Relationships between CEO's Age, Signature, and Gender with Company Performance: An Analysis of the Listed Companies in Vietnam

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Abstract: The study evaluates the impact of CEOs' characteristics on company performance based on applying the production function and the TPB model. We collect the secondary data from 221 companies listed in the Vietnam stock market database, including Ho Chi Minh City Stock Exchange (HOSE), Ha Noi Stock Exchange (HNX), UPCOM, and OTC stock markets at the end of 2019. This paper measures firm performance by three dependent variables: the logarithm of company profit after taxes, total assets, and profits. This study provides three research results as seen as follows. Firstly, based on the production function, Vietnam companies can increase their performance by arranging more people who become a board members and placing their companies in Ho Chi Minh City to conduct their business. Secondly, according to the TPB model, the study confirms that the CEO's signature also improves the company's profits and revenues. Thirdly, the CEO's gender and the female proportion of the board members have a complex without significant effect on their company values. Lastly, both the young companies and young CEOs are two negative factors that indicate low profits and a downward tendency in those for these companies. The results are robust by the various models. The research findings suggest a meaningful implication for managers and investors who lead companies or look for future investment cooperation partners.

Keywords: company performance, production function, CEO's gender, CEO's signature, Vietnam listed companies.

首席執行官年齡、簽名、性別與公司業績的關係：越南上市公司分析

摘要：該研究基於應用生產函數和計劃行為理論模型評估首席執行官特徵對公司績效的影響。我們收集了2019年底在越南股市數據庫中上市的221家公司的二手數據，包括胡志明市證券交易所、河內證券交易所、非上市公眾公司市場和在櫃檯股票市場。本文測量公司績效由三個因變量決定：公司稅後利潤、總資產和利潤的對數。本研究提供瞭如下三個研究結果。首先，根據生產職能，越南公司可以通過安排更多的人成為董事會成員並將公司安置在胡志明市開展業務來提高業績。其次，根據計劃行為理論模型，研究證實首席執行官的簽名也提高了公司的利潤和收入。第三，首席執行官的性別和董事會成員的女性比例具有復雜性，對其公司價值觀沒有顯著影響。最後，年輕的公司和年輕的首席執行官都是兩個負面因素，表明這些公司的利潤低且有下降趨勢。各種模型的結果都是穩健的。研究結果對領導公司或尋找未來投資合作夥伴的管理者和投資者俱有重要意義。

关键词：公司業績、生產函數、首席執行官性別、首席執行官簽名、越南上市公司。

1. Introduction

The relationship between chief executive officer (CEO) and their company performance is a hot research issue in the literature in the past decades. There is a complex argument about the role of CEOs in driving their business from different perspectives of scholars [1]. Choosing a suitable CEO that can help the company gain effective business results is the most impactful factor on company performance [2]. The other group authors confirm that the gender of the CEO

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and chairperson is closely related to the company performance [3]. A few researchers note that CEO's letters have a positive relationship with company profits, while the others argue that CEOs are inconsistent with their performance [4].

Furthermore, handwritten signatures have a close relationship with personal behavior, embodying personality traits [5]. These authors note that signature size is significantly related to social dominance in male and female CEOs. At the same time, narcissism is significantly affected by signature size for women only.

Most researchers previously considered the relationship between CEO's characteristics and company performance with psychology; thus, they applied the psychological theories to predict their argument. However, company performance depends on different factors noted in the production function. Several studies examine the relationship between CEOs and company performance by applying psychology and production (Table 1). The paper investigates the impact of supply-side factors and behavioral factors on company performance by applying the production function and the TPB model.

Company performance is defined by financial, environmental, social, governance performance, or overall performance [1].

The paper is structured as follows: (first section) introduction, (second section) the literature that shows the gap for promoting this research, (third section) methodology, which notes the theoretical base that drives the study and research data, (fourth section) discusses of the research findings and some discussion which reveals the main results of the study as well as the major contribution of the study, (last section) conclusions, implications, and limitations of this study.

2. Brief Literature Review

Tables 1 and 2 reveals that most previous scholars applied the psychological models to investigate the CEO's role on company performance.

Table 1 Summary of the research method to explore factors affecting CEO's behavior and company performance

Research approaches	**Authors applied**
Psychology approach	[1], [4], [5], [6], [7], [8], [9]
Mixed approaches based on the psychology model	[2], [3], [10], [11], [12]
Mixed approaches based on the production function	[13]

Table 2 Summary of the impact of the CEO's specification on company performance

Independent variables	**Positive effect**	**Negative effect**	**Neutral / difference**
CEO's specification:			
Age	[2], [3]	[7], [13]	
Gender	[3], [10]	[6]	[4]
Education	[13]	[1]	
Country of origin	[2]		
Signature/Letters	[5]	[11]	[4]
Personality traits	[9], [12]		
Tenure/experience	[13]	[11]	
Company specifications:			
Age	[2]		
Size	[2], [12], [13]		
The demand-side factors:			
Net sale	[13]		
The supply-side factors:			
Production cost	[12]		
Cash flow	[13]		

3. Methodology

3.1. Methods

Firstly, the study applies the traditional production functions to assess a company's results as below:

$$Y = f\ (K^{\alpha}, L^{1-\alpha}) \quad (1)$$

This study uses earnings per share (EPS) to indicate a company's financial capital. The geographic location, where the company operates through the company address, can explain the company's geographic factors, such as the environment, the law, and the market (CA).

The number of board members (NB) and female ratio of this board (FE) denotes a company's human resources. Since the company was founded during the operation period, the knowledge and experience of the company's human capital show us clearly. The company's outcome can be measured by three variables: profit after tax, revenue, and total asset.

Secondly, Ajzen [14] develops the TPB model and enlarges it in 2019 to predict the behavior of a person:

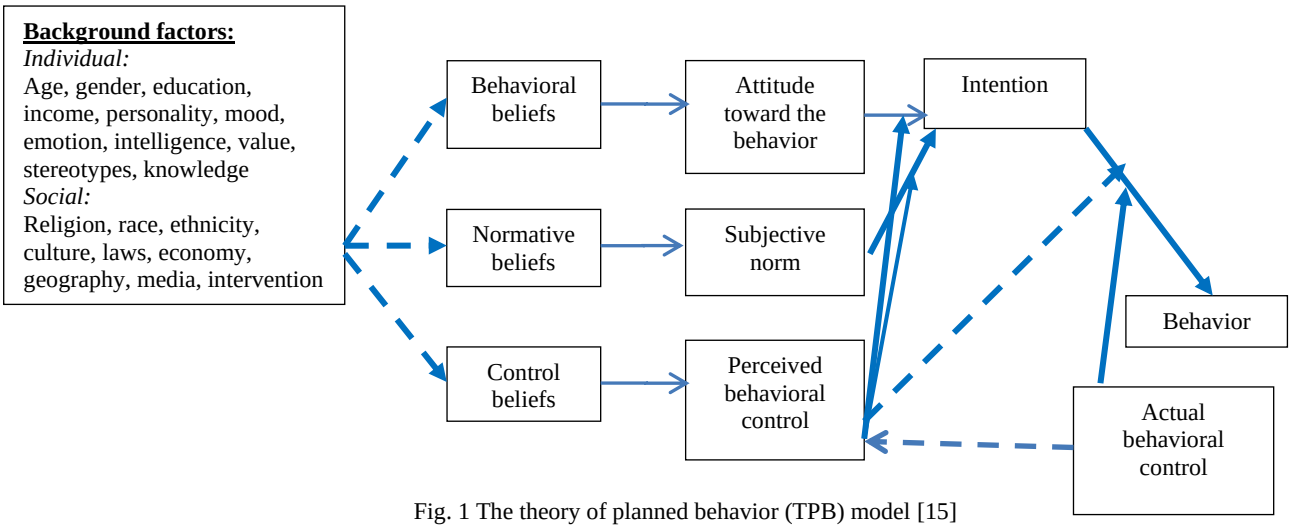

Fig. 1 The theory of planned behavior (TPB) model [15]

Applying Ajzen's TPB model [15], we can define the individual factors that can impact the CEO's behavior, such as CEO's age (CEY) which can show us a CEO's experience [13], [11]. The CEO's gender (CG) may determine the difference in their traits. CEO's signature (CSI) is a variable that helps readers to define the CEO's traits [11], [4], [5]. We also measure the CEO's behavior by the company's performance in which they make decisions while leading their business. In this case, we evaluate the company performance by three mentioned variables: profit after tax, revenue, and a total asset to test the robustness of the model.

Based on the common production function developed by Cobb and Douglas [16]:

$$Y = f(K, L) \quad (2)$$

We design the equation to evaluate the CEO's effective behavior based on the production function as below:

$$FP_{i1} = \beta_0 + \beta_{1i}FE_i + \beta_{2i}NB_i + \beta_{3i}CA_i + \beta_{4i}CY_i + \beta_{5i}EPS_i + \vartheta_{i,} \quad (3)$$

Following the behavioral theory, this study adds each variable that represents the CEO's characteristic in the equation (2); Step by step for evaluating company performance separately by the TPB model (Equations 4-6).

$$FP_{i2} = \beta_0 + \beta_{1i}FE_i + \beta_{2i}NB_i + \beta_{3i}CA_i + \beta_{4i}CY_i + \beta_{5i}EPS_i + \beta_{6i}CSI_i + \vartheta_{i,} \quad (4)$$

$$FP_{i3} = \beta_0 + \beta_{1i}FE_i + \beta_{2i}NB_i + \beta_{3i}CA_i + \beta_{4i}CY_i + \beta_{5i}EPS_i + \beta_{6i}CEY_i + \vartheta_{i,} \quad (5)$$

$$FP_{i4} = \beta_0 + \beta_{1i}FE_i + \beta_{2i}NB_i + \beta_{3i}CA_i + \beta_{4i}CY_i + \beta_{5i}EPS_i + \beta_{6i}CG_i + \vartheta_{i,} \quad (6)$$

The combination of the production function and the TPB model is presented as bellow (Equation 7).

$$FP_{i5} = \beta_0 + \beta_{1i}FE_i + \beta_{2i}NB_i + \beta_{3i}CA_i + \beta_{4i}CY_i + \beta_{5i}EPS_i + \beta_{6i}CSI_i + \beta_{7i}CEY_i + \beta_{8i}CG_i + \vartheta_{i,} \quad (7)$$

where:

- FP presents the company performance measured by three variables as below:

(1) Logarithm of the company's profit after tax (LnPRA)

(2) Logarithm of the company's total assets (LnTAS)

(3) Logarithm of the company's revenue (LnREV)

- Regarding the workforce, the study uses the following two variables: (1) female ratio in total board members of each company (FE) and (2) the number of board members (NB).
- To explain geographic factors, this study uses the variable "CA" denoting the company's address, where the company's core business is located (this is a dummy variable: the number "1" denotes "Ho Chi Minh City" and "0" for anywhere else in Vietnam).
- CY stands for the number of years the company has been in operation since its inception, demonstrating the CEO's knowledge and experience.
- EPS stands for the company's earnings per share that represent its financial capital.
- CSI stands for CEO's signature. See table 1 for a detailed explanation
- CEY is the year of the CEO's birth
- CG stands for the CEO's gender (here is a dummy variable: "1" represents the male CEO, and "2" represents the female CEO.

This paper develops the hypotheses:

H_1: FE is positively related to FP,
H_2: NB is positively related to FP,
H_3: CA is positively related to FP,
H_4: CY is positively related to FP,
H_5: EPS is positively related to FP,
H_6: CSI is positively related to FP,
H_7: CEY is positively related to FP,
H_8: CG is positively related to FP,

3.2. Data

We collect secondary data of 221 listed companies from the financial stock market database in Viet Nam (see table 10: research of listed companies) by the end of 2019 (See Table 3).

We collect the listed financial statements of the companies by the end of 2019. We frame the CEOs' signatures at the bottom of the reports with a rectangle and measure their length and width. We then calculate the area of these rectangles according to the following formula:

The area of a rectangle equals its length times its width (Table 3).

Table 3 Description of variables [17]

Variable	Obs	Mean	Std. Dev.	Min	Max
Profit after tax (million VND) (PRA)	221	396,044	1,820,462	-1,064,809	18,200,000
Earnings per share (million VND) (EPS)	221	1,940	4,545	-28,679	33,743
Total assets (million VND) (TAS)	221	21,300,000	128,000,000	2,382	1,240,000,000
Revenue (million VND) (REV)	221	3,971,612	15,100,000	4,789	131,000,000
Companies' address (CA – dummy variable: the company's office address in Ho Chi Minh City is represented by "1", elsewhere by "0"	221	0.29	0.45	0	1
Founded company year (CY)	221	2001.77	10.49	1960	2017
Number of board members (persons) (NB)	221	7.92	2.76	3	21
The female ratio in board members (percent) (FE)	221	0.22	0.16	0	0.83
CEOs' gender (CG – Dummy variable: "1" represents male CEO, "2" for female CEO	221	1.15	0.36	1	2
CEO's signature (CSI – cm^2)	221	12.17	8.37	0.7	70.55
Year of the CEO's birth (CEY)	221	1969.21	7.98	1947	1989

Table 3 shows that the oldest company was founded in 1960 and the newest one in 2017. The minimum number of board members is 3, and the largest one is 21. There are no female board chairs.

There are no women on the boards of some companies; however, the maximum female rate is 0.83 in one of the studied companies. The smallest area of the CEO's signature is 0.7 square centimeters, and the largest one is 70.55 square centimeters. The oldest CEO was born in 1947, and the youngest one in 1989.

Table 4 Correlation matrix (* p < 0.1, ** p < 0.05 and *** p < 0.01)

	LnPRA	EPS	LnTAS	LnREV	CA	CY	NB	FE	CG	CSI	CEY
LnPRA	1										
EPS	0.35	1									
	(0.00)***										
LnTAS	0.77	0.16	1								
	(0.00)***	(0.02)**									
LnREV	0.69	0.23	0.74	1							
	(0.00)***	(0.00)***	(0.00)***								
CA	0.14	-0.08	0.18	0.17	1						
	0.05	0.24	(0.01)***	(0.01)***							
CY	–0.12	–0.07	–0.11	–0.11	0.01	1					
	(0.09)*	0.27	(0.10)*	(0.11)*	0.84						
NB	0.48	0.17	0.60	0.52	0.10	–0.07	1				
	(0.00)***	(0.01)***	(0.00)***	(0.00)***	0.15	0.32					
FE	–0.09	–0.02	–0.05	–0.01	0.08	0.06	–0.13	1			
	0.21	0.73	0.46	0.89	0.23	0.35	(0.05)**				
CG	0.16	0.01	0.18	0.12	0.01	0.04	0.10	0.32	1		
	(0.02)**	0.87	(0.01)***	(0.06)*	0.85	0.52	(0.12)*	(0.00)***			
CSI	0.04	–0.06	0.02	0.06	–0.03	–0.02	–0.03	–0.16	–0.13	1	
	0.54	0.39	0.73	0.40	0.65	0.76	0.71	(0.02)**	(0.06)*		
CEY	0.01	–0.12	0.06	–0.11	0.06	0.06	0.05	–0.02	–0.07	0.03	1
	0.91	(0.07)*	0.34	(0.09)*	0.34	0.40	0.50	0.81	0.31	0.69	

Table 4 shows that most of the independent variables are strongly correlated with the dependent variables; therefore, this study can apply both production function theory and behavioral theory to evaluate the company's performance.

4. Results and Discussion

Table 5 provides evidence of applying the production function to evaluate a company's performance by three variables with the same results: First, the company's address where the company does business in Ho Chi Minh City has a strong positive effect on business performance. This variable represents the geography factor indicating that Ho Chi Minh City is a potential place for investment. Second, the number of board members is considered an important human capital of a company and a beneficial factor in promoting company value. EPS variable is a financial factor supporting the company's performance. Only the female ratio of board members has no significant impact on the company's performance.

Table 5 Company performance measured only by production function eq3 (* p < 0.1, ** p < 0.05 and *** p < 0.01)

Dependent variables	**LnPRA**		**LnTAS**		**LnREV**	
Independent variables	**Coef. Std. Err.**	**t statistic P>t**	**Coef. Std. Err.**	**t statistic P>t**	**Coef. Std. Err.**	**t statistic P>t**
FE	–0.47 (0.83)	–0.57 (0.57)	0.26 (0.66)	0.40 (0.69)	0.58 (0.66)	0.89 (0.38)
NB	0.34 (0.05)	6.91 (0.00)***	0.42 (0.04)	10.53 (0.00)***	0.33 (0.04)	8.25 (0.00)***
CA	0.51 (0.30)	1.71 (0.09)*	0.58 (0.24)	2.43 (0.02)**	0.56 (0.24)	2.36 (0.02)**
CY	–0.02 (0.01)	–1.18 (0.24)	–0.01 (0.01)	–1.31 (0.19)	–0.01 (0.01)	–1.21 (0.23)
EPS	0.00 (0.00)	5.04 (0.00)***	0.00 (0.00)	1.17 (0.24)	0.00 (0.00)	2.65 (0.01)***
_cons	51.98 (26.31)	1.98 (0.05)**	36.83 (20.45)	1.80 (0.07)*	48.62 (20.39)	2.38 (0.02)**
Number of obs	203		221		221	
Prob > F	0.00		0.00		0.00	
Adj R-squared	0.31		0.38		0.30	
Root MSE	1.89		1.58		1.58	

The study tries to explore the role of CEO's traits in leading their company; thus, the CEO's signature is added to equation 4 to obtain the results that can confirm that CEO's signature increases the company's profit after tax as well as its revenue, however it has an insignificantly positive effect on the company's total assets (Table 6).

Table 6 Company performance measured by applying both production and psychology models: the production function and the CEO's behavior model with adding the CEO's signature eq4 (* p < 0.1, ** p < 0.05 and *** p < 0.01)

Dependent variables	**LnPRAT**		**LnTASS**		**LnREV**	
Independent variables	**Coef. Std. Err.**	**t statistic P>t**	**Coef. Std. Err.**	**t statistic P>t**	**Coef. Std. Err.**	**t statistic P>t**
FE	–0.32 (0.83)	–0.39 (0.70)	0.35 (0.66)	0.52 (0.60)	0.74 (0.65)	1.14 (0.26)
NB	0.34 (0.05)	6.99 (0.00)***	0.42 (0.04)	10.55 (0.00)***	0.33 (0.04)	8.36 (0.00)***
CA	0.45 (0.30)	1.51 (0.13)*	0.55 (0.24)	2.30 (0.02)**	0.51 (0.24)	2.14 (0.03)**
CY	–0.02 (0.01)	–1.20 (0.23)	–0.01 (0.01)	–1.32 (0.19)	–0.01 (0.01)	–1.24 (0.22)
EPS	0.00 (0.00)	5.17 (0.00)***	0.00 (0.00)	1.23 (0.22)	0.00 (0.00)	2.79 (0.01)***
CSI	0.03 (0.02)	1.91 (0.06)*	0.01 (0.01)	1.12 (0.26)	0.03 (0.01)	2.24 (0.03)**
_cons	51.93 (26.13)	1.99 (0.05)**	36.78 (20.44)	1.80 (0.07)*	48.62 (20.39)	2.38 (0.02)**
Number of obs	203		221		221	
Prob > F	0.00		0.00		0.00	
Adj R-squared	0.32		0.38		0.31	
Root MSE	1.88		1.58		1.56	

To test the role of time when a CEO was born, we replace the variable "CSI" with the variable "CEY"; the results show that young CEOs can help the company earn more profit than older CEOs. However, young CEOs can decrease revenue. Like with signatures, a young CEO's impact on total assets is insignificant.

Table 7 Company performance measured by applying both production and psychology models: the production function and the CEO behavior model by adding the CEO's year of birth eq5 (* p < 0.1, ** p < 0.05 and *** p < 0.01)

Dependent variables	**LnPRAT**	**LnTASS**	**LnREV**

Independent variables	Coef. Std. Err.	t statistic P>t	Coef. Std. Err.	t statistic P>t	Coef. Std. Err.	t statistic P>t
	–0.47	–0.56	0.27	0.41	0.56	0.85
FE	(0.83)	(0.58)	(0.66)	(0.68)	(0.65)	(0.39)
	0.33	6.85	0.42	10.45	0.33	8.44
NB	(0.05)	(0.00)***	(0.04)	(0.00)***	(0.04)	(0.00)***
	0.50	1.68	0.57	2.38	0.59	2.49
CA	(0.30)	(0.09)*	(0.24)	(0.02)**	(0.24)	(0.01)***
	–0.02	–1.20	–0.01	–1.35	–0.01	–1.11
CY	(0.01)	(0.23)	(0.01)	(0.18)	(0.01)	(0.27)
	0.00	5.02	0.00	1.26	0.00	2.38
EPS	(0.00)	(0.00)***	(0.00)	(0.21)	(0.00)	(0.02)**
	0.01	0.31	0.01	1.79	–0.03	–2.20
CEY	(0.02)	(0.06)*	(0.01)	(0.43)	(0.01)	(0.03)**
	51.93	1.99	16.65	0.51	104.01	3.22
_cons	(26.13)	(0.76)	(32.74)	(0.61)	(32.33)	(0.00)***
Number of obs	203		221		221	
Prob> F	0.00		0.00		0.00	
Adj R-squared	0.31		0.38		0.31	
Root MSE	1.90		1.58		1.56	

Continuing to examine the effect of CEO gender, this study adds the dummy variable of CEO gender (CG) to replace CEY in equation (6) and receives the results that confirm that the CEO's gender does not affect the profit and revenue of the company; nevertheless, it can only increase the company's total assets (Table 8).

Table 8 Company performance measured by applying both production and psychology models: production function and CEO behavior model by adding CEO's gender eq6 (* p < 0.1, ** p < 0.05 and *** p < 0.01)

Dependent variables	LnPRAT		LnTASS		LnREV	
Independent variables	**Coef. Std. Err.**	**t statistic P>t**	**Coef. Std. Err.**	**t statistic P>t**	**Coef. Std. Err.**	**t statistic P>t**
	–0.85	–0.98	–0.29	–0.41	0.32	0.47
FE	(0.87)	(0.33)	(0.69)	(0.68)	(0.70)	(0.64)
	0.32	6.54	0.40	10.13	0.32	7.97
NB	(0.05)	(0.00)***	(0.04)	(0.00)***	(0.04)	(0.00)***
	0.53	1.79	0.60	2.53	0.57	2.40
CA	(0.30)	(0.08)*	(0.24)	(0.01)***	(0.24)	(0.02)**
	–0.02	–1.20	–0.01	–1.41	–0.01	–1.25
CY	(0.01)	(0.23)	(0.01)	(0.16)	(0.01)	(0.21)
	0.00	4.88	0.00	1.20	0.00	2.66
EPS	(0.00)	(0.00)***	(0.00)	(0.23)	(0.00)	(0.00)***
	0.57	1.40	0.75	2.37	0.35	1.10
CG	(0.41)	(0.16)	(0.32)	(0.02)**	(0.32)	(0.27)
	51.90	1.98	37.84	1.87	49.09	2.41
_cons	(26.24)	(0.05)**	(20.24)	(0.06)*	(20.39)	(0.02)**
Number of obs	203		221		221	
Prob > F	0.00		0.00		0.00	
Adj R-squared	0.31		0.39		0.30	
Root MSE	1.89		1.56		1.57	

Table 9 shows the results from combining both production function and TPB model in the same equation to predict the interaction of chaos specification in a company that follows: the production function continues to confirm the same effect of its factor as its single model. However, the CEO behavior may change its impact on its performance depending on the interactions between these factors except the variable "CEO's signature". The hypothesis test results are summarized as below:

- FE (β_1)> 0 the result is –0.72 < 0 without significance →Rejected
- NB (β_2)>0 the result is 0.32 > 0 with significance → Accepted
-
- CA (β_3)> 0 the result is 0.47 > 0 with significance→ Accepted
- CY (β_4)< 0 the result is –0.02 < 0 without significance →Rejected
- EPS (β_5)> 0 the result is 0.00001 > 0 with significance→ Accepted
- CSI (β_6)> 0 the result is 0.03 > 0 with significance→ Accepted
- CEY (β_7)< 0 the result is 0.01 > 0 without significance →Rejected
- CG (β_8)> 0 the result is 0.63 > 0 with significance → Accepted

Table 9 Company performance measured by applying both production and psychology models: production function and CEO's behavioral model by adding the CEO's specification eq7 (* p < 0.1, ** p < 0.05 and *** p < 0.01)

Dependent variable	**LnPRAT**		**LnTASS**		**LnREV**	
Independent variables	**Coef. Std. Err.**	**t statistic P>t**	**Coef. Std. Err.**	**t statistic P>t**	**Coef. Std. Err.**	**t statistic P>t**
FE	–0.72 (0.87)	–0.83 (0.41)	–0.22 (0.69)	–0.32 (0.75)	0.47 (0.69)	0.68 (0.50)
NB	0.32 (0.05)	6.53 (0.00)***	0.40 (0.04)	10.05 (0.00)***	0.33 (0.04)	8.28 (0.00)***
CA	0.47 (0.30)	1.57 (0.12)*	0.55 (0.24)	2.35 (0.02)**	0.54 (0.23)	2.29 (0.02)**
CY	–0.02 (0.01)	–1.24 (0.22)	–0.01 (0.01)	–1.47 (0.14)*	–0.01 (0.01)	–1.17 (0.24)
EPS	0.00 (0.00)	5.01 (0.00)***	0.00 (0.00)	1.39 (0.17)	0.00 (0.00)	2.54 (0.01)***
CSI	0.03 (0.02)	1.97 (0.05)**	0.02 (0.01)	1.30 (0.19)	0.03 (0.01)	2.42 (0.02)**
CEY	0.01 (0.02)	0.35 (0.73)	0.01 (0.01)	0.95 (0.34)	–0.03 (0.01)	–2.21 (0.03)**
CG	0.63 (0.41)	1.53 (0.13)*	0.80 (0.32)	2.53 (0.01)***	0.36 (0.31)	1.14 (0.26)
_cons	40.94 (40.87)	1.00 (0.32)	13.87 (32.36)	0.43 (0.67)	104.27 (32.01)	3.26 (0.00)***
Number of obs	203		221		221	
Prob> F	0.00		0.00		0.00	
Adj R-squared	0.32		0.39		0.33	
Root MSE	1.88		1.56		1.54	

Table 10 Research listed firms

ID	**CODE**	**ID**	**CODE**	**ID**	**CODE**	**ID**	**CODE**
1	VSF	35	SSF	69	SGT	103	ITA
2	AUM	36	VPR	70	DL1	104	S74
3	MTP	37	BBC	71	CAB	105	TCD
4	GVT	38	TET	72	DNL	106	DTK
5	DHP	39	GGS	73	VTG	107	EMG
6	AMV	40	HHP	74	BCG	108	TMG
7	Thanh Nien Media	41	SPC	75	FLC	109	NSG
8	VMD	42	MLS	76	VTR	110	CCM
9	Soctrang	43	NDT	77	VinaGame	111	TBX
10	CCA	44	FGL	78	HDG	112	PLX
11	BBT	45	SSC	79	OCH	113	TVM
12	NVP	46	ANT	80	SID	114	PLC
13	KSE	47	TAR	81	CLG	115	BFC
14	SKH	48	VHE	82	ANPHU	116	CKA
15	APT	49	PMC	83	VNS	117	TPP
16	AFC	50	BHG	84	BVG	118	AMS
17	TTG	51	DTP	85	EVG	119	NNC
18	CPA	52	DHP	86	Huong Giang	120	PXL
19	ACL	53	KAC	87	DAH	121	PVD
20	MML	54	C21	88	MBG	122	KSB
21	KDF	55	HLG	89	HBC	123	TMW
22	CBC	56	TH1	90	SAC	124	DAG
23	THP	57	PLO	91	ILA	125	MIC
24	TLI	58	SGH	92	LIC	126	PVG
25	BHP	59	CMG	93	TLP	127	PLP
26	SKN	60	HIG	94	VIC	128	BKC
27	TAC	61	QCG	95	DVN	129	FCM
28	NSS	62	VJC	96	BDP	130	ACM
29	SBL	63	GAB	97	TCW	131	VNP
30	NSC	64	VGI	98	TIG	132	HEM
31	NTT	65	ASA	99	AVC	133	CTT
32	BLF	66	TEG	100	TN1	134	SPP
33	ABT	67	HTI	101	MLG	135	TDN
34	NDC	68	SHG	102	CPI	136	CMK
137	GAS	168	DXG	199	PXT		
138	LG9	169	HAX	200	GMX		
139	NTP	170	HVG	201	TTN		
140	DHP	171	DSN	202	MSH		

ID	CODE	ID	CODE	ID	CODE	ID	CODE
141	KHD	172	DNT	203	RTB		
142	KKC	173	HHG	204	TVD		
143	REE	174	VIN	205	DQC		
144	BTP	175	SGC	206	TXM		
145	QHW	176	CCR	207	LHG		
146	DNH	177	HTC	208	ATS		
147	CKD	178	VCM	209	VSN		
148	SQC	179	PNC	210	PGS		
149	PAP	180	VNX	211	VKD		
150	TVA	181	HRB	212	APF		
151	HNP	182	MSC	213	TND		
152	DPC	183	TCH	214	NSL		
153	STV	184	SBM	215	CMN		
154	AMC	185	CCI	216	SPH		
155	MGC	186	DAD	217	DRI		
156	FSO	187	SLD	218	NDP		
157	ABBS	188	KGM	219	PPP		
158	ABS	189	EIC	220	NQT		
159	ACBS	190	THS	221	HAF		
160	ACB	191	KTC				
161	API	192	PRC				
162	APS	193	NST				
163	VCB	194	HES				
164	VBB	195	BAX				
165	SCB	196	SBA				
166	Vietabank	197	XHC				
167	CTG	198	FHS				

Table 11 Results of VIF test – Dependent variable: LnPRA

Variable	VIF	1/VIF
FE	1.16	0.86
CG	1.16	0.87
NB	1.11	0.90
EPS	1.06	0.95
CA	1.05	0.95
CEY	1.04	0.96
CSI	1.03	0.97
CY	1.02	0.98
Mean VIF	1.08	

Table 12 Results of VIF test – Dependent variable: LnTAS and LnREV

Variable	VIF	1/VIF
FE	1.17	0.86
CG	1.16	0.87
NB	1.10	0.91
EPS	1.07	0.94
CA	1.04	0.96
CEY	1.03	0.97
CSI	1.03	0.97
CY	1.02	0.98
Mean VIF	1.08	

5. Conclusion

The study applies both the production function and psychological approaches to investigating companies' and CEOs' characteristics and market demand side to the company's performance measured by their profitability, assets, and revenue by using the secondary data extracted from the Vietnam listed companies.

The study results indicate:

(1) Measuring the CEOs' characteristics with their large signatures can make their companies earn more money so that policymakers or investors can choose them to become CEOs.

(2) The young CEOs may reduce their company's revenue

(3) The female CEOs can enhance their companies' profits and assets better than male CEOs.

The study results suggest the company policymakers and the investors improve the company's profit and revenue. A manager considers increasing the number of board members with experience in the market, not too young, and placing his company in Ho Chi Minh City to run it. Furthermore, the companies' managers pay more dividends to their stakeholders that can drive their performance better.

The limitation of this study is that it only considers the role of CEOs and companies in general. The paper has not considered the impact of their education and proficiency in one or more international languages on company performance. It is not clear if the environment strongly influences company performance, the law or the market, or all. Besides that, the results show that "CEO with a large signature brings to the company more money", which can strongly influence the selection of signature-based human resources, but mitigates other important factors.

Further research may be expanded by extracting more data to explore the different roles of CEOs and companies' characteristics in each industry.

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