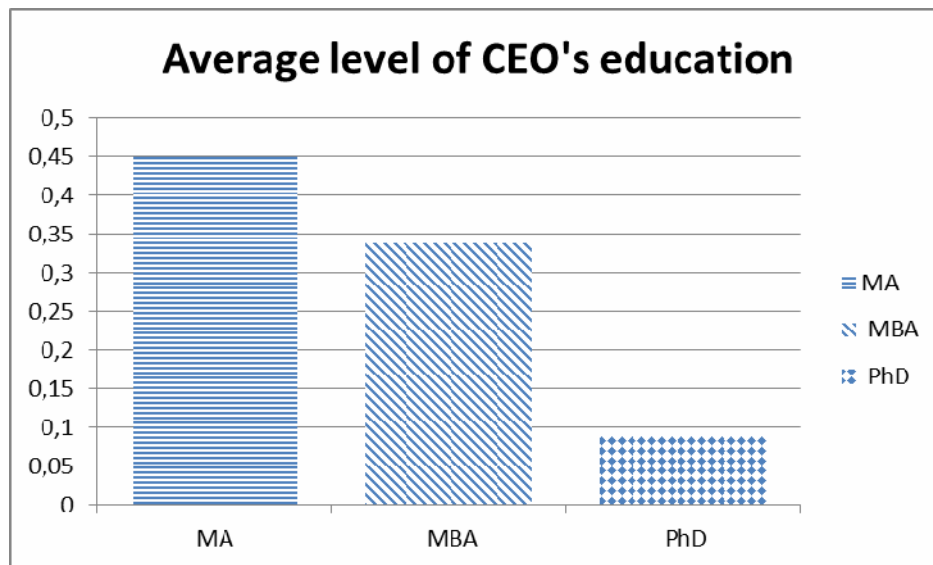.

APPENDIX A

Figure 2: Average level of CEO's education

Table 4: Fixed Effect and Probit regressions

	(1) **Fixed Effect**	(3) **Fixed Effect**		(4) **Probit**
ma	.0179***	.0187***	Ma	.0222
	(5.9458)	(5.98)		(1.326)
mba	.0111***	.0098***	Mba	.2798***
	(3.8014)	(3.441)		(9.741)
phd	-.0609***	-.0608***	Phd	-.0232
	(-11.721)	(-11.917)		(-.5975)
Returns of index sp500	.3586***	.3554***	phd_uai	-.0008
	(8.317)	(8.078)		(-1.242)
ukftlc_ret	.2367***	.2456***	awards	-.0169**
	(7.213)	(7.335)		(-2.179)
CEO's age	-.0011***	-.0013***	Age	-.00049
	(-5.722)	(-6.0556)		(-.8856)
Volume of trade on underlying stock	2.25e-11**	2.52e-11***	ma_uai	-.00052*
	(2.342)	(2.584)		(-1.88)
Return on banking index	.3457***	.3445***	mba_uai	-.0055***
	(18.368)	(17.95)		(-9.54)
Quarters the CEO is in power	.00009**	-.00005	phd_uai	-.0008
	(1.364)	(-1.187)		(-1.242)
Presence in topceo rating		-.01014**	topceo	.1083***
		(-2.084)		(10.14)
constant term	.0605***	.0726***	_cons	-.0843**
	(5.00)	(5.48)		(-2.502)
sigma_u	.0211	.02221		
sigma_e	.1223	.12353		
rho	.0289	.03132		
R-sq within	0.0192	0.0189		
R-sq between	0.0286	0.0266		
R-sq overall	0.0074	0.0068		

*, **, *** respectively indicate significance levels at 10%, 5% and 1% levels

APPENDIX C

Table 5: Professor's Geert Hofstede cultural measurements

Index	Explanation by Geert Hofstede
PDI	This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people. People in societies exhibiting a large degree of power distance accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with low power distance, people strive to equalize the distribution of power and demand justification for inequalities of power.
IDV	The high side of this dimension, called Individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of themselves and their immediate families only. Its opposite, Collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we."
MAS	The masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness and material reward for success. Society at large is more competitive. Its opposite, femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented.
UAI	The uncertainty avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behavior and are intolerant of unorthodox behavior and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles.