CEO Salary, Personal Characteristics, and Firm Performance in Chinese-Listed Firms:
A Cross-Sectional Econometric Modeling Approach

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Abstract

This study examines the relationships among CEO salary, CEO personal characteristics (such as age, education, and gender), and firm performance. Based on the special phenomenon that female CEOs are much fewer than male CEOs in Chinese-listed firms, the current research aims to discover whether gender is a significant factor affecting firm performance and CEO salary. Cross-sectional econometric models are estimated using data from about 2,600 Chinese-listed firms in 2018 in this study. According to the findings, CEO gender is not significant enough to affect firm performance while female CEOs, although capable of playing the same roles as male CEOs, receive a lower level of salary than male CEOs on average, which leads to certain degree of gender discrimination in the CEO position in China's listed firms. The findings of this study also have implications for further studies relating to CEO pay, financial performance, and gender discrimination.

Keywords: CEO salary; personal characteristics; firm performance, gender effect; listed firms; econometric models.

JEL Codes: C21, M12, M21, M52.

1. Introduction

Executive compensation is an important and also sensitive issue for corporate management and firm performance, and hence has attracted wide-spread attention from business investors and financial economists over time. Basically, executive compensation is also a complex agency issue, which, for different firms and time periods, may be different not only in levels, but in structures or compositions as well (Bebchuk & Fried 2003, Hoi et al. 2019). Empirical and theoretical considerations suggest that the issue can, largely or partly, be studied by examining the driving forces for executive payment (or salary, to be simple). Based on a comprehensive survey of theories and evidences, Edmans et al. (2017) analyze three potential explanations for the driving forces of executive salary, including maximization of shareholder values by boards, rent seeking by executives, as well as regulation, taxation and accounting policies. Since none of the three explanations can well account for observed facts and historical trends in executive salary, more studies are needed to be done in difference aspects, including different regions, personal characteristics, and industries.

This study is just a such effort to examine the relationships among executive salary, executives' personal characteristics (such as age, education, and gender), and firm performance, especially the gender effect in executive salary and firm performance. No matter it is widely noticed and accepted or not, an interesting phenomenon in China in the past two decades after China joined WTO (World Trade Organization) and entered into a new age of economic prosperity is that women have occupied more and more important positions in the traditionally men-dominated commercial society. With their different personal characteristics and increasing knowledge and wisdom, women can help firms better understand the complexity of their surroundings in general, and help firm managers improve creativity and solve some problems more effectively in particular (Du & Feng 2012). However, due to social and historical reasons, the relative proportion of women in senior management positions is still significantly lower than that of men in China and, although improved a lot, there still exists widespread gender discrimination in salary and job promotions (Li et al. 2017).

Indeed, personal characteristics of company executives (or CEOs, to be simple) have great impacts on their wage level. Perryman et al. (2016) state that female CEOs have a lower average age than male CEOs, but sometimes they may receive a higher level of salary (not average salary) than male CEOs. Previous researches also show that CEO wage level can be affected by a number of personal factors including age, gender, educational level, total working experience (in years), and tenure (in years) with the current company. On the other hand, firm profiles including firm age, total assets, total profits, ROA (return on assets), and RAE (return on liquidity) and, of course, also have impacts on CEO salary.

The research objective of this paper is to find the possible effects of personal characteristics and firm profiles on CEO salary. Especially, this paper tries to answer the following two

questions: (1) is CEO gender an essential factor affecting firm performance? and (2) is CEO gender a significant aspect affecting CEO salary level? It is expected that the current research can produce some meaningful results and practical suggestions for better business management, especially about the relationship between CEO salary and personal and company features and weather there is significant gender discrimination in CEO salaries.

2. Literature Review

There are many issues and activities related to executive compensation, see Obermann & Velte 2018) for a literature review on the relevant determinants and consequences. In the following we will briefly review some literature on CEO salary and its relationships with a number of affecting factors and with firm performance as well. Based on this, some research hypotheses will be proposed.

2.1. Return on Assets and Return on Equity

Return on assets (ROA) and return on equity (ROE) are two widely-used indicators for the performance of a company relative to its total assets and shareholders' equity respectively, with ROA more relevant to profitability (relative to assets) and ROE more relevant to financial performance (Libby et el. 2009, 2010). There have been a large amount of studies in the literature using ROA or ROE as the dependent or independent variable to measure firm performance (Elsaid & Ursel 2011; Khan & Vieito 2013; Lam et al. 2013). But as indicated in Wu (2020), ROA is relatively more often adopted than ROE in measuring firm performance, partly because assets are more real than equities and less subject to fluctuations and manipulations, especially for banks and other finance-related companies (Tan & Floros 2012; Vallascas & Hagendorff 2013). Therefore in this study ROA is selected as the key measure of firm performance.

2.2. CEO Salary

There are many references that have examined the important relationship between CEO salary and financial performance. Matolcsy & Wright (2014) investigate 3,503 large Austrian firms in the period 1999-2005 and conclude that, compared to firms with inconsistency between CEO salary and firm characteristics, firms whose CEO salaries are consistent with firm characteristics perform better. Besides, Sigler (2011) illustrates that 280 firms listed on the New York Stock Exchange from 2006 to 2009 exhibit a positive relationship between total CEO pay and firm performance measured by ROE. Kagango (2016) and Lilling (2006) also confirm the positive relationship between CEO salary and market value of a firm.

Moreover, Mcknight & Tomkins (2004) report that CEO salary level could be influenced by both firm implications and personal factors, where significant firm implications include shareholder return, firm age, firm size, and sales, while effective individual factors include CEO

age, tenure, and gender. Chang et al. (2010) indicate that CEO pay is also related to personal ability as well as firm performance. In the current study, the relationships among CEO salary, CEO characteristics and firm performance will be studied in more details in a new context.

2.3. Effects of CEO's Gender

Compared with male CEOs, it seems that female CEOs tend to be more social responsibility oriented and have more supervisory motivations in a company (Ibrahim & Angelidis 1994). A recent study from Vietnam shows that firms managed by females are less likely to be those industries with higher risk levels, and the differences due to the observed characteristics of firms managed by males and females can explain 56% of the gap in the risk indexes between the two groups of firms (Hoang et al. 2019). In the context of Chinese listed companies, Du & Feng (2012) and Zhu & Deng (2017) find that, 1) there is a significant positive correlation between female CEOs and charitable donations, 2) firms with higher proportion of female executives tend to make more philanthropic contributions, but 3) female CEO's positive influence on firm's social responsibility can be intervened by governance management. Although firms' social responsibility may have special influence on their performance, the motivations and tendencies of CEOs to perform these duties are not easy to be well quantified and hence will not be taken into further considerations in this study.

On the other hand, the influence of a CEO's gender in the firm's performance can be different in different types of industries. For instance, Ding (2014) claims that in education, culture and art, broadcasting, film and television industries, personal factors of female CEOs have significant impacts on firms' performance compared with male CEOs, and human capital, social capital, and proportion of female executives are all positively correlated with firm performance. But in another study, Li et al. (2016) find that the effects of female CEOs are much weaker than male CEOs in culture and creative industry. In fact, the impact of CEO's gender difference in firm performance in different industries is not clear enough to form a clear hypothesis, especially in this study with a big sample of many industries, and hence will not be considered further. For more on the relationship between CEO gender and firm performance, the readers are referred to, e.g., D'Ewart (2015), Dezsö & Ross (2012), Hu (2015), Jalbert et al. (2013), Smith et al. (2006), Swinney et al. (2006), and Ye et al. (2010).

2.4 CEO's Education, Age and Tenure

As Jalbert et al. (2010) argue, CEO's educational level is positively related to firm performance and CEO's salary level. It is believed that the education level of CEOs is closely correlated to firm performance and male and female CEOs have different degrees of impacts on company performance. It is suggested that when building a top management team, companies should consider developing a diversified management group with a gender balance and, especially, if female executives improve their educational levels, they are more likely to get promoted and

help improve corporate performance. But on the other hand, as Xiong (2016) find, there is a negative relationship between CEO age and firm performance, i.e., the growth of firm declines with CEO's age. Similarly, Hart & Mellors (1970) have examined the relationship between CEO age and the growth rate of firm assets and argued that firms led by older CEOs grew at a slower but less volatile rate. However, the empirical results of Wang (2014) show that firms operated by elder CEOs (aged more than 50 years) performed better than firms managed by younger CEOs (aged less than 50 years) after firm acquisitions, both in the short-run and long-run. In this paper, the specific impacts of CEO age on firm performance and CEO salary, including the gender difference in these impacts, will be further explored.

Another CEO related factor is CEO's tenure which could be associated with CEO salary (Sigler 2011). Since the position of CEO requires the accumulation of experience and knowledge, firms are likely willing to offer higher salaries to skilled CEOs with an expectation for them to improve firm performance. In the current study, econometric model will be constructed to examine the possible links CEO tenure to CEO salary and/or firm performance.

2.5. Firm Age and Size

According to Liu et al. (2015), firm age can affect firm performance to a certain extent. It claimed that firm performance could be positively affected by the CEO's learning processes, including experiential learning and vicarious learning. Nevertheless, firm age could weaken the influence of CEO learning processes on firm performance. Moreover, firm age also has impacts on firm size and CEO salary (Ozkan 2011). In this study, firm age could be taken into consideration as an effective factor, which could affect both CEO salary and firm performance, when constructing our models.

Firm size, which could be measured by such variables as sales, total assets and the number of employees, may not be an obvious factor to affect the relationship between CEO compensation and firm performance in many studies. However, it should be one of the control variables which cannot be neglected in the relevant research process. Ozkan (2011) notes that CEO base pay is affected by the size of the organization and the estimation of job complexity. O'Reilly et al. (1988) also indicate that the cash compensation of CEOs is closely connected with variables of firm size. To further support the inference above, Gabaix et al. (2014) find that 10% increase in firm sales will result in a 2% to 3% increase on CEO bonus or salary. Therefore, it is concluded that the relation between firm size and CEO pay could be causal. In accordance with the statement that "CEOs can increase their pay by increasing firm size, even when the increase in size reduces the firm's market value" (Nulla 2013), it can be inferred that firm size could influence the relationship between CEO compensation and enterprise performance. Moreover, larger enterprises tend to pay more salary to attract more gifted CEOs according to Ozkan (2011).

2.6. Statement of Research Hypotheses

Based on the above review and discussions, the key questions under study in this paper are summarized as the following hypotheses, where .

Hypothesis 1: CEOs' characteristics, gender, education, age, and tenure have a joint significant influence on firm performance (based on sub-sections 2.3-2.5).

Hypothesis 1a: Firms managed by male CEOs perform better than firms managed by female CEOs, on average (based on sub-section 2.3).

Hypothesis 2: CEOs' characteristics, education, age, and tenure have a joint significant influence on their salary (based on sub-sections 2.2-2.5).

Hypothesis 2a: Male CEOs receive more salary than female CEOs, on average (based on sub-section 2.3).

3. Data and Methodology

This paper has two parallel research goals. The first one is to study the effects of CEO's personal characteristics in firm performance, and the second one is to examine how CEO's salary is affected by the CEO's personal characteristics, after controlling for some firm characteristics. Various econometric approaches are applied for achieving the research goals, including t-tests for the significance of individual effects, F-tests for the significance of joint effects, and Chow-tests for the significance of group differences.

3.1. Variable Selection

To achieve the research goals using econometric approaches, modeling variables should be carefully and clearly selected and defined. Firstly, all variables to be selected are based on the above literature review. CEO's personal characteristics are one group of variables to be used to explain the dependent variables of firm performance (annual *ROA* in %) and CEO's *salary* (annual compensation in thousand Chinese yuan), including CEO's gender, educational level, age and tenure. Firm's characteristics are also considered or controlled to make the dependent variables better explained by CEO's personal characteristics, including firm's age and total assets. As widely used, total assets are selected as a measurement for firm size in this study

The gender variable, denoted as *male*, takes the value of 1 for male CEOs and 0 for female CEOs, which is a typical dummy variable. The variable *age* in years is self-explanatory, and the variable tenure refers to how many months a CEO has been in that position at the current company. The educational-level variable, denoted as *edu*, can take different while similar forms and in this study is, for simplicity while without loss much generality, defined as a eight-point ordinal variable taking the values of 0, 1, 2, 3, 4, 5, 6, 7 for CEOs with junior middle-school or

lower education, senior middle-school education, vocational college education, 3-year tertiary education, 4-year tertiary education (Bachelor degree), postgraduate education (Master degree), doctoral education, and post-doctorship, respectively. Finally the two variables for firm's characteristics, firm's age (in years) and total assets (in million Chinese yuan), should be self-explanatory and are denoted as *fage* and *asset* respectively.

3.2. Data Collection and Analysis

Two different sources of data were collected and used for this study. The CEOs' personal information was collected from the Eastmoney.com database while the companies' information was downloaded from the Resset database. The sampled companies include all companies listed on the two Mainland Chinese stock exchanges (in Shanghai and Shenzhen) in 2018 and only cover A and B shares (excluding H shares). For a company, the current CEO's information was viewed as an observation. After removing some companies with incomplete or unavailable data, the final data to be used for modeling and analysis were for a sub-sample of 2,246 listed companies in the two Chinese stock markets, which should be quite sufficient to get reliable results and draw representative conclusions.

It should be noticed that we used full data from the two popular data bases with firms with missing data dropped from the study for simplicity as well as for avoiding some methodological troubles in self-dropping or self-selecting some firms. This may not be the best approach, but is quite objective and convenient, and should be accepted for preliminary and explorative studies like the one reported in this paper.

Table 1 shows the descriptive statistics of the sample data. Among others, it can be seen that Chinese CEOs tend to be older with an average age close to 53 years. Another relevant observation is that Chinese CEOs tend to have higher educational levels with more than 60% of them having Master or Doctoral degrees. It is also necessary to indicate from the data summary that in the sample of 2,246 China's listed firms in 2018 to be studied, only 126 or 5.61% of them have female CEOs. The proportion is obviously low but the absolute number is acceptable for reliable model estimation. Also, this is the real situation in China, at least currently, and there should not be any big surprise for this.

Table 1. Descriptive Statistics of Sample Data

Indicator	Percentage (%)							
Gender	Male (1)				Female (0)			
	94.39				5.61			
Education	0	1	2	3	4	5	6	7
	0.44	1.87	0.97	9.30	26.57	50.92	9.40	0.53

Indicator	Mean	Standard Deviation
CEO age (year)	52.94	7.41
Tenure (month)	56.51	36.54
ROA (%)	4.13	8.82
Assets (million yuan)	7,078.94	8,183.71
Firm age (year)	20.42	3.23
CEO salary (thousand yuan)	467.77	190.12

Correlation matrix of the eight modeling variables is also calculated for doing relevant analysis for them, as reported in Table 2. It can be seen that most correlation coefficients are quite small in magnitude and statistically insignificant at the 5% level, except in two cases (between CEO age and education and between firm age and assets) with significant correlations. Thus it can be largely concluded that the relevant variables are quite different and do not exhibit strong multicollinearity, which is a good evidence for the multiple linear regression models proposed and estimated below to be statistically appealing.

Table 2. Correlation Coefficients of the Modeling Variables

	ROA	Gender	CEO age	Tenure	Edu	Firm age	Assets	CEO salary
ROA	1.0000							
Gender	-0.0014	1.0000						
CEO age	-0.0158	0.0878	1.0000					
Tenure	0.0221	0.0293	0.2701	1.0000				
Edu	-0.0658	0.0130	-0.1669*	-0.0695	1.0000			
Firm age	0.0199	-0.0195	-0.0082	-0.0029	-0.0307	1.0000		
Assets	-0.0630	-0.0183	-0.0264	-0.0308	-0.0109	0.4669**	1.0000	
CEO salary	-0.0008	-0.0001	-0.0059	-0.0419	-0.0106	-0.0079	-0.0187	1.0000

*: $p < 0.05$. **: $p < 0.001$.

3.3. Model Specification

CEO salary is the key dependent variables in this study, which is expected to be affected by firm's performance (ROA) and CEO's and firm's characteristics as indicated above. An

additional part of this study is to explain firm performance using CEO's and firm's characteristics as well as CEO's salary. Multiple linear regression models are proposed and estimated for the research purposes. To make the study more interesting and also to reflect the important but possibly different effects of different educational levels in CEO salary and firm performance, the squared education-level term (edu^2) is considered in the models, thus specifying the research models as follows,

$$ROA = \beta_0 + \beta_1 \, male + \beta_2 \, age + \beta_3 \, tenure + \beta_4 \, edu + \beta_5 \, edu^2$$
$$+ \beta_6 \, fage + \beta_7 \, asset + \beta_8 \, salary + u \tag{1}$$

$$salary = \lambda_0 + \lambda_1 \, ROA + \lambda_2 \, age + \lambda_3 \, tenure + \lambda_4 \, edu + \lambda_5 \, edu^2 + \lambda_6 \, fage + \lambda_7 \, asset + e \tag{2}$$

Here in models (1) and (2), β's and λ's are linear regression coefficients to be estimated using sample data, and u and e are random errors for other omitted factors affecting the dependent variables.

It should be noticed that β's and λ's in the above multiple linear regression models (1) and (2) have their own units or scales in relation to those of the corresponding dependent and independent variables, and hence should be used with care in practice. Using the classical ordinary least squares (OLS) method the estimated β's and λ's for the given sample can be obtained to do cause-effect analysis for the sample. The reliability of these analysis results (roughly in terms of applicability to other simpler samples or cases) can be evaluated by some statistical tests (such as t-test and F-test). All these can be done with the help of some popular computer packages like Excel, SPSS, and EViews.

In the above model (2), to explain the gender difference in CEOs' salaries which is of practical interest, the male dummy variable is not explicitly introduced as in the ROA model (1) which actually only considers intercept difference between male and female CEOs, but implicitly introduced into every coefficient. In other words, there is a model just for male CEOs, called model (2m), and also a model just for female CEOs, called model (2f). The two models (2m) and (2f) will be estimated just using the data from firms with male and female CEOs respectively, and then the results will be compared using Chow-test for model difference between male and female CEOs.

4. Results and Analysis

In the following, traditional multiple linear regression estimation and testing methods are applied to examine how firm performance and CEO salary are affected by firm's and CEO's characteristics so as to well manage these characteristics to achieve satisfactory levels for firm performance and CEO salary. To be simple and clear, standard level of 5% will be used throughout the study when evaluating the significance of modeling results.

4.1. How Performance is Affected?

Firstly, model (1) for explaining ROA is estimated with results given in equation (3) (with t-values listed under the estimated regression coefficients) as well as in the second column of Table 3. It is noticed that the regression model is highly significant with a big F-statistic of 11.92 ($p < 0.001$), although R^2 (or adj-R^2) is only about 0.04 which however is quite common for large samples like in this study. Among the few explanatory variables, only two have significant effects in firm performance. One is firm age which positively affects firm performance, suggesting that older firms tend to have better performance due to, for example, more experience and more social and business connections. Another one is CEO salary which negatively affects firm performance, implying that higher pay for CEOs doesn't help improve the performance of China's listed firms most of which are non-private firms.

$$
\begin{aligned}
\text{ROA} = {}& 0.0672 - 0.0031\,\text{male} + 0.00009\,\text{age} - 0.00002\,\text{tenure} + 0.0014\,\text{edu} \\
& (6.77) \quad\ (-0.73) \qquad\quad (0.69) \qquad\qquad (-0.88) \qquad\qquad (0.70) \\
& - 0.0002\,\text{edu}^2 + 0.0008\,\text{fage} + 0.00002\,\text{asset} - 0.00002\,\text{salary} + \hat{u} \qquad (3) \\
& \ \ (-0.71) \qquad\quad (4.10) \qquad\quad\ (0.18) \qquad\qquad (-8.38) \\
& n = 2{,}246,\ R^2 = 0.0409,\ \text{adj-}R^2 = 0.0375,\ \text{F-statistic} = 11.92\ (p < 0.001)
\end{aligned}
$$

Other explanatory variables individually are not significant in explaining firm performance, including CEO's gender, age, education (and squared education) and tenure as well as firm's total assets, implying that each of these factors, especially firm's scale measured by its total assets, is not stably linked to firm performance. An F-test is also conducted to examine the joint significance of CEOs' personal characteristics (gender, age, education and tenure) in affecting firm performance with the null hypothesis of $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$. The resulting sample F-statistic is only 0.53 which is much smaller than the corresponding 5% critical value of 2.37, therefore it can be concluded that the four characteristics of CEOs collectively are also not significant in affecting firm performance. As a result, Hypotheses 1 and 1a are both rejected.

Table 3. Estimation Results for Models (1) and (2) (p-value in brackets)

Independent variables	Dependent variable			
	Model (1): ROA	Model (2): salary		
	All CEOs	All CEOs	Male CEOs	Female CEOs
male	-0.0031	----	----	----
	(0.466)			
age	0.00009	0.0006	0.2391	17.5628
	(0.489)	(1.000)	(0.829)	(0.163)
tenure	-0.00002	-0.7034	-0.8122	-5.7262
	(0.379)	(0.001)	(0.000)	(0.148)
edu	0.0014	31.2032	33.0056	208.4721
	(0.486)	(0.048)	(0.040)	(0.129)
edu^2	-0.0002	-3.1010	-3.5012	-4.7320
	(0.480)	(0.103)	(0.072)	(0.077)
fage	0.0008	-2.9990	-3.0577	-4.5010
	(0.000)	(0.057)	(0.059)	(0.522)
asset	0.00002	-1.8400	-1.4500	-6.1500
	(0.859)	(0.065)	(0.161)	(0.116)
salary	-0.00002	----	----	----
	(0.000)			
ROA	----	-1,378.3270	-1,370.1330	-1,199.3900
		(0.000)	(0.000)	(0.064)
constant	-0.0672	817.1003	811.4960	79.0751
	(0.000)	(0.000)	(0.000)	(0.906)
R^2	0.0409	0.0437	0.0440	0.1072
adj-R^2	0.0375	0.0407	0.0408	0.0782
F-statistic	11.92**	14.60**	13.89**	2.33*
n (sample size)	2,246	2,246	2,120	126

*: $p < 0.05$; **: $p < 0.001$

4.2. What Factors Affect CEO Salary?

Secondly, model (2) for explaining CEO salary is estimated (using all data) with results given in equation (4) as well as in the third column of Table 3. It can be seen that this regression model is also highly significant with a sample F-statistic as big as 14.60 ($p < 0.001$), although it only explains ($R^2 =$) 4.37% of the sample variations in CEO salary, which is quite common for large samples with thousands of individual units or subjects like in the current study. Among the few explanatory variables in model (4), not like in model (3) for explaining firm performance, most have clear effects in CEO salary and only age is highly insignificant. In detail, the effects of ROA and CEO's tenure and education in CEO salary are significant at the 5% level, and the effects of firm's age and total assets and CEO's education squared are significant at 10 % level. All this suggests that the estimated model (4) reveals a quite stable pattern for CEO salary in which, except CEO's education, all other five variables (firm's age, assets and ROA and CEO's tenure and education squared) are negative in affecting CEO salary. Hence Hypothesis 2 is supported in this study.

$$\text{salary} = 817.1003 + 0.0006\,\text{age} - 0.7034\,\text{tenure} + 31.2032\,\text{edu} - 3.1010\,\text{edu}^2$$
$$(11.43)\qquad (0.00)\qquad\quad (-3.26)\qquad\;\; (1.98)\qquad\;\; (-1.63)$$

$$- 2.9990\,\text{fage} - 1.8400\,\text{asset} - 1{,}378.3270\,\text{ROA} + \hat{u} \qquad\qquad (4)$$
$$\;\;(-1.90)\qquad\quad (-1.84)\qquad\quad (-8.41)$$

$$n = 2{,}246,\; R^2 = 0.0437,\; \text{adj-}R^2 = 0.0407,\; \text{F-statistic} = 14.60$$

Gender difference in CEO salary patterns is an interesting issue to further explore. For this purpose, simply adding a gender dummy into the model like model (3) is not enough, and the famous Chow-test approach is applied here. The general model (2) is first estimated using all data to get the overall model (4), then estimated just using the data for firms with female CEOs to get model (5) and just using the data for firms with male CEOs to get model (6), and these results are also listed in Table 1 for easy reference. Based on these three estimated models, the general salary difference between male and female CEOs can be tested through Chow-test and the specific difference can be analyzed by comparing models (5) and (6).

$$\text{salary} = 79.0751 + 17.5628\,\text{age} - 5.7262\,\text{tenure} + 208.4721\,\text{edu} - 4.7320\,\text{edu}^2$$
$$(0.12)\qquad (1.40)\qquad\quad (-1.46)\qquad\qquad (1.53)\qquad\qquad (-1.77)$$

$$- 4.5010\,\text{fage} - 6.1500\,\text{asset} - 1{,}199.3900\,\text{ROA} + \hat{u} \qquad\qquad (5)$$
$$(-0.64)\qquad\quad (-1.58)\qquad\quad (-1.87)$$

$$n = 126\ (\text{female CEOs}),\; R^2 = 0.1072,\; \text{adj-}R^2 = 0.0782,\; \text{F-statistic} = 2.33$$

$$\text{salary} = 811.4960 + 0.2391\,\text{age} - 0.8122\,\text{tenure} + 33.0056\,\text{edu} - 3.5012\,\text{edu}^2$$
$$(11.05)\qquad (0.22)\qquad\quad (-3.66)\qquad\quad\; (2.06)\qquad\;\; (-1.80)$$

$$- 3.0577\,\text{fage} - 1.4500\,\text{asset} - 1{,}370.1330\,\text{ROA} + \hat{u} \qquad\qquad (6)$$
$$\;\;(-1.89)\qquad\quad (-1.40)\qquad\quad (-8.09)$$

$$n = 2{,}120\ (\text{male CEOs}),\; R^2 = 0.0440,\; \text{adj-}R^2 = 0.0408,\; \text{F-statistic} = 13.89$$

It can be seen that models (5) and (6) for female and male CEOs are both overall highly significant, with sample F-statistics of 2.33 ($p < 0.024$) and 13.89 ($p < 0.001$) respectively. The patterns of effects of the independent variables in CEO salary are largely the same in the combined model (4), female model (5) and male model (6), i.e., age is insignificant, education has positive effect, and all other factors have negative effects. Furthermore, the sample F-statistic for doing Chow-test is 1.69, smaller than the 5% critical value of 1.94, so overall gender difference in CEO salary patterns is not significant and there is no big need to separate the sample/model into a male one and a female one. In other words, the above combined model (4) is appropriate for analyzing how CEO salary is affected by some variables without considering the gender factor. As a result, Hypothesis 2a is not supported in this study, i.e., there is no significant evidence suggesting a higher salary for male CEOs than for female CEOs.

5. Concluding Remarks

5.1. Discussions and Conclusions

The regression results in model (3) for explaining firm performance fail to support Hypotheses 1 and 1a. CEO's characteristics are not found to have significant effects in firm performance as measured by ROA, and especially CEO's gender is only very weakly linked to firm performance. As for explaining CEO salary, model (4) shows that Hypothesis 2 is accepted with CEO's education and tenure having significant effects, but Hypothesis 2a is not supported through the Chow-test, i.e., gender difference in CEO salary is not significant..

It is noticed that from model (4) that CEO's age has positive but very insignificant effect in his/her salary, both statistically and practically. CEO's tenure has negative effect in his/her salary, which is statistically significant ($p < 0.001$) but practically is insignificant: one more year of working as the company's CEO will in average lead to a reduction of about CNY700 in his/her annual salary. CEO's education has a positive linear effect in his/her salary as expected, which is statistically significant ($p = 0.048$) and also practically significant. Since education squared has a negative but not-so-significant effect ($p = 0.103$) in CEO salary, there seems to be a turning point in return to education (salary increase from one more year of education) which however is not so significant, i.e., return to education is more likely to be constant than to have an inverse U-shape. These findings about the effects of CEO's characteristics on CEO salary are largely consistent with those from Hart & Mellors (1970), Jalbert et al. (2010), and Xiong (2016).

Also, this study produces implausible findings that firm performance (ROA), firm size, and total assets all have negative impacts on CEO salary in the combined model (4), which contradict to the previous findings from O'Reilly et al. (1988) and Gabaix et al. (2014). This may be resulted from without taking options and bonus of CEOs into account in this study. For listed firms with better performance and larger assets, their stocks will generally perform better in the stock markets, and the related stock options and bonus may be the greater incentives and rewards for the diligence of the CEOs.

5.2. Research Limitations and Future Directions

In relation to research limitations and future directions, it should be noticed that one part of this study is to examine how CEO salary is linked to CEO characteristics. But since the database has incomplete information about the CEO's stock options and bonus, these are omitted from CEO's total compensations and only CEO salary is used as the dependent variable, which may make the results biased. On the other hand, the latest data in 2018 were used in conducting this study but some companies had not yet disclosed their latest annual reports when conducting the study, and eventually only about 70% Chinese listed companies were covered, which, although

representing a quite big sample already, still has room for improvement in future studies. Another part of this paper focuses on how CEO characteristics affect firm performance, based on a cross-sectional data set in 2018. Since historical information of CEOs of listed companies is not so easy to trace, previous years' and previous CEOs' effects on firm performance cannot be included, which may be wrongly attributed to the current CEOs' effects. In addition, CEO's influence in firm performance may be different in different industries, which is not considered in this study due to the difficulty in clearly grouping the sample firms into different industrial types. This could be an interesting area in future studies so as to be able to formulate different industrial policies for firm performance improvements.

Another observation is that although female and male CEO salary models (5) and (6) do not have statistically significant differences as evaluated by the popular Chow-test, the two models' coefficients actually have quite different magnitudes. At least partly this should be due to the absolute dominance of males in the top positions of listed Chinese firms in the sample: 94.39% of firms have male CEOs while only 5.61% of firms have female CEOs. To obtain both practically meaningful and statistically significant results in the differences between male and female CEO salary models, it is suggested that a somewhat balanced sample with, for example, about 30% of female CEOs should be sought to re-estimate the relevant models in future studies.

It should also be noted that such factors as CEO's risk-taking ability and firm's investment level are also of value in explaining CEO's salary and firm performance. For example, Li et al. (2017) make a theoretical analysis of the differences between male and female CEOs in corporate risk-taking ability. Their study find that the risk-taking level of enterprises with female CEOs is significantly higher than enterprises with male CEOs. Moreover, in non-state-owned enterprises, the positive impact of female CEO on the firm's risk-taking capability is more significant. According to Martin et al. (2009), high-risk companies prefer to recruit female CEOs as a method of improving firm performance. Also in accordance with Olsen and Cox (2001), there exists a significant negative correlation between female CEO and investment level of the company, which indicates that female CEOs tend to reduce the company's investment level to a certain extent. Compared with male CEOs, female CEOs often make more conservative decisions when facing options and limit the enterprise's investment level (Olsen and Cox 2001). However, due to data shortage (partly due to the difficulties in quantifying the CEO's risk-taking ability and he firm's investment level), these two additional factors have not been adopted in the current study. In future studies, it is suggested to consider these two variables to examine their possible effects in CEO salary and firm performance, especially in survey studies which can resolve the difficulties in getting data on these two somewhat subjective factors.

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