

CEO Characteristics and the Probability of Financial Distress: Evidence from Pakistan

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Abstract

We empirically test whether various characteristics of the CEO have an impact on the corporate survival of firms in Pakistan. The corporate governance literature suggests that various characteristics of the CEO have an impact on various aspects of firm performance as a whole. Ultimately these characteristics of the CEO must also have implications for the firm's overall survival. Moreover, Pakistan, being a developing country with a corporate governance landscape that is in its infancy, provides a natural setup to see how CEO characteristics link with firm survival in developing countries. Using Panel FGLS Regression and Panel Logistic Regression Analysis over a sample of 42 non-financial firms from the KSE-100 index for the period 2009-2013, it is the finding that CEO Ownership and Tenure are significant determinants of a firm's survival probability. The results suggest that a one year rise in CEO tenure and a 1% rise in CEO Ownership may reduce the distress probability by 2% and 17%, respectively. The study also finds that trade debt and interest coverage ability are also related to a firm's distress risk. These findings suggest that the CEOs should be given more ownership such as share-based compensation in the firm which does not only help reducing agency conflicts but also improves the firm's financial health.

Keywords: CEO Characteristics; CEO Duality; Altman's Z-Score; Financial Distress
JEL Codes; G32, G34; M19

Introduction

Predicting the probability of corporate bankruptcy has always been the interest of research in corporate finance. In this regard, corporate governance factors have got particular attention in recent years. For example, Thornhill and Amit (2003) suggest that failure among the younger firms may be attributable to deficiencies in managerial knowledge and financial management abilities. The impact of the CEO compensation package and its components has also been found to affect firm risk and performance (Coles et al., 2006; Core & Guay, 1999; Rajgopal & Shevlin, 2002).

Some other studies have also shown that other CEO characteristics such as age, tenure, duality (the same person simultaneously holding board chair & CEO positions in a single firm) and ownership in the firm have significant impact over the firm's financing and investment policies (Alexander & Lee, 1996; Nourayi & Mintz, 2008; Yasser et al., 2011). This suggests that these characteristics can also thus have an impact on the firm's probability of distress and need to be explored. Pakistan is a developing country, and its corporate governance (CG) landscape is still in its initial stages as compared to the developed world. The corporate governance code was first introduced in the country in

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2002 (Security & Exchange Commission of Pakistan, 2002) by the supreme corporate control authority the Securities and Exchange Commission of Pakistan (SECP)⁴ followed by recent updates (Security & Exchange Commission of Pakistan, 2016). As compared to the developed world, corporate governance and particularly the role of the CEO has not been the focus of regulators, the firms and even the researchers in Pakistan. Therefore, the Pakistani corporate market can be taken as an interesting natural laboratory to test the established theory. On the research literature side too, the effectiveness of the Pakistani CG Code and its true practice is very sparsely studied. We could find only a few recent studies in this regard (Gulzar & Wang, 2010; Sheikh & Wang, 2012; Yasser et al. 2011). However, to the best of our knowledge, so far no study has paid attention to the direct relationship of CEO characteristics and the probability of firm failure in Pakistan.

Thus, keeping in view this background, the present study explores how various CEO characteristics, such as CEO tenure, ownership and CEO duality can affect the firm's probability of failure. The contribution of the study is two folds. First, it adds to the important literature on corporate governance in the Pakistani market. Second, it also contributes fresh evidence on the financial distress literature in Pakistan.

The rest of the paper is organized in the following manner. The next section builds on a review of the existing literature. Section 3 presents data collection and methodology. Analysis and results are presented in section 4 while section 5 offers the conclusion and important implications.

Theory And Hypotheses

The corporate bankruptcy literature is among the oldest research literature in the area of corporate finance. Researchers have so far attributed the firm's failure to a number of external and internal factors, for example, Beaver (1966), Altman (1968) and Ohlson (1980) attribute firm failure to a number of internal accounting performance characteristics, while others (Shumway, 2001), attribute it to external factors like market performance.

More recently researchers have also started paying attention to corporate governance factors as a significant determinant of various aspects of firm performance and bankruptcy. For example, the size, composition and independence of the board of directors have an impact on; firm performance (Erhardt & Werbel, 2003; Hillman & Dalziel, 2003; Hermalin & Weisbach, 1991), firm value (Carter, Simkins & Simpson, 2003; Fich & Shivdasani, 2005; Yermack, 1996) and firm failure (Daily & Dalton, 1994; Filatotchev, Toms & Wright, 2006). Similarly, the impact of the CEO's compensation and duality is also associated with firm performance, firm value and distress probability (Brick, Plamon, & Wald, 2006; Core, Holthausen & Larcker, 1999; Dah, Abosedra & Matar, 2012; Gormley, Matsa & Milbourn, 2013; Kubo & Kato, 2006; Mehran, 1995). There are others who shed some light on the overall impact of corporate governance on a firm's probability of bankruptcy (Gueyie & Elloumi, 2001).

The CEO also plays a significant role in the performance of the firm on various fronts. Researchers have examined various CEO-related issues, including information

⁴ Securities and Exchange Commission of Pakistan

seeking, personality, pay, cognitions and duality which are all important factors to consider (Eckbo, Thorburn & Wang, 2016; Ntim et al., 2017). There are, however, quite a few studies that have focused on the direct relationship between the probability of a firm's failure and managerial characteristics such as CEO tenure, age, dual role and ownership in the firm (Faccio, Marchina & Mura, 2016; Khan & Vieito, 2013).

An important aspect of the CEO's role in the firm is his tenure - the length of time a CEO has spent in the firm as the CEO. Tenure is not only a proxy of the CEO's entrenchment in the firm but also that of his experience and understanding of the matters of the firm. For example, Gibbons and Murphy (1992) found that managerial control increases when the CEO stays longer on the position and they adopt policies that are consistent with their personal interests. Similarly, D'Aveni (1990) and Hambrick and D'Aveni (1992) suggest that in every stage of CEO tenure, the firm faces different problems. Ooghe and De Prijcker (2008) found that the bankruptcy of start-up companies was characterized by a management with a severe deficiency in industry-related and managerial experience. Hambrick and Fukutomi (1991) proposed that new CEOs begin with a knowledge deficit but steadily learn about their jobs, organizations, and the environment. Based on the above discussion, we present the following hypothesis.

H₁: CEO Tenure negatively affects the firm's probability of bankruptcy

On the other hand, if a firm's CEO is also the chairman of the board, it signifies the CEO chair duality. Reasons commonly presented in favour of the dual CEO role include cost reduction, improved communication, reduced conflicts and improved efficiency. For example, Brickley, Coles and Jarrell (1996) provide empirical evidence of improved efficiency in the case of firms with dual CEO roles. Others who support the cost reduction and conflict based motives for dual CEO roles include Davis et al. (1997), Donaldson and Davis (1991) and Stoeberl and Sherony (1985). On the other hand, Jensen (1993) and proponents of the agency theory state that CEO chair duality will deteriorate the control mechanism and negatively influence the role of board members assessing manager's activities. The duality of the CEO significantly increases his power over the board and the firm hence reducing the effectiveness of the control mechanism of the governance structure. For example, Hambrick and D'Aveni (1992) found that the CEO's domination in the firm can even result in the bankruptcy of the firm. More recently, Yasser et al. (2011) demonstrated that CEO duality has a negative effect on firm performance. Hence, we develop the following hypothesis.

H₂: CEO duality has an impact on the firm's probability of bankruptcy

Another important CEO characteristic relates to his shareholding in the firm. Fama and Jensen (1983) and Demsetz (1983) argue that managerial shareholdings have opposing effects on agency conflicts and it can entrench the present management leading to an upsurge in managerial cunning. The managers of a firm can lead and make efforts for firm expansion beyond its optimal size and for personal gains that can result in an increase in gearing level. This will lead to the greater power of managers but a negative impact on a firm's efficiency. Short, Keasey and Duxbury (2002) found a positive relationship between CEO ownership and firm leverage whereas negative relationship has

been observed between external equity holder's ownership and leverage of a firm. We hypothesize the following relationship.

H₃: *CEO ownership (Shareholding) has an impact on a firm's probability of bankruptcy*

Methodology

Sample

The KSE-100 Index is the benchmark index of the Pakistani market and covers more than 80% of the market capitalization. It covers a diverse set of 34 industries and is the most widely used benchmark population in research studies on the Pakistani market. We, therefore, started off with the KSE-100 index firms and then gradually shortlisted our sample by adopting the following criteria;

- i. Since, the firm risk, its determinants and regulatory requirements, for this industry, are quite different from those of the non-financial sector; hence we have excluded financial firms.
- ii. We retain firms that are continuously listed and have their annual reports available over our sample period.
- iii. We excluded firms that were controlled and financed by the government. The dynamics of the CEO's impact over the firm's risk are different in their case from those of the other firms.
- iv. Firms that had incomplete data over the sample period were also excluded.

These selection criteria resulted in a panel sample of 42 firms over 5-years (i.e. 210 firm-year observations). Finally, after excluding outliers and extreme values, a sample of 42 firms (and 198 firm-year observations) entered our estimation process.

A five years period from 2009-2013 is chosen as the sample period. Our study period starts with 2009 to avoid the impact of 2007-2008 financial crises on our findings and ends at 2013 as it corresponded with the most recently available public information on the sample companies at the time of conducting the study.

Data & Variables

We use Modified Altman's Z-Score (Altman, 2000) to proxy for the probability of firms' financial distress. Firm-level accounting data and data for the calculation of the modified Z-Score were collected from the financial statement analysis of the companies published by the State Bank of Pakistan⁵.

Z-Score is calculated by using the following equation as provided in Altman (2000).

$$Z\text{-Score} = 6.56 (X1) + 3.26 (X2) + 6.72 (X3) + 1.05 (X4) \quad (1)$$

Where;

X1 = Sales / Total Asset X2 = Retained Earnings / Total Asset

X3= EBIT / Total Asset X4= Book value of Equity / Total asset

All the data are from the annual reports of the companies. This data comprises of CEO characteristics, i.e. CEO duality, ownership and tenure and other corporate governance variables. Where CEO duality is a dummy variable that takes a value of 1 for dual-role CEOs and 0 otherwise. CEO tenure is the number of years a CEO serves with

⁵ The Central bank of Pakistan i.e. The State Bank of Pakistan has conducted two exercises of financial statements analyses of the public sector firms registered on the bourse of the country. The first one from 2006 to 2011 and the other from 2007 to 2012 both available on the bank's website www.sbp.gov.pk

the firm. We calculate CEO ownership as the percentage of shares of the firm which CEO holds. The data for this comes from the section “Pattern of Shareholding” of the firms’ financial statements. In addition, we include operating cash flow to sales, trade debt to total assets, interest coverage and debt to equity ratios to account for other the important determinants of financial distress risk as previous literature suggests (Andrade & Kaplan, 1998; Molina & Preve, 2012; Wruck 1990).

The Model

We test our hypothesis using two approaches. First, we use a panel regression of the firm’s Z-Score, used as a proxy for financial distress, over CEO characteristics and other important control variables. We use the Hausman test to analyze whether the fixed or the random effects model is appropriate. Equation (2) below shows our general panel regression model;

$$ZScore = \alpha_0 + \beta_1 Duality_{it} + \beta_2 CEOwn_{it} + \beta_3 Tenure_{it} + \beta_4 OPCash_{it} + \beta_5 TRDebt_{it} + \beta_6 DTE_{it} + \beta_7 INTCov_{it} + \varepsilon_{it} \quad \text{---(2)}$$

Where;

Duality is CEO Duality Dummy, *CEOwn* is the percentage shareholding of the CEO in the firm, *Tenure* is CEO Tenure in years, *OPCash* is Operating Cash Flow to Sales ratio, *TRDebt* is the ratio of Trade Debt to Sales, *DTE* is the Debt to Equity ratio and *INTCov* is Interest Coverage ratio while the subscripts “i” and “t” represent the individual firm and year in the panel respectively.

Since, a binary variable on the basis of Z score (instead of using absolute values) usually produces more accurate results., we re-estimate the relationships with a Panel Logistic Regression of a Z-Score dummy which is 1 for financially distressed firms (when Z-Score is less than the threshold value of 1.81 as indicated by Altman) and 0 otherwise. The definition of general logistic regression model is

$$P(Y | X) = \frac{e^{\beta_0 + \beta_1 X}}{1 + e^{\beta_0 + \beta_1 X}} \quad (3)$$

Which describes the conditional probability of the occurrence of a particular event of interest “Y” (i.e., being financially distressed in our case), as a function of the exponent of explanatory or predictor factor(s) “X”.

By taking natural log on both sides, we come up with the following logit transformation that we can then easily estimate for prediction purposes;

$$\ln\left(\frac{P(Y | X)}{1 - P(Y | X)}\right) = \beta_0 + \beta_1 X \quad (4)$$

Where we call the left-hand side as logit of the probability of the event (i.e. financial distress). In our case thus the model becomes;

$$Logit(ZDummy) = \alpha_0 + \beta_1 Duality_{it} + \beta_2 CEOwn_{it} + \beta_3 Tenure_{it} + \beta_4 OPCash_{it} + \beta_5 TRDebt_{it} + \beta_6 DTE_{it} + \beta_7 INTCov_{it} + \varepsilon_{i,t} \quad (5)$$

The rest of the variables have the same notations and definitions as in equation (2). We estimate equation (5) using the statistical analysis software STATA 10.

Results and Analysis

Univariate Analysis (Descriptive Statistics)

Table 1 below summarizes the sample descriptive statistics. The *CEO* has a minimum value of 0, which shows that the sample has CEOs without shareholding in the firm. On the other hand, the sample includes CEO with a maximum shareholding of 24.4% in the firm. The *OPCash* (Operating Cash level) of an average firm in the sample is 27% of sales. Further, the sample firms range from firms who do not use trade debt at all to those with a trade debt of up to 19%.4 of total sales. *INTCov* (i.e. interest coverage) is maximum at 69.6% while it averages at 8.9% in the sample.

Table 1: *Sample Descriptive Statistics* (N=190)

Variable	Mean	Std Dev	Min	Max
ZScore	8.657	4.475	.238	20.684
CEOown	2.979	5.500	.000	24.437
Tenure	3.043	1.969	1.000	8.00
OPCash	.273	.294	-.300	1.030
TRDebt	4.387	4.740	.000	19.410
DTE	1.565	1.387	.130	6.660
INTCov	8.898	14.201	-15.020	69.630

Multivariate Analysis

To test the hypothesized relationships, we resort to two methods. First, we use panel regression analysis taking the absolute values of the Altman's Z Score as a measure of financial distress. Next, we resort to a more rigorous method i.e. logistic regression analysis where we regress our qualitative variable indicating a firm's probability of distress based on the firm's Z Score, over variables of CEO characteristics and other control variables.

a) Panel regression analysis

Here we first run both fixed and random effects panel regressions of the Altman's Z-score over our variables of interest and then run the Hausman test for model specification. We use the Hausman test to suggest whether a fixed or random effects model befit the situation and data at hand. Table 2 below presents the results of our fixed effects and random effects panel regressions.

Table 2: *Fixed and Random Effects Panel Regression of Z-Score over CEO Characteristics*

Variables	Fixed Effects Model	Random Effects Model
	Dep Var. ZScore	Dep Var. ZScore
Duality	.535	1.404
	-1.308	-1.125
CEOown	-.039	-.019
	-.092	-.075
Tenure	.088	.0625
	-.127	-.119
OPCash	1.752**	1.815**
	-.743	-.717
TRDebt	-.012	-.012
	-.024	-.0218

DTE	-.223	-.181
	-.184	-.169
INTCov	.019**	.017**
	-.009	-.009
Constant	7.636***	7.290***
	-1.281	-1.379
Observations	190	190
R-squared	.152	.148
Number of Companies	42	42

Standard errors are reported beneath the coefficients. While ***, ** and * represent significance at 1%, 5% and 10 % levels respectively

Table 3 below presents the result of Hausman specification test for fixed versus random effects. The result suggests that the probability of Chi Squared is more than the 5% significance level; we, therefore, accept the random effects model.

Table 3: Hausman Specification test for Fixed vs Random Effects Panel Regression

Variable	Coefficients		Diff.	Standard Error
	Fixed Effects	Random Effects		
ZScore	.535	1.404	-.869	.666
CEOwn	-.039	-.019	-.020	.054
Tenure	.088	.063	.025	.043
OPCash	1.752	1.815	-.063	.194
TRDebt	-.012	-.012	.000	.010
DTE	-.223	-.181	-.042	.074
INTCov	.019	.017	.002	.003
Chi2(7)	= (b-B)'[(V _b -V _B) ⁻¹](b-B)			
	= 2.46			
Prob>chi2	= 0.9299			

Next, we further apply the Breusch Pagan Lagrangian Multiplier LM test for random effects (results in Table 4 below) in order to test whether there is any possible heteroskedasticity in our panels. The results of the LM test, being highly significant, suggest the presence of heteroskedasticity. Therefore, we finally apply the panel FGLS regression in order to cater for the heteroskedasticity. The results of our heteroskedasticity-robust FGLS regression are in table 5.

Table 4: Breusch & Pagan Lagrangian Multiplier (L-M) Test for Random Effects

	Var	sd = sqrt(Var)
ZScore	20.443	4.521
e	3.205	1.790
u	26.860	5.183
Test: Var(u) = 0		
	Chibar2(01) = 104.49	
	Prob > chibar2 = .000	

Table 5: *Heteroskedasticity-Adjusted FGLS Panel Regression of Z-Score over CEO Characteristics*

FGLS-Model		
VARIABLES	ZScore	SE
Duality	1.236***	-.365
CEOown	-.021	-.020
Tenure	-.188***	-.017
OPCash	2.992***	-.399
TRDebt	-.066***	-.005
DTE	.480***	-.042
INTCov	.003	-.005
Constant	6.348***	-.396
Observations	190	
Number of Companies	42	

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

The above results of our FGLS regressions show that out of the three CEO characteristics two, namely Duality and Tenure, are significantly related to the value of the ZScore. In Table 5 above, the dummy of CEO Duality is having a positive sign and is highly significant which shows that being a dual CEO is significantly associated with higher Z-Score (safer firms). In other words, firms with single roles are more prone to a possible distress. This is consistent with Donaldson and Davis (1991) and Davis *et al.* (1997) who argue in favour of CEO duality on grounds such as lesser communication problems, effective control and cost reduction. On the other hand, CEO *Tenure* is found to be highly significant with a negative sign. This means that ZScore decreases with a CEO's tenure in the firm. This result, on one hand, seems contrary to the stewardship hypothesis and the CEO experience argument while on the other hand conforms to the CEO entrenchment hypothesis which claims that as a CEO's tenure in the firm increases, he becomes more and more entrenched in the firm which makes it easy for him to extract personal benefits. This may further lead to weaker performance and even bankruptcy. For example, Gibbons and Murphy (1992) found that managerial control increases when the CEO stays longer on the position and they adopt policies that are consistent with their personal interests. We, however, cannot finally conclude on this point here as these findings get their validation through our second stage logit analysis which is likely to take into account the cutoff point value of the ZScore.

In addition to this, among the control variables Trade debt, operating cash and debt to equity ratios are there to influence significantly the ZScore value. There is positive association between operating cash and Debt to equity while there is negative association between trade debt and Zscore. This means that having a high capital structure and operating cash flows increase the ZScore which reflects a safer financial position. While on the other hand, a rise in Trade Debt may increase the risk of bankruptcy.

b) Logistic regression analysis

In this part of our analysis, we use a dummy variable denoting whether the firm is near financial distress or else based on the values of the Altman's Z score. Using the

cutoff value as suggested in Altman (2000) we code the dummy as 1 when the ZScore's value is less than 1.81 meaning a high risk of bankruptcy, while 0 when the value is higher than 1.81 representing safer firms. We then run a logistic regression of this dummy over CEO characteristics and other control variables. We transform the coefficients into odds ratios and probabilities to help better explain the marginal effect of each predictor variable. Results are presented below in Table 6.

The Results in Table 6 below show that CEO Ownership and Tenure are important determinants of a firm's probability of distress. Both the variables CEOwn and Tenure are negatively and highly significant which shows that the probability of distress may decrease as tenure and ownership of the CEO in the firm increase. The marginal effect probabilities show that a 1% rise in CEO ownership and a one year increase in CEO's tenure reduces the risk of distress by 17% and 2% respectively. Our result on Tenure is quite in line with the expectations though opposite to what the Panel FGLS results suggest in table 5 above, however, the logit result is more reliable as the dependent variable (ZScore Dummy) is a categorical variable taking into account the cutoff ZScore value as opposed to the continuous version of the ZScore as dependent variable in FGLS. Moreover, these findings support previous findings and hypothesis in existing literature, e.g. our finding on the ownership is consistent with Agency theory which argues that we can reduce agency problems and hence improve firm performance if we give the manager some share in the ownership. Our finding on tenure is consistent with Ooghe and De Prijcker (2008) and Hambrick and Fukutomi (1991) who also find that firms have poor performance if the CEO has fewer years of experience and has knowledge deficit.

Table 6: Panel Logistic Regression of Z-Score over CEO Characteristics

Variables	Panel Logit Coef.		Odds Ratio	Marginal Prob.
	ZDummy	SE		
Duality	-.037	-2.738	.964	49%
CEOwn	-1.579***	-.580	.206	17%
Tenure	-3.987***	-1.105	.019	2%
OPCash	-4.981	-5.836	.007	1%
TRDebt	-.798***	-.292	.450	31%
DTE	1.823	-1.202	6.190	86%
INTCov	-.277*	-.15	.758	43%
Insig2u	5.432***			
	-.506			
Observations	190			
Number of Companies	42			

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

Moreover, when it comes to control variables, people find both trade debt and interest coverage as significant predictors of bankruptcy. They think there is negative association between both and the probability of distress. This is in line with the expectations as an increased level of interest coverage signals that the firm is healthy and as this ratio decreases firms face problems with repaying their debt obligations which may sometimes lead to bankruptcy. Similarly, our finding on the trade debt is consistent

with the fact that since access to bank and bond markets is limited in Pakistan, the only major source of financing for firms is through trade debt. A high level of trade debt may represent the supplier's confidence in the financial health of the firm and therefore may be associated with a reduced risk of distress.

Conclusion

Different characteristics of the CEO and their relationship with various aspects of firm performance and survival have been a topic of discussion in previous literature; however, these studies focus on a single characteristic at a time. We contribute to this literature we test the impact of various CEO characteristics (duality, ownership, tenure) over the probability of corporate distress in a sample of non-financial firms from Pakistan's KSE 100 index. To this end Altman's modified Z-Score (Altman, 2000) is used as a proxy for the probability of corporate distress and CEO characteristics data was hand collected from annual reports of sample firms over a period from 2009 to 2013. As main econometric techniques, we use Feasible GLS Panel regression and Logit Regression analysis.

Results from the Heteroskedasticity-adjusted FGLS panel regressions show that among CEO Duality and CEO tenure are related to corporate distress probability. On the other hand, our panel logistic regression demonstrates that CEO Ownership and Tenure are significantly related to a firm's distress probability. We find that both CEO Ownership and tenure have a reducing effect on the probability of distress with marginal probabilities of a reduction in distress risk of 17% and 2 % respectively. Both these findings support the Agency and CEO stewardship and experience hypothesis and previous findings. Moreover, among the control variables both trade debt and interest coverage are found to be significant predictors of bankruptcy with marginal probabilities of reducing the risk of distress by 31% and 43% respectively.

This study carries some limitations. First of all, due to the unavailability of data, we could not include some characteristics of the CEO for example, the age of the CEO. We were also limited by insufficient disclosures by the Pakistani firms.

Future research can extend the literature by including a broader set of CEO characteristics. Moreover, including board size, board independence and firm age can offer further insights. We can also explore financial firms of KSE 100 index to investigate the influence of CEO's characteristics on firm performance. A comparison of the financial distress determinants in both these sectors can be another valuable addition to the literature.

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