Executive Education, Gender, And Firm Performance: Evidence From China

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ABSTRACT

We explore the relationship between the education and gender of executives and firm performance using mainland China firm data. We find that executive education is positively associated with a firm's market performance. However, this positive relationship is not moderated by executives' gender. Our research result is consistent with the existing literature that firm market value increases with executive education, and that executive gender does not matter in terms of the relationship between higher education and firm performance.

Keywords: Executive Education; Firm Performance; Gender

JEL Code: G32; M10; M12

1. INTRODUCTION

*W*ith intense global competition, education has long been thought as an important investment in human capital which drives economic growth (Becker, 1962). Top executives' education background might influence a firm's performance level. For example, formal education, professional title, and career experiences precipitate executives' strategic choices and organization's profitability level (Hambrick & Mason, 1984), and Chinese researchers identify that higher CEO education level can enhance firm's development in the long term (Lu & Zhang, 2015). However, prior studies fail to agree on the relationship between CEO education and a firm's financial performance. On the one hand, some researchers prove that a CEO with higher education does not have a greater ability to manage the firm (Gottesman & Morey, 2006). On the other hand, some conclude that the board of directors' higher graduate degrees help increase firm value as knowledge helps the decision-making process (Darmadi, 2013).

In this study, our primary objective is to explore whether gender moderates the relationship between executive education and firm financial performance. For this purpose, we first explore whether a positive relationship between executive education and firm performance exists. Then, we examine whether executive gender strengthens the positive relationship between executive education and firm performance.

Using a sample of 7,897 firm-year observations of Chinese listed private firms, we find a significant and positive relationship between executive education and a firm's market performance. However, executive education has no significant impact on firm accounting performance. The result indicates that better-educated executives seem to improve firm long-term performance by increasing market value. More importantly, we find that gender does not moderate the relationship between executive education and a firm's financial performance in China.

We contribute to CEO education studies related to China that are not adequately addressed in the existing literature. More importantly, this is the first study documenting an interaction effect of executive gender on the relationship between executive education and firm performance.

Our study is different from prior studies on the issue of gender and a firm's performance in other countries. First, we conduct research in China, which has a different economy from the rest of the world. In 1978, China started wide range market-oriented reforms, leading to a mixed economy (Qiping & White, 1994). Thus, empirical studies on the other countries' firms might not be applicable to China. Second, we explore the relationship among three variables

using an interaction variable of gender on the relationship between executives' education and firm performance: executives' education, gender, and firm performance; however previous studies mostly talk about two variables, executives' education and firm performance.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

This study examines whether executives' education level is positively associated with a firm's financial performance (H1) and whether executives' gender strengthens the positive relationship between executives' education and a firm's financial performance (H2).

2.1. Executive Education and Firm Performance in Developed Countries

Table 1 shows the results from the existing literature over the relationship between CEO education and a firm's performance. While some studies claimed that CEO education level has no influence on a firm's accounting performance (Gottesman & Morey, 2006; Jalbert, Furumo, & Jalbert, 2010), some believed that CEO education could affect a firm's short-term performance (Bhagat, Bolton, & Subramanian, 2010). In terms of market performance, CEO education does not affect a firm's long-term development measured by Tobin's q (Bhagat et al., 2010; Gottesman & Morey, 2006), and CEO education is not related to the market return to shareholders in Australia (Lindorff & Prior Jonson, 2013).

2.2. Executive Education and Firm Performance in Developing Countries

Table 1 shows that prior studies on developing countries generally provide results different from those in developed countries. In Indonesia, the board members' postgraduate degrees from prestigious domestic universities positively influence the financial performance of listed firms (Darmadi, 2013). In contrast, Chinese researchers suggest that CEO's higher education degree increases firm market value by enhancing long-term development. However, the positive education effect is not identified in the short term by accounting performance, but it can boost firm long-term development (Lu & Zhang, 2015).

Extending and supplementing prior perspectives on the relationship between CEO education and firm performance, we focus on CEO education and a firm's performance for the Chinese listed firms as it is generally believed that CEO education is related to the cognitive ability, behavioral, and social capital of a CEO, which in turn influence firm performance (Gottesman & Morey, 2006). Accordingly, we propose the following hypothesis.

Hypothesis 1: Executive education is positively associated with a firm's financial performances.

Table 1. Summary of previous literature

Author (Year)	Sample (Period)	Education Measurement	Market Perf.	Accounting Perf.
Gottesman and Morey (2006)	488 firm-years observations in the U.S. (1997-2003)	2 measurements: the level of educational attainment; the prestige of the schools	Tobin's q (NR)	ROA ROE(NR)
Bhagat, Bolton, and Subramanian (2010)	14,596 firm-years observations in U.S. (1993-2007)	3 measurements: top-20 undergraduate school, MBA, law or master's degree, and MBA or law degree from a top-20 program	Tobin's q (NR)	ROA (+)
Jalbert, Furumo, and Jalbert (2010)	6,305 annual observations in the U.S. (1997-2006)	2 measurements: undergraduate or graduate degree; graduate school ranking	N/A	ROA ROE ROI (NR)
Darmadi (2013)	160 firm-year observations in Indonesia (2007)	4 proxies: postgraduate degrees, prestigious universities, degrees obtained from developed countries, and degrees in financial disciplines	Tobin's q (NR)	ROA (+)
Lindorff and Prior Jonson (2013)	183 firm-years observations in Australia (2007-2012)	2 measurements: education levels: MBA, graduate, undergraduate; degrees: business, engineering, law, medical, art	ROS (NR)	N/A
Lu and Zhang (2015)	1109 firm-year observations in China (2003-2012)	2 measurements: education level: above bachelor's degree and below bachelor's degree; education years	Tobin's q (+)	ROA ROE ROS (NR)

+: positive relationship; -: negative relationship; NR: neutral relationship

2.3. The Relationships among Executives' Education, Gender, and Firm Performance

With market reopen and economic development, the living standard in China has been increased significantly for the last two decades. Education has also received much more attention than before. Under the government policy of 9-year compulsory education, all children are required to attend school. Although the old belief still remains in rural areas that women should stay at home and not be educated, the gender inequality gap is decreasing, and there has been an increasing focus on the gender of top executives of firms in China, especially in cities. It seems that education background, gender, and firm financial performance are closely related.

In fact, no empirical or theoretical evidence on the relationship among education, gender, and firm financial performance exists. Researchers (Campbell & Mínguez-Vera, 2008; Davis, Babakus, Englis, & Pett, 2010; Khan & Vieito, 2013) agree that a firm with balanced gender percentage is more successful in financial performance. For example, gender diversity in the boardroom can increase a firm's market value (Campbell & Mínguez-Vera, 2008); female-led small and medium-sized service businesses perform significantly better due to their stronger market orientation compared to those led by male (Davis et al., 2010); firms headed by female CEOs are less risky than firms headed by male CEOs (Khan & Vieito, 2013).

As for top executive's gender and firm performance, prior studies generally believe that a well-balanced gender percentage can increase firm performance (Campbell & Mínguez-Vera, 2008; Khan & Vieito, 2013; Smith, Smith, & Verner, 2006). For example, focusing on a sample of S&P 1,500 U.S. firms, Khan and Vieito (2013) suggest that female CEOs positively and significantly affect a firm's ROA and firms headed by female CEOs are less risky than firms with male CEOs. As females are more careful than males, greater female executive composition of the board can positively affect the quality of the Spanish firm's monitoring role, and thus the financial performance (Campbell & Mínguez-Vera, 2008). Moreover, one study researching 2,500 Danish firms again suggests that the proportion of women in top management jobs tends to have positive effects on a firm's performance (Smith et al., 2006). However, the literature using the sample of Chinese firms generally suggests that gender differences do not affect a firm's financial performance (Lam, McGuinness, & Vieito, 2013; Ye, Zhang, & Rezaee, 2010).

Based on the implications drawn from the prior studies, we expect that in China the joint effect between executives' education and gender composition will not play a moderating role in the relationship between education and a firm's financial performance. Accordingly, we establish the second hypothesis as follows.

Hypothesis 2: Executives' gender will not play a moderating role in the positive relationship between education and a firm's financial performance.

3. RESEARCH DESIGN

3.1. Data and Sample Selection

The sample data consist of executive profile data and firm financial data from the China Stock Market & Accounting Research (CSMAR), which is one of the largest Chinese stock market databases.

We consider a sample of listed private companies across all industries in the Shenzhen Stock Exchange and Shanghai Stock Exchange for the period of 2005-2016. We remove the firms with missing values and winsorize observations with top and bottom 1% extreme values for the continuous variables. The final sample of 7,897 firm-year observations is obtained.

3.2. Research Model

Following Gottesman and Morey (2006), we construct the following model:

$$FIRM\_PERFORMANCE\_PROXY_{i,t}=$$
$$\beta_{0,i} + \beta_1 EDUCATION_{i,t} + \beta_2 FEMALE_{EXECUTIVE_{i,t}} + \beta_3 EDUCATION * FEMALE\_EXECUTIVE_{i,t}$$
$$+\beta_4 SERVICE_{PERIOD_{i,t}} + \beta_5 AGE_{i,t} + \beta_6 COMPENSATION_{i,t} + \beta_7 ENGINEER\_DUMMY_{i,t}$$
$$+\beta_8 STOCL\_OWNERSHIP_{i,t} + \beta_9 GOVERNANCE_{i,t} + \beta_{10} FIRM_{SIZE_{i,t}} + \beta_{11} LEVERAGE_{i,t} + \beta_{12} LIQUIDITY_{i,t}$$
$$+\beta_{13} INDUSTRY\_DUMMY + \beta_{14} YEAR\_DUMMY$$

Where, for company *i* in period t:

Dependent Variables *(FIRM_PERFORMANCE_PROXY)*

TOBINQ	=	(market value of equity + book value of liabilities) / book value of total asset
PBR	=	market value of equity divided by book value of equity;
ROA	=	operating income divided by average total assets
ROE	=	net income divided by average equity

Variable of Interest

EDUCATION	=	the level of education, 1=technical high school or below, 2=technical college, 3=bachelor, 4=master, 5=doctor degree
FEMALE_EXECUTIVE	=	percent of female executives in the executive members

Control Variables

SERVICE_PERIOD	=	employment period measured by month
AGE	=	age of an executive measured by year
COMPENSATION	=	total compensation received by the executives
ENGINEER_DUMMY	=	an indication variable that equals 1 if the professional title of the executive is related to the engineer, otherwise 0
STOCK_OWNERSHIP	=	percent of stock owned by the executives
GOVERNANCE	=	the number of independent directors / the number of total directors
FIRM_SIZE	=	natural log of the company's sales
LEVERAGE	=	total liabilities divided by total shareholders' equity
LIQUIDITY	=	current assets divided by current assets

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3.3. Measurement of Interest Variables

Following prior studies (Darmadi, 2013; Gottesman & Morey, 2006; Jalbert et al., 2010; Lu & Zhang, 2015), we use executives' education level to measure the executive education background. We use numbers from 1 to 5 to represent these degrees from technical secondary school and below to doctoral degree.

A number of prior studies related to executive gender and a firm's financial performances (Campbell & Mínguez-Vera, 2008; Davis et al., 2010; Liu, Wei, & Xie, 2014; Smith et al., 2006) use a female executive percentage of a firm as the measurement of executive gender. Similarly, we use dummy 1 to represent female and dummy 0 to represent male, and then we calculate the average of those dummy values to represent the female executive percentage.

The existing literature frequently uses both *ROA* and *TOBINQ* to measure the financial performance of a firm (Bhagat et al., 2010; Darmadi, 2013; Gottesman & Morey, 2006; Jalbert et al., 2010; Lu & Zhang, 2015). Following prior studies, we also use both market performance and accounting performance to measure a firm's financial performance, because market performance is more related to a firm's long-term prospective market value, which is different from short-term performance reflected by annual financial statements. In terms of market performance, Tobin's q (*TOBINQ*) and price to book ratio (*PBR*) are used as indexes. For accounting performance, return on equity (*ROE*) and return on assets (*ROA*) are used.

4. EMPIRICAL RESULTS

4.1. Correlations of Selected Variables

Table 2 presents correlations among selected variables. *EDUCATION* significantly and positively relates to *TOBINQ, PBR, ROA,* and *ROE*. *FEMALE_EXECUTIVE* significantly and positively relates to *TOBINQ, PBR,* and *ROE*. These relationships show that higher education level and higher female executive percentage are positively related to a firm's financial performances. We check the multicollinearity of independent variables in our regression models, correlation coefficients as well as VIF (variance inflation factors), finding that there is no material multicollinearity problem in our model.

Table 2. Correlations among selected variables

		1	2	3	4	5	6	7
1.	*TOBINQ*	1.000						
2.	*PBR*	0.981**	1.000					
3.	*ROA*	0.132**	0.202**	1.000				
4.	*ROE*	0.081**	0.086**	0.658**	1.000			
5.	*EDUCATION*	0.112**	0.115**	0.060**	0.047**	1.000		
6.	*FEMALE_EXECUTIVE*	0.043**	0.050**	0.025*	0.014	-0.067**	1.000	
7.	*SERVICE_PERIOD*	-0.002	0.007	0.007	-0.013	-0.030**	-0.001	1.000
8.	*AGE*	-0.022	-0.024*	-0.033**	-0.051**	-0.140**	-0.033**	0.352**
9.	*COMPENSATION*	-0.016	0.004	0.265**	0.209**	0.214**	-0.034**	0.195**
10.	*ENGINEER_DUMMY*	-0.055**	-0.057**	0.003	0.003	0.009	-0.137**	0.062**
11.	*STOCK_OWNERSHIP*	0.050**	0.085**	0.131**	0.045**	0.025*	0.008	0.029**
12.	*GOVERNANCE*	0.079**	0.085**	-0.007	-0.01	0.032**	0.029**	0.006
13.	*FIRM_SIZE*	-0.357**	-0.362**	0.228**	0.245**	0.011	-0.057**	0.143**
14.	*LEVERAGE*	-0.164**	-0.217**	-0.199**	-0.173**	-0.028*	-0.009	-0.017
15.	*LIQUIDITY*	0.121**	0.191**	0.203**	0.049**	0.069**	0.047**	-0.01

(Table 2 continued on next page)

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(Table 2 continued)

		8	9	10	11	12	13	14
8.	*AGE*	1.000						
9.	*COMPENSATION*	0.172**	1.000					
10.	*ENGINEER_DUMMY*	0.164**	0.011	1.000				
11.	*STOCK_OWNERSHIP*	-0.024*	0.080**	-0.004	1.000			
12.	*GOVERNANCE*	-0.002	0.031**	-0.029**	0.113**	1.000		
13.	*FIRM_SIZE*	0.099**	0.454**	0.030**	-0.090**	-0.074**	1.000	
14.	*LEVERAGE*	0.042**	-0.006	-0.022*	-0.169**	-0.051**	0.230**	1.000
15.	*LIQUIDITY*	-0.047**	0.059**	-0.022	0.228**	0.041**	-0.248**	-0.307**

Pearson correlation coefficients are shown below the diagonal. * and ** represent statistical significance at the 5 percent and 1 percent levels on a two-tailed test, respectively. Variables are defined in 3.2 Research model.

4.2. Regression Analysis

4.2.1. Executives' Education and Market Performance

Table 3 shows the regression of education on market performance and the interaction with gender. In Model 1, we analyze the relationship between executives' education and firm market performance, *TOBINQ*. The coefficient (0.148, $p<0.01$) of *EDUCATION* is significantly and positively associated with the market performance of *TOBINQ*, indicating that executive education seems to have a long-term effect on a firm's financial performance.

In Model 2, we examine the relationship between executives' education and Tobin's Q with the consideration of the moderating variable of *FEMALE_EXE *EDU*. In other words, we compare the differences in the effects of executives' gender diversity on the relationship between education and firm performance. The coefficient (-0.114, (-0.76) (t-stat)) of *FEMALE_EXE *EDU* is insignificant, suggesting that executives' gender does not play a moderating role in the positive relationship between executives' education and a firm's market performance.

Model 3 and Model 4 explore the relationship between *EDUCATION* and *PBR* and the effect of executive gender diversity on this relationship. The coefficient (0.131, $p<0.01$) of *EDUCATION* is significantly and positively associated with the market performance of *PBR*, supporting the result shown in the Model 1. Moreover, the coefficient (-0.122, (-0.84) (t-stat)) of *FEMALE_EXE *EDU* is insignificant, supporting the result shown in Model 2.

Table 3. Regression of education and interaction with gender on market performance

Independent Variables	Model 1 TOBINQ Coefficient (t-stat)	Model 2 TOBINQ Coefficient (t-stat)	Model 3 PBR Coefficient (t-stat)	Model 4 PBR Coefficient (t-stat)
EDUCATION	**0.148*****	**0.167*****	**0.131*****	**0.151*****
	(4.16)	**(3.84)**	**(3.90)**	**(3.71)**
FEMALE_EXECUTIVE	0.056	0.400	0.117	0.486
	(0.56)	(0.91)	(1.19)	(1.14)
FEMALE_EXE*EDU		**-0.114**		**-0.122**
		(-0.76)		**(-0.84)**
SERVICE_PERIOD	-0.002**	-0.002**	-0.002*	-0.002*
	(-1.98)	(-2.01)	(-1.93)	(-1.95)
AGE	-0.024***	-0.024***	-0.027***	-0.027***
	(-4.30)	(-4.32)	(-5.26)	(-5.29)
COMPENSATION	0.268***	0.268***	0.272***	0.273***
	(6.82)	(6.83)	(7.40)	(7.41)
ENGINEER_DUMMY	-0.036	-0.036	-0.042	-0.042
	(-0.41)	(-0.42)	(-0.52)	(-0.52)
STOCK_OWNERSHIP	-0.445	-0.451	0.521	0.515
	(-0.60)	(-0.60)	(0.71)	(0.70)
GOVERNANCE	0.685*	0.679*	0.675*	0.668*
	(1.69)	(1.67)	(1.75)	(1.73)
FIRM_SIZE	-0.702***	-0.702***	-0.669***	-0.669***
	(-23.26)	(-23.29)	(-24.08)	(-24.11)
LEVERAGE	-0.058**	-0.058**	-0.102***	-0.102***
	(-2.09)	(-2.09)	(-3.91)	(-3.92)
LIQUIDITY	-0.009	-0.009	0.023***	0.023***
	(-1.24)	(-1.23)	(3.40)	(3.41)
CONSTANT	12.861***	12.811***	11.738***	11.685***
	(19.23)	(19.07)	(19.01)	(18.85)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Adj. R^2	0.39	0.39	0.42	0.42
n	7897	7897	7897	7897

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels on a two-tailed test, respectively. All of the test statistics and significance levels are calculated based on robust standard errors adjusted for heteroskedasticity at both the firm and year levels. Variables are defined in 3.2 Research model.

4.2.2. Executives' Education and Accounting Performance

Table 4 shows the regression of education on accounting performance and the interaction with executives' gender diversity. In regression Model 1 and 3, the coefficients (-0.002, (-1.53) (t-stat); -0.003, (-1.00) (t-stat)) of *EDUCATION* are insignificant with the *ROA* and *ROE*, indicating that executives' higher education level is not associated with a firm's accounting performance and does not have a short-term effect on the financial performance.

Model 2 and Model 4 in Table 4 show the moderating effects of executives' female gender diversity. The coefficients (0.002, (0.33) (t-stat)) and (-0.011, (-0.83) (t-stat)) of *FEMALE_EXE *EDU* suggest that executives' gender diversity does not play a moderating role in the relationship between executives' education and accounting performance.

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Table 4. Regression of education and interaction with gender on accounting performance

Independent Variables	Model 1 ROA Coefficient (t-stat)	Model 2 ROA Coefficient (t-stat)	Model 3 ROE Coefficient (t-stat)	Model 4 ROE Coefficient (t-stat)
EDUCATION	**-0.002**	**-0.002**	**-0.003**	**-0.001**
	(-1.53)	**(-1.41)**	**(-1.00)**	**(-0.32)**
FEMALE_EXECUTIVE	0.010***	0.005	0.020**	0.053
	(2.79)	(0.32)	(2.28)	(1.33)
FEMALE_EXE*EDU		**0.002**		**-0.011**
		(0.33)		**(-0.83)**
SERVICE_PERIOD	0.000	0.000	-0.000	-0.000
	(0.17)	(0.18)	(-0.33)	(-0.36)
AGE	-0.001***	-0.001***	-0.002***	-0.002***
	(-4.32)	(-4.31)	(-4.11)	(-4.15)
COMPENSATION	0.013***	0.013***	0.020***	0.020***
	(9.85)	(9.86)	(6.82)	(6.83)
ENGINEER_DUMMY	0.003	0.003	0.003	0.003
	(1.06)	(1.06)	(0.46)	(0.45)
STOCK_OWNERSHIP	0.222***	0.222***	0.232***	0.231***
	(10.23)	(10.23)	(6.14)	(6.12)
GOVERNANCE	-0.013	-0.013	-0.002	-0.003
	(-0.90)	(-0.90)	(-0.06)	(-0.09)
FIRM_SIZE	0.015***	0.015***	0.035***	0.035***
	(16.62)	(16.63)	(15.92)	(15.93)
LEVERAGE	-0.010***	-0.010***	-0.030***	-0.030***
	(-8.85)	(-8.84)	(-7.75)	(-7.75)
LIQUIDITY	0.003***	0.003***	0.001***	0.001***
	(12.81)	(12.80)	(3.27)	(3.29)
CONSTANT	-0.406***	-0.405***	-0.790***	-0.795***
	(-17.19)	(-16.97)	(-14.75)	(-14.54)
Industry dummies	Included	Included	Included	Included
Year dummies	Included	Included	Included	Included
Adj. R^2	0.25	0.25	0.18	0.18
n	7897	7897	7897	7897

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels on a two-tailed test, respectively. All of the test statistics and significance levels are calculated based on robust standard errors adjusted for heteroskedasticity at both the firm and year levels. Variables are defined in 3.2 Research model.

5. SUMMARY AND CONCLUSION

Our research showed that executive education is positively related to a firm's market performance measured by *TOBINQ* and *PBR*. The positive relationship primarily seems to originate from investors' belief that a better-educated executive manages the firms better than the less-educated executive, implying that investors are likely to recognize executives' education level as an important factor to enhance a firm's value. More importantly, our results suggested that executives' gender does not play a moderating role in the relationship between executives' education and market and accounting performance.

This study provides insights for academic and practitioners. To researchers, the empirical evidence on the moderating effect of executives' gender on the relationship between Chinese executives' education and firm's market performance complements the existing literature on education and firm performance relationship. To managers, for enhancing market value, it is suggested that practitioners need to put more importance on executive education rather than executive gender.

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