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BANKING & FINANCE | RESEARCH ARTICLE

CEO age and gender: Subsequent market performance

Marcelo Eduardo^{1*} and Brooks Poole¹

Abstract: The issue of CEO age and gender vs. concurrent performance is extensively examined, but the association with subsequent performance has limited treatment in the financial literature, and with conflicting findings. In the current study, we examine the association between CEO age and gender, and subsequent company market performance using a more recent set of observations and the standard four-factor model to estimate future cumulative abnormal shareholder returns. We find that subsequent abnormal shareholder returns are marginally significantly higher for female CEOs than for their male counterparts, but no material pattern is observed between CEO age and subsequent abnormal shareholder return performance.

Subjects: Corporate finance; Economics, Finance, Business & Industry; Finance; Social Sciences

Keywords: finance; CEO compensation; gender; market efficiency

1. Introduction

The role of CEO age and gender in explaining concurrent or past shareholder returns has been extensively explored in recent financial literature with mixed findings. The examination of the association between CEO age and gender, and *subsequent* abnormal shareholder return performance, however, indicates limited investigation. The research question of this study is as follows: are CEO age and gender correlated with a company's subsequent abnormal shareholder return performance?

ABOUT THE AUTHOR

Marcelo Eduardo is the "Sam Anderson Professor of Finance" at the Mississippi College School of Business. His research interests have centered on the areas of Financial Institutions, Financial Education, and Corporate Finance. In terms of institutions, the author has published articles in the area of Banking and regulation with particular emphasis on CRA regulations and their impact. Eduardo's research in financial education includes award-winning cases dealing with cost of capital and ratio analysis scenarios. More recently, Eduardo has researched the topic of behavioral finance as it impacts capital structure corporate decisions, as well as the impact that CFO rankings have on company performance. This CEO gender and age study fits into this area of research.

PUBLIC INTEREST STATEMENT

An interesting aspect of CEO performance discussions is the impact that CEO age and gender has, if any, on the performance of the company as measured by its stock market returns. Previous studies that search for a relationship between these characteristics and current or past company performance have produced mixed results showing in some cases that female CEO's outperform their male counterparts, while other studies have found no such relationship or even a negative impact by female CEO's. This study attempts to provide a different perspective into this question by examining the impact of gender and age on subsequent performance. By looking at the company's excess stock returns over a market benchmark for the year *following* the year of CEO compensation, the study reveals that such subsequent returns are slightly higher for female CEO's. The study also finds that CEO age has no impact on company's subsequent performance.

The current paper contributes to the literature by investigating the relationship between CEO age and gender and subsequent cumulative abnormal shareholder return. The study's sample draws current data from Fortune 500 companies. A standard four-factor market model is employed to capture the impact of market parameters in measuring subsequent cumulative abnormal shareholder return. While no significant association between CEO age and subsequent market performance is observed, the association between CEO gender and subsequent market performance is observed to be marginally significant with female CEOs outperforming their male counterparts. Including females in the management structure benefits an organization, but CEO age does not affect the organization's future abnormal performance.

2. Literature review

2.1. CEO gender and company performance

Studies on the importance of CEO-specific characteristics and performance are generally mixed. With regard to gender, some studies find companies benefit more from females occupying high-level management positions. Companies led by female CEOs or chairs are associated with higher ROAs (Peni, 2014). Female executives are viewed to be better suited to comprehending customer needs (Brennan & McCafferty, 1997), although no relationship is observed between gender and company performance (Dezsö & Ross, 2008). A positive relationship is found between the percentage of women on top management teams and organizational performance (Krishnan & Park, 2005). In a study of Danish firms, a positive relationship is observed between the percentage of females in top management and firm performance (Smith, Smith, & Verner, 2006). Using the Fama-French valuation framework, a positive relationship is observed between the proportion of female officers and abnormal returns for firms operating in complex environments (Francoeur, Labelle, & Sinclair-Desgagné, 2008). Small service businesses led by female CEOs outperform their male counterparts, primarily due to their stronger market orientation (Davis, Babakus, Englis, & Pett, 2010). When the CEO of a US company is female, company risk is less than when the CEO is male (Khan & Vieito, 2013). In a study of Singaporean companies, investors react positively to the addition of women on the board of directors (Kang, Ding, & Charoenwong, 2010). The presence of female directors on Norwegian companies increases board efficiency through reduced conflicts (Nielsen & Huse, 2010a). A study of Fortune 1,000 companies reveals a positive relationship between the percentage of the board represented by either females or ethnic minorities and firm value (Carter, Simkins, & Simpson, 2003). In a study of female director appointments in Spain, the market is observed to react positively in the short-run (Campbell & Minguez Vera, 2010). Companies led by female CEOs or chairs produce higher ROAs, and age is positively related to performance (Peni, 2014; Krishnan & Park, 2005; Smith et al., 2006). Female executives are better suited to comprehending customer needs (Brennan & McCafferty, 1997).

Conversely, other studies find the presence of females in upper management to be associated with negative consequences in terms of performance. Among Chinese-listed corporations, CEO gender and firm performance have a limited association (Lam, McGuinness, & Vieito, 2013). The average effect of the presence of women on the boards of American companies is negative, driven by the lack of takeover defenses in those companies (Adams & Ferreira, 2009). In a study of FTSE 100 companies, while there is no observed relationship between women's presence on boards and accounting performance, a negative relationship is observed with subjective stock valuation performance measures (Haslam, Ryan, Kulich, Trojanowski, & Atkins, 2010). The perception of women as unequal board members in Norwegian companies reduces their potential to contribute to board policy formulation (Nielsen & Huse, 2010b).

Finally, some studies find upper management gender is found to be unassociated with company performance. CEO gender is found to have a negative, but insignificant relationship with corporate social responsibility (Huang, 2012). While the percentage of board members that are female is positively related to company financial performance in Spain, the relationship is not statistically significant (Campbell & Minguez-Vera, 2008). No relationship is observed between female CEOs and

company performance (Dezsö & Ross, 2008). The evidence on the ability of women directors to influence shareholder value is mixed (Simpson, Carter, & D'Souza, 2010).

2.2. CEO age and company performance

Studies examining the role of executive age in relation to company performance are limited and also produce mixed findings. One study observes executive age to be inversely related to firm performance (Bertrand & Mullainathan, 2003; Davidson, Xie, Xu, & Ning, 2007). Also, older executives are found to be prone to be more conservative as they approach retirement focusing on projects that produce earlier results (Gibbons & Murphy, 1992), while younger CEOs are more prone to focus on short-term performance to establish reputation (Hirshleifer, 1993). However, executive experience is postulated to have a positive influence on performance (Baysinger & Hoskisson, 1990). Finally, executive age may have an impact on company performance that may be positive or negative (Bertrand & Schoar, 2003). The findings between CEO age and performance are mixed, while experience and quality of upper management are positively associated with performance (Peni, 2014).

3. Sample

Sample inclusion requires that the company be listed in the Fortune 500 for each year within the 2007–2012 time period, and also be publicly traded for the five years immediately preceding each observation year for purposes of model parameter estimation. Inclusion restrictions reduce the initial potential sample of 3,000 company-years to 1,306 company-years.

4. Methodology

An ANCOVA (analysis of variance with a covariate) is applied to test the association between the independent variables (age and gender) and performance (subsequent cumulative abnormal market returns).

4.1. Dependent variable

The cumulative abnormal monthly returns on the stock for the year *following* the year of CEO compensation serves as the dependent variable in the current study. Monthly returns estimated for the 60-month time period ending in the year of published CEO-specific data are used to establish model parameters. Standardized cumulative abnormal returns for the 12 months immediately following the CEO-specific data publication year serve as the measure of excess returns.¹ Monthly expected returns are generated using the four-factor model prescribed by Fama and French (1996) and Carhart (1997), as follows:²

$$E(r_{i,t}) - R_{f,t} = \beta_i[E(R_{M,t}) - R_{f,t}] + s_iE(SMB_t) + h_iE(HML_t) + m_iE(MF_t) - \varepsilon_{f,t} \quad (1)$$

where $E(r_{i,t})$ is the expected monthly return on company i for month t , β_i , s_i , h_i , and m_i are the coefficients of the return model for company i for the 60-month estimation period ending just prior to the start of the 12-month period of observation, $R_{f,t}$ is the Treasury Bill rate for month t , $R_{M,t}$ is the return on the market portfolio M for month t , SMB_t is the difference between the return on a portfolio of small stocks and the return on a portfolio of big stocks for month t , HML_t is the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks for month t , MF_t is the momentum factor found by the average return on two high prior return portfolios minus the average return on two low prior return portfolios for month t , and $\varepsilon_{f,t}$ is the error term.

Scaled abnormal returns are then calculated for each company for each estimation period month as:

$$AR_{it} = (R_{it} - \bar{R}_{it})/s_i \quad (2)$$

where AR_{it} is the scaled abnormal (residual) return for company i for month t , \bar{R}_{it} is the predicted return for company i for month t , R_{it} is the observed return for company i for month t , and s_i is the sample standard deviation of monthly residual returns for company i over the estimation period.

Cumulative scaled abnormal returns are then defined for the subsequent 12-month observation period, where $t = 0$ is the last month of the 60-month model formulation period, as:

$$CAR_t = \sum_{t=1}^{12} AR_t \quad (3)$$

4.2. Independent variables

CEO age and gender are the independent variables in the analysis, perhaps serving as proxies for experience and the gender pay disparity, respectively. CEO age for each year from 2006 to 2012 inclusive is obtained from Fortune Magazine.³ CEO gender for the same time periods is obtained from SEC registration statements via SEC website (EDGAR).⁴

5. Results and analysis

Sample characteristics are presented in Table 1. Results indicate a subsequent cumulative abnormal scaled return for the sample that is not statistically different from zero. Average CEO age is roughly 57 years, and the presence of female CEOs in the sample is quite low, with only 43 of the 1,306 CEO years represented by female CEOs.

Observation of the ANCOVA model with both AGE (covariate) and GENDER (factor) reveals that gender is marginally significant while age is insignificant, but the ANCOVA model is statistically insignificant (see PANEL A in Table 2). A scatterplot for CAR and CEO gender is included (see Graph C). The lack of relationship between subsequent market performance and CEO age is also presented in the form of a scatterplot (see Graph A). There appears to be no visual relationship between CAR and CEO age. The insignificance of CEO age is in contrast with other studies that submit mixed results. Other research efforts observe CEO age to be positively associated with shareholder benefit (e.g. Baysinger & Hoskisson, 1990), or negatively associated with shareholder welfare (e.g. Bertrand & Mullainathan, 2003; and Davidson et al., 2007), or a pattern that may be positive or negative (Bertrand & Schoar, 2003; and Peni, 2014). However, few studies incorporate the standard four-factor model (Carhart, 1997; Fama & French, 1996) to control for systematic effects in measuring abnormal returns, and other studies are based on an earlier time period of observation.

Additionally, we controlled for size (log of sales). The results in Table 3 (PANEL A) suggest that including size into the model does not change the results and still renders GENDER as significant while AGE remains insignificant. The model is rerun without GENDER in (PANEL B).

The model is regenerated without the covariate (see PANEL B1), with the results demonstrating marginal significance for both the model and gender. Observation of the categorical mean CAR values reveals that female CEOs outperform their male CEO counterparts (see PANEL B2). This finding is visually reinforced with the bar chart displayed in Graph B. This findings is consistent with those of other studies that observed a positive benefit from the presence of females in the management structure (e.g. Francoeur et al., 2008; Kang et al., 2010; Khan & Vieito, 2013; Krishnan & Park, 2005; Peni, 2014; Smith et al., 2006). The results are also contradictory to those of other studies who either

Table 1. Sample characteristics

N = 1,306	
Variable	Mean/(standard deviation)
CAR ^a	-0.363/(5.860)
CEO age (Years)	56.870/(5.458)
CEO gender (1-female 2-male)	1.970/(0.179)
(Male CEO years = 1,263)	
(Female CEO years = 43)	

^aCAR is the subsequent cumulative scaled annual abnormal return as defined in Equation (3).

Table 2. CEO Age and gender vs. subsequent market performance

Source	Sum of squares	df	Mean square	F	Sig.
PANEL A					
Corrected model	113.854	2	56.927	1.660	0.191
Intercept	7.514	1	0.219	0.219	0.640
Age	16.693	1	0.487	0.487	0.486
Gender	104.573	1	104.573	3.049	0.081
Error	44,692.075	1,303	34.299		
Total	44,977.822	1,306			
Corrected total	44,805.929	1,305			
PANEL B1					
Corrected model	97.161	1	97.161	2.834	0.093
Intercept	20.511	1	20.511	0.598	0.439
Gender	97.161	1	97.161	2.834	0.093
Error	44,708.768	1,304	34.286		
Total	44,977.822	1,306			
Corrected total	44,805.929	1,305			
PANEL B2					
Gender	Mean		Standard deviation	N	
Female	1.115		6.120	43	
Male	-0.413		5.846	1263	
Total	-0.363		5.860	1306	

Notes: In both models, the dependent variable (CAR) is the subsequent cumulative scaled abnormal returns as defined in Equation (3). In the first ANCOVA model (PANEL A), both gender (factor) and age (covariate) serve as independent variables. In the second model (PANEL B1), only gender is included as an independent factor. Mean values of the second model are displayed in PANEL B2.

Graph A. CAR vs. CEO age.

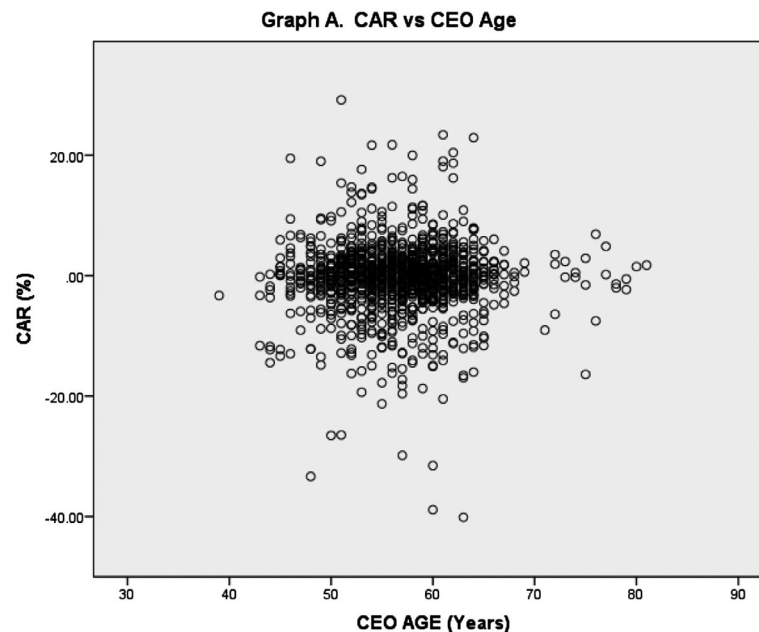
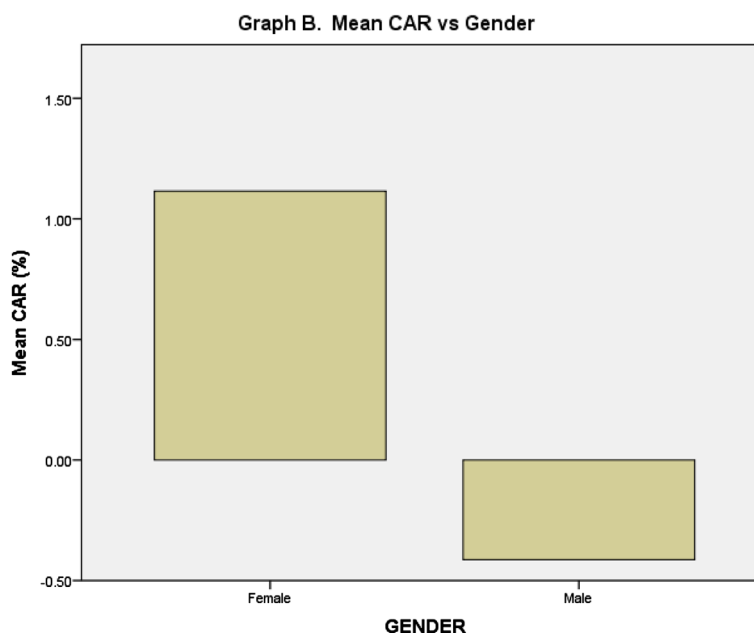


Table 3. CEO age and gender vs. subsequent market performance controlling for size

Model	Coefficients	S. error	t	Sig.
<i>PANEL A</i>				
Constant	4.895	4.638	1.056	.291
Age	.022	.030	.795	.427
Gender	-.490	.914	-1.776	.076
SIZE	-.023	.404	-.827	.409
<i>PANEL B</i>				
Constant	5.694	4.527	1.258	.209
Gender	-.470	.908	-1.701	.089
Size	-.020	.401	-.734	.463

Notes: In the model (PANEL A), the dependent variable (CAR) is the subsequent cumulative scaled abnormal returns as defined in Equation (3). Gender, age, and now size serve as independent variables. In the second model (PANEL B), only gender and size are included as the independent variables.

Graph B. Mean CAR vs. gender.

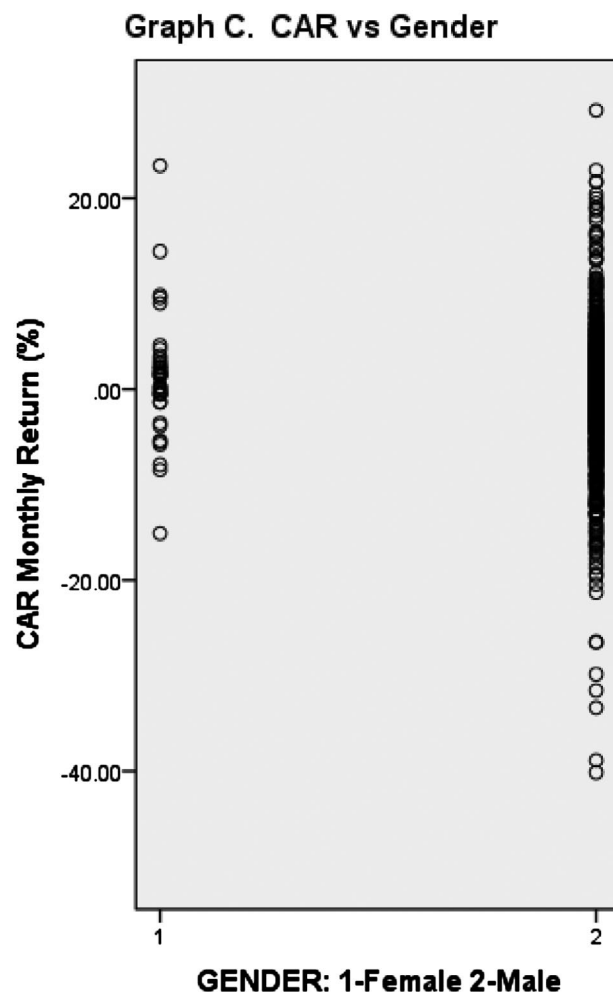


observed a negative impact of females in management (e.g. Adams & Ferreira, 2009; Haslam et al., 2010; Lam et al., 2013; Nielsen & Huse, 2010b), or no significant association in terms of performance (e.g. Campbell & Mínguez-Vera, 2008; Dezsö & Ross, 2008; Huang, 2012; and Simpson et al., 2010).

6. Conclusions

The current study examines the relationship between CEO age and gender and subsequent market performance. The subsequent market performance is measured as the cumulative abnormal shareholder returns in the following year based on the standard four-factor market model (Carhart, 1997; Fama & French, 1996). While no significant association between CEO age and subsequent market performance is observed, the association between CEO gender and subsequent market performance is observed to be marginally significant with female CEOs outperforming their male counterparts. The study's findings support the beneficial aspects of including females in the management structure, but no shareholder benefit is observed to be associated with CEO age.

Graph C. CAR vs. gender.



The study does not address additional issues such as years of CEO experience within the same industry, or the benefit of females on the company boards. Those and other issues are left for further study.

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Notes

1. For example, for CEO-specific data published for 2012, the expected returns model parameter estimates are based on the 60 months comprising the 2008–2012 time period, with cumulative abnormal return per-

formance based on the 12 months comprising the 2013 year. A likewise procedure is used for each of the other five observation years of the study.

2. Returns are obtained from monthly closing prices, adjusted for splits and dividends, via the

Wall Street Journal online website at:

<http://quotes.wsj.com>. The four-factor model develops parameter estimates based on the three systematic factors introduced by Fama and French (1996) and Carhart's (1997) momentum factor. These data are publicly available from the Kenneth French Data Library at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

3. Publication of these data by *Fortune* ceased with the 2012 year.

4. <http://edgar.gov>.

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