CEO Turnover Following Exogenous Shocks

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Abstract

This research examines whether CEOs are fired from their positions following a period of poor firm performance and exogenous shocks that are beyond their control. Economic theory holds that when deciding to retain or fire a CEO, boards of director's filter out exogenous shocks. Using data on US oil companies from 1996 to 2015, I find that CEOs are significantly less likely to be dismissed when a company's Return on Assets (ROA) is high. Therefore, I find that poor performance is one of the factors that drives CEO turnover. Moreover, I do not find any significant relation between exogenous shock, in this case, measured by the fluctuations in oil price, and CEO turnover. In addition, I also find that CEO turnover is not sensitive to exogenous shocks when there are more independent directors on the board. Therefore, my findings are consistent with the economic theory that corporate boards are filtering out exogenous shocks before deciding to dismiss their CEO. However, I find CEO turnover is sensitive to firm performance when there are more independent directors on the board. This result implies that independent directors are better at assessing CEOs based on a firm performance rather than a firm's response to exogenous shocks.

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1. Introduction

Global oil prices have sharply collapsed in the past few years. The oil price had been stable at around $110 a barrel from 2010 to 2014, but the price suddenly dropped to around $40 a barrel in mid-June 2014. Since then the price has decreased even more. It was just $34 per barrel by the end of 2015. This is the lowest oil price since 2009. Presumably, this oil price crisis has been caused by an unexpected peak in US oil production due to substantial improvements in "fracking" technology resulting in an oversupply of oil. Previously, in July 2008, the oil price had reached a peak of $145 per barrel, which was mainly due to US President George W. Bush's executive order to ban offshore drilling in US coastal areas. After this peak, the oil price fell sharply in 2009 due to global financial crisis. Business has little influence on these exogenous factors which remain largely unpredictable. For instance, hurricane Katrina in the US, changes in oil production in Iraq, the falling value of the US dollar, fluctuations in the supply and demand of oil, and tensions in the Middle East, including potential conflict with Iran, the Egyptian revolution, and the Libyan civil war have all affected oil prices. While these exogenous shocks are beyond management's control, they nevertheless impact the firm performance.

One of the responsibilities of a CEO is to monitor a company's performance and to deliver expected performance standards. The CEO must develop a strategy for driving the firm performance. However, exogenous shocks such as fluctuations in oil prices are beyond a CEO's control. According to Betrand and Mullainathan (2001), shareholders will not reward a CEO for observable luck. However, they do find that CEO's get paid for "good luck". On the other hand, CEO's are sometimes punished for "bad luck". There is empirical evidence that shows that boards often take exogenous shocks into account and tend to blame the CEO for adverse events that are beyond their control. This is supported by Jenter and Kanaan (2015) who find CEOs are more likely to be dismissed from their positions after bad industry reports and bad market performance. Based on these empirical results and motivated by the recent fluctuation in oil prices, I will investigate the following research question:

RQ: Are CEOs replaced for factors that are beyond their control?

In order to answer this question, I use data from Compustat and Institutional Shareholder Services (ISS) for US oil companies from the period 1996 to 2015. I find results which are consistent with the standard economic theory that CEO turnover is not triggered by exogenous shocks, but is significantly and inversely related to a firm performance. In other words, the

CEO is less likely to be fired when a firm performance is high and more likely to be fired when a firm performance is low. To extend this research, I also examine the impact of the independence of the board on CEO turnover. One role of the board of directors is to control the process in which executives are hired, assessed and dismissed. It has been argued that independent directors will be better in their assessment of a CEO. Therefore, I expect that independent boards will try to identify and exclude exogenous shocks before deciding to replace the CEO. Consistent with my hypothesis, I find that independent directors are more sensitive to a firm performance rather than to exogenous shocks when it comes to decisions about CEO dismissal.

I believe, this research makes at least two contributions. First, I extend the prior research studies of Bertrand and Mullainathan (2001) and Jenter and Kanaan (2015). In their study, Bertrand and Mullainathan (2001) examine pay for luck by using oil price as a measurement of exogenous shock, while Jenter and Kanaan (2015) in their study investigate CEO turnover and the relative performance with the industry stock performance as a measurement of exogenous shock. This research incorporates both of these studies in order to examine whether CEO's can be fired because of exogenous shocks, which in this case is the fluctuation in oil prices. Second, this research can also be useful to the shareholders, potential investors, and CEOs themselves, since it provides empirical evidence about whether CEOs have been evaluated fairly based on their ability, not because of other factors which are outside their control.

The remainder of this research is structured as follows. Section 2 looks at the prevailing theories and develops a hypothesis for investigation. Section 3 discusses the methodology used in this research including the data collection. The results are subsequently presented in Section 4. Finally, Section 5 offers a discussion of the conclusions reached in this research.

2. Literature Review and Hypothesis Development

2.1. CEO Turnover

Agency theory holds that principals engage the agents to perform some services on their behalf to maximize the shareholder's value (Jensen and Meckling, 1976). However, this kind of relation can create an agency problem because of the different interests held by both of the parties. It is reasonable to expect that shareholders would want to find the right CEO to take control of their investments at a firm. In order to achieve this objective, shareholders never stop in trying to find ways to make a CEO interests align with the shareholder's interest. They can use any number of various approaches to sway a CEO including an attractive salary package, stock options, and bonuses to attract and retain the right CEO who will add something to a shareholder's value for their firm. Hence, finding and retaining the right CEO can be very costly. Shareholders need to be able to evaluate their CEO's effort, i.e. whether it is contributing to the shareholder's value or not. Therefore, if a particular CEO's effort is not contributing to the shareholder's value, then it is a wise move to terminate these kinds of CEOs instead of retaining the "wrong" CEO for the company.

Many research studies have been conducted on CEO turnover. Murphy and Zabojnik (2008) and Jensen et.al (2004) find that CEO turnover increased 11.3% in the 1990s. More specifically, Reinsvold (2014) finds that turnover of oil and gas CEOs increased significantly in 2013 compared to 2012. In his study, Reinsvold (2014) also found that an oil and gas CEO has a median tenure of 4.5 years at a company and that most of these CEOs were recruited from outside companies. Banker and Datar (1989) and Holmstrom and Milgrom (1991) argue that agency cost can be mitigated by using performance measures that are relatively more precise and more sensitive to an agent's effort. Based on the above theory, Engel, Hayes and Wang (2003) investigate CEO turnover at 800 large US firms. For their study, they examine 1,813 turnovers during the period of 1975 to 2000. They argue that the contribution of agency theory is to measure an agent's performance. The result of their research shows that accounting information seems to receive more emphasis or a greater weight in turnover decisions when accounting-based measures are more precise and more sensitive. Moreover, they find evidence suggesting that market-based performance measures receive less emphasis or less weight in turnover decisions when accounting-based measures are more sensitive.

In addition, Kaplan and Minton (2012) find that the annual CEO turnover at large US companies was 5.6% from 1992 to 2005, with an average CEO tenure of less than seven years. They also find that there is a stronger and significant relation between internal turnover and the stock performance of a firm. The authors use three proxies to measure a firm's stock

performance. First, they examine the annual return on the S&P 500 Index. Second, they look at relative industry performance which is measured by a two-digit SIC code level and equals the difference between the return on the median firm in the industry and the return on the S&P 500 Index. Third, they analyze the relative firm performance which is measured as the industry-adjusted firm stock return that is equal to the firm's stock return minus the return for median firm in the same two-digit SIC code. The results are all three sensitivities are significantly greater (more negative) in the 1998 to 2005 sub-period. They also consider five possible factors that drive changes in turnover and turnover-performance sensitivity. First, they find that the Gompers, Ishi and Metrick (GIM) index, as a measurement of governance (or shareholder's rights) and fraud, does not have an impact on CEO turnover. Second, they find that block holder ownership is positively and significantly related to CEO turnover. Third, they consider on the role of independent directors on CEO turnover. Their results suggest that boards with more independent directors are associated with more CEO turnover and also more sensitive to poor performance. Finally, they examined whether the probability of CEO turnover was greater in the years under the Sarbanes-Oxley (SOX) legislation and the results showed an increase in turnover associated with the SOX legislation.

While it seems that CEO turnover and firm's performance is associated, firm performance is itself is largely determined by the quality of a firm's products, other employees and stakeholders, its life cycle and in some case possibly even luck (Chang, Dasgupta and Hilary, 2010). Some argue that executives should be evaluated based on a controllability principle; this is the idea that a manager should be evaluated based on that which she or he controls (Antle and Demski, 1988). Hence, the ideal condition for CEO dismissals should be unrelated to exogenous shocks which affect the firm performance. Otherwise, the CEO will be rewarded with the wrong incentives from the principal, and they will be more likely to wait for good luck or advantageous conditions to increase their performance. Moreover, a CEO is more likely to give less effort to a company, if they think that the reward is not suitable with their value creation. Therefore, providing managers with adequate incentives is important.

The ability of a CEO is the most relevant explanation for the firm performance because a CEO's ability does not change as a function of the business cycle, nor is it affected by other exogenous shocks to firm performance (Jenter and Kanaan, 2015). Gibbons and Murphy (1990) examine on a sample of 1,000 CEO turnovers over the period of 1974 to 1986. Using logit regression of CEO turnover as the dependent variable and firm, industry and stock performance as independent variable, they find CEO turnover is significantly related to firm performance. In addition, they find no evidence on industry level performance. This indicates that industry-

level peer performance is not used in CEO turnover decision. Their research is supported by the work of Barro and Barro (1990) who find evidence for the complete filtering of peer performance in a sample of CEO turnovers at large commercial banks from 1982 to 1987.

However, there are several other studies which find that CEO's are rewarded by positive exogenous shocks and blamed for negative shocks that beyond their control. Bertrand and Mullainathan (2001) find that CEOs are rewarded for observable luck. They define luck as change in firm performance that is beyond a CEO's control. CEO's tend to get paid more if there is a positive exogenous shock. In their research, they looked at different types of negative exogenous shocks, including fluctuation of oil prices, movement in exchange rates and mean industry performance. They found these exogenous shocks also had an impact on CEO turnover. Options to retain or fire the CEO after bad accounting performance is one of the crucial decisions that boards have to make. Negative shocks ("bad luck") are also related to the firm performance, and sometimes the CEO is blamed for this event, even though it is not his fault. Moreover, Morck, Shleifer, and Vishny (1989) examine the turnover of top managers from 1980 to 1985. They find that the boards are not completely unresponsive to poor performance. When a firm significantly underperforms compared to its industry, the probability of turnover increases for the top management. Their study shows that boards remove top managers when they cannot compete with their industry and boards also compare their company's performance with other companies from the same industry. Jenter and Kanaan (2015) also examine CEO turnovers in their study. They analyze CEO turnover from 1993 to 2009 and find that CEOs are more likely to be dismissed from their jobs after bad industry and bad market performance. Furthermore, Fisman, Khurana, and Rhodes-Kropf (2014) find that increased pressure from shareholders may compel boards to act against CEOs when stock prices are down, even if the bad performance is not the CEOs' fault.

CEO turnover can increase a company's cost. This is because finding the right CEOs with the required specific knowledge is not easy especially during periods of recession. Moreover, the new CEO still needs time to get acquainted with the firm's business environment before he or she can be expected to take a leading position in their industry. CEO turnover is also a means to encourage the CEO to do his best (Holsmstrom 1979). If there is a threat of removal, the CEO is assumed to take this threat into account when deciding how to run the firm. The threat of removal for poor performance should provide stronger incentives, which in turn may have an impact on both the probability of turnover and the level of compensation of a CEO.

Boards have increasingly become more careful when they decide to retain or dismiss a CEO. When choosing a new CEO, the board of directors considers how well suited the abilities of each candidate are given the competitive situation faced by the firm. When things are not going well for the company, those candidates that are more suited and better able to change the direction of a firm will be more attractive to the board. Boards also consider potential exogenous shocks before replacing the CEO.

In summary, there are several factors that can have an impact on a CEO's success, including the CEO's ability, their previous experience and the role of luck. However, the CEO is not the most crucial factor when it comes to a firm's success. For instance, industry matters much more. Therefore, oftentimes luck plays a big role in a CEO's success. Nevertheless, from a decision influencing perspective, measurements of performance are used to provide incentives to the agents to take actions that are good for the firm. Performance measures can be used to determine whether the agents choose value maximizing action strategies or not. However, these performance measures also need to filter out any exogenous shocks because measures that are less precise (noisier), should receive less weight in addition to obtaining the real value of the agent's effort. Therefore, CEO's should only be fired if the board predicts that the benefits of CEO's replacement will exceed the value created by the current CEO. Based on the theory above, I argue the following hypothesis:

H1: Exogenous shocks should have no predictive power on the likelihood of CEO turnover.

2.2. The Board of Directors in the CEO Succession Process

According to agency theory, a company's board of directors is responsible for monitoring and controlling the management of a firm. They are responsible for protecting the interests of the shareholders against the potential self-serving behavior of the management. To be more specific, the most important role of the board of directors is to evaluate a company's management and replace it if it fails to perform well. In his study, Yermack (1996) argues that a smaller board will monitor relatively more efficient, which will more likely to increase the chance of a CEO's dismissal. In contrast, Ocasio (1994) in his study finds a positive relation between board size and CEO turnover. He argues that a large board is more likely to take control over a firm and generate alternative political coalitions that will challenge a CEO and hence limit his power. Moreover, these studies also consider the evolving role of boards. They find that boards not only respond to poor performance relative to the industry, but they also respond to poor industry performance and to poor market performance.

The on-going debate regarding the composition of boards is also related to the discussion of board monitoring. This debate can split into two sides: those who argue for dependent directors and those who argue for independent directors. Some believe that dependent directors will be better at monitoring a firm because they have an advantage with their in-depth knowledge of firm specific activities and the firm's competitive environment which independent directors cannot have (Bushman, Chen and Engel, 2000). On the other hand, others argue that boards with independent directors do a better job of monitoring their executives because they are appointed to protect the interests of the shareholder. If the incentives of outside directors are better aligned with those of shareholders than inside director incentives, then outside directors are more likely to conduct a broad search for the best possible CEO candidate.

Borokhovich and Parrino (1996) examine in their study a sample of 969 CEO successions at 588 large public firms during the period 1970 to 1988. They find that the likelihood of a firm to appointing a new CEO increases monotonically with the percentage of independent directors at the firm. This relation is observed for both voluntary and forced departures.

Cornelli et al. (2003) examine 473 firms in their study employing 665 CEOs between 1992 and 2004. Of this sample, 181 CEOs were fired and 11 left voluntarily. They find that boards tend to filter out noise when evaluating a CEO. Reform in governance has empowered boards to act on their information and become active monitors. Boards' increased power and adopting measures of good governance has led to closer monitoring of a CEO's abilities before making a decision on dismissal.

Following Cornelli et al. (2003), I examine whether the relation between exogenous shock and the probability of CEO turnover is influenced by corporate governance. This test will provide us with information about whether active monitoring will reduce the dismissal of CEOs due to exogenous factors. Boards should fire a CEO only if the CEO is incompetent and the firm's declining performance is caused by this incompetence. In addition, a CEO should not be fired for poor performance that was the result of bad luck or making decision that was wrong for past performance, but reasonable for future performance. Monitoring enables boards to distinguish between bad luck and honest mistakes from behavior or decisions that would raise concerns about a CEO's ability and in turn about the company's future performance. Based on the theory above, I expect that more independent directors will better monitor of the CEO. Moreover, in a period of recession, boards are supposed to filter out the exogenous shock hence they will be less likely to blame a CEO for exogenous shocks that are beyond his control. I expect this will result in CEO's working even harder during the recession period since they

need to survive the rough period and maximize shareholder value by stabilizing or increasing the firm performance. Therefore, it is more likely boards will try to gather more information about a CEO's ability and a CEO will only be fired if the boards consider that their firm's value is not being maximized. Therefore, I construct the following hypothesis:

H2: The probability of CEO replacement due to exogenous shocks decreases when the number of independent directors increases.

There are numerous studies that investigate the relation between board independence and firm performance. Garg (2007) argues that having more independent directors does not guarantee a firm's improved performance because independent directors are often poorly monitor the management. The study of Johari, Saleh, Jaafar and Hassan (2008) support these findings. In their study, they found that even though the proportion of independent directors on the board was one-third of its total members, this proportion could not be associated with the earnings management of the company.

In contrast, Rosenstein and Wyatt (1990) report a positive and significant stock price reaction when an independent director is appointed to the board. This indicates that the market expects the appointment of an independent director will benefit the company's shareholders. Gani and Jermias (2006) also find that board independence has a significantly more positive effect in performance for firms that are pursuing a strategy of cost efficiency. This finding is also supported by Pombo and Gutierrez (2011), who examine on average of 335 firms per year during the period 1996 to 2006. In their research, they find a positive relation between the percentage of independent directors and a firm's return on assets. Independent directors turned out to be key drivers for the improvement of a firm performance.

Regarding CEO turnover, Laux (2008) finds that dependent directors remove poorly performing CEO's less often than independent directors. Similarly, Conyon and He (2008) analyzed 1,200 Chinese firms from 1999 to 2006 and found that CEO turnover sensitivity for poor performance was increased at firms that have a greater fraction of independent directors on the board. This is in line with agency theory that says only independent boards can act as an effective governing mechanism (Fama, 1980). Boards that are dominated by independent directors are more likely to dismiss the incumbent CEO under circumstances of poor performance than dependent directors (e.g., Boeker, 1992; Hermalin and Weisbach, 2003; Warner et al., 1988), which suggests that boards dominated by independent directors are more likely to act in the interest of the shareholders rather than in the interest of the management

(Haleblian and Rajagopalan, 2006). Another reason in why independent directors are more effective in monitoring is because they want to protect and develop their reputation in the managerial-labor market as experts in decision control Fama and Jensen (1983).

In addition, Weisbach (1988) examines in his research a sample of US firms and finds that CEO turnover is more sensitive to firm performance when boards are dominated by independent directors. He argues that boards with independent directors are more effective in monitoring than boards with dependent directors since dependent directors' careers are tied to the CEO's and hence insiders generally are unable or unwilling to remove incumbent CEOs. Moreover, he also indicates that outside directors represent shareholder interests better than inside directors. After controlling for ownership, size, market, and industry effects, he finds that CEOs are more likely to be remove following poor performance if outside directors have voting control. Following the study of Weisbach (1988), I construct the following hypothesis:

H3: The probability of CEO replacement due to poor firm performance increases when the number of independent directors increases.

3. Research Method

3.1. Sample Selection

This research focuses on CEO turnover at US oil companies. I obtain the data for this research from the Wharton Research Data Services (WRDS) database for the sample period of 1996 to 2015. I retrieve the CEO turnover data from Execucomp, accounting data from Compustat and data for the board of directors from ISS. The Standard Industrial Classification (SIC) system codes are used to identify companies in oil industries for the sample of this research. Following Bertrand and Mullainathan (2001), this research investigates oil companies because they are an ideal place to observe the impact of exogenous shocks since the price of oil affects performance, measurable and plausibly beyond the control of the CEOs. Among the data used in this research, I include only the companies with SIC codes: 1381 (drilling oil and gas wells); 1382 (oil and gas field exploration services); 1389 (oil and gas field services, NEC) and 3533 (oil and gas field machinery and equipment). After filtering the SIC codes and merging three of the databases above, I get 405 companies that remained in the sample. The data is constructed as panel data and estimated using Probit regression.

3.2. Variable Measurement

3.2.1. Dependent Variable

For the dependent variable, I use a dummy variable with value 1 if there is CEO turnover, 0 for otherwise. I obtain CEO turnover data from Execucomp. I recognize that CEO turnover has occurred, if the CEO listed as CEO at a firm at the end of the year t is not the same as the CEO listed at the end of the year t+1. There are limitations to this research since practically there can be numerous reasons for executive change such as retirement, illness, death, dismissal or voluntary resignation, among others. However, differentiating among these different reasons is certainly problematic. I only exclude the data if there is information that the reason the CEO left the firm was to retire. This resulted in 46 CEO turnovers during my observation years.

3.2.2. Independent Variables of Interest

Firm performance

According to Engel et al. (2003), the measurement of accounting based performance receives more weight in turnover decisions than market-based performance. It also supported by Hermanlin and Weisbach (1998) who argue that possible turnover of the CEO is reflected in the stock price. Hence, if this is the case, the firm performance and turnover will affect each

other in both ways. This can be the reason why measurement on accounting-based performance is more informative about turnover than market-based performance.

Based on above explanation, I use ROA_{t-1} as a measurement of an accounting firm performance. I use the firm performance from the previous year because, according to Tirole (2006), boards use past information in a forward-looking way and often ignore signals that are informative about the CEO's likely future performance.

Oil price

Following Bertrand and Mullainathan (2001), I use oil price for the measurement of exogenous shock. As Figure 1 shows, the oil price has fluctuated substantially over the last 20 years. CEOs of companies cannot do anything to affect these fluctuations. They are beyond the control of a CEO. For example, the high spike on 2008 is caused by Saudi Arabia decision to increase oil output, and the world markets were saturated and Saudi Arabia promise of increased production would not lower the prices. However, in the following year, the oil price fell sharply. One of the reasons was due to the global financial crisis which resulted in reduced oil demand leading to a sharp drop in the oil price. In addition, during the past couple years (2014-2015), the US has significantly boosted oil production because of better fracking technology. This has resulted in an oversupply in world market oil and has further driven the price down. Overall, these fluctuations are affecting large movements in firm profits. CEO's can either be rewarded or punished by these positive or negative exogenous shocks. Therefore, I use oil price to investigate the relation between CEO turnover and exogenous shock. The data is obtain using the average annual OPEC crude oil price in US dollars per barrel.

Figure 1.

Movement of oil price from 1996 to 2015.
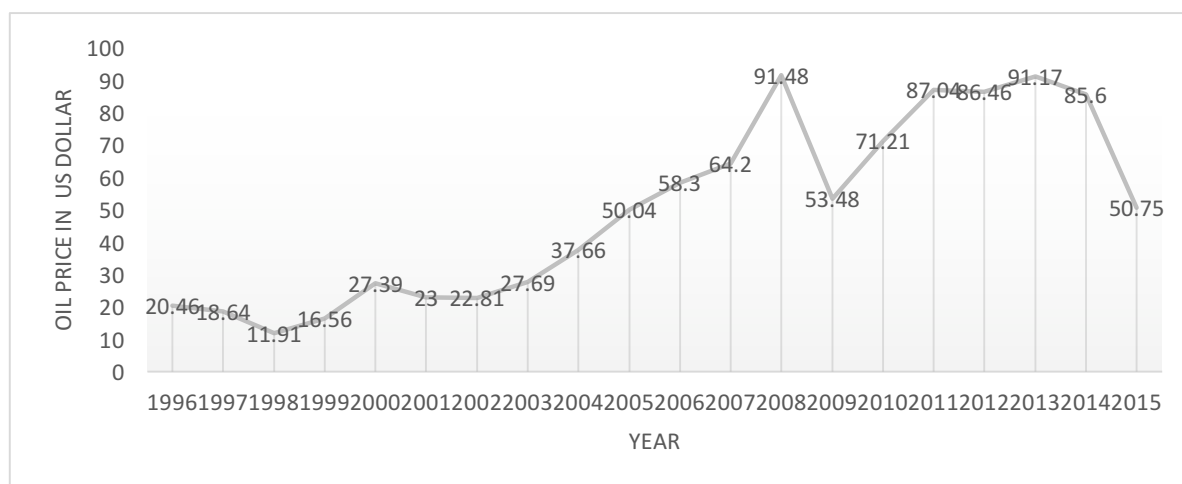
Board independence

There are two major reasons independent directors are supposed to be better at monitoring CEOs (Fama and Jensen, 1983; Jensen, 1993; and Hermalin and Weisbach, 2003). First, independent directors have incentives to display their expertise in decision making. As a result, they are more inclined to remove a non-performing CEO (Fama and Jensen, 1983). Second, with their careers tied to the CEO's, inside directors are generally unable or unwilling to replace the CEO while independent directors can make a more independent decision (Weisbach, 1988). Based on the above theory, I use board independence as one of the variable of interest. Like with the study of Huson et.al (2001), board independence is calculated as the percentage of the number of independent directors divided by the total number of directors.

3.2.3. Control variables

CEO equity ownership and CEO duality

I also examine whether CEO power, namely CEO equity ownership and CEO duality, is affected by the relation between exogenous shock and CEO turnover. More powerful CEOs may be better able to protect themselves against unfair removals, thus weakening the effect of exogenous shock on CEO turnovers. Alternatively, more powerful CEOs may be better able to hide behind exogenous shock during good times, thus strengthening the effect of turnovers (Jenter and Kanaan, 2015). I use the percentage of CEO equity divided by common shares outstanding to calculate this equity ownership.

Goyal and Park (2002) find that the sensitivity of CEO turnover to firm performance is significantly lower when the CEO and chairman duties are held by the same individual. They argue that this is caused by the lack of independent leadership in firms that combine the CEO and chairman positions makes it difficult for the board to remove poorly performing managers. Thus, I also add the CEO duality by using dummy variable with value 1 if the CEO is also chairman of the board and 0 for otherwise.

CEO tenure

Tenure of a CEO could affect CEO turnover either positively or negatively. CEOs with longer tenure could have established a power base over time, suggesting that CEO turnover is negatively related to CEO tenure. Alternatively, long tenure is a sign that the CEO is closer to retirement, therefore it means CEO tenure and CEO turnover are likely to be positively related (Salancik and Meindl, 1984).

In his research, Ocasio (1994) concluded that when the CEO is longer at a firm, he will have more expertise about the firm and the environment of the company. He also examined during the crisis of 1980 and find the CEO with longer tenure had a higher firm performance. Dikolli et al. (2011) also find evidence that the relation between firm performance and CEO turnover declines in CEO tenure. Based on the above study, I use CEO tenure measured by the number of years the CEO has been appointed as CEO until his replacement.

Board size

I use board size and board independence as another control variable. From the ISS database, the variable for the board of directors can take on three values: E for employee (inside director); L for linked (affiliated); or I for independent director. I take the total of these three values to obtain the final number of directors on a company as a measurement of board size. In their research, Lipton and Lorsch (1992) argue that if a board's capacities for monitoring increase with board size, then benefits are outweighed by other costs such as slower decision making, less candid discussions of managerial performance and biases against risk taking. Therefore, a smaller board size is expected to be able to better monitor CEO performance.

Firm size

Finally, I use firm size as a control variable in order to account for differences between smaller and larger companies. Firm size is measured by the log of total assets.

Table 1

Variable description

Variable	Specification
CEO Turnover	Dummy variable equal to 1 when there is CEO turnover and 0 for otherwise
ROA $_{t-1}$	Net income / total assets
Oil Price $_{t-1}$	Average annual oil price
CEO Tenure	Year t minus year become CEO
CEO Equity Ownership	Total shares owned by the CEO / total common shares outstanding
Firm Size	Log of total assets
Board Indep	Percentage of independent directors / total board of directors
Board Size	Total number of board of directors
CEO Duality	Dummy variable equal to 1 if CEO is also a chairman and 0 for otherwise

3.3. Research Design

Since the dependent variable of my research is a binary variable, I use Probit regression to examine whether CEO turnover is caused by firm performance or exogenous shock. In order to determine whether it is firm performance or exogenous shock which is affecting CEO turnover, I use the regression model below. I expect that the coefficient for β_2 will not be significant which indicates that oil price (exogenous shock) does not have predictive power for CEO turnover.

H1 : Probability (CEO turnover$_{i,t}$) = $\beta_0 + \beta_1$ ROA$_{i,t-1} + \beta_2$ Oil price$_{i,t-1} + \beta_3$ CEO tenure$_{i,t}$ +

β_4 CEO equity ownership$_{i,t} + \beta_5$ Firmsize$_{i,t} + \varepsilon_{i,t}$ (1)

To see whether board independence is sensitive to the exogenous shock, I use the interaction variable of oil price and board independence. This will test whether an increased proportion of independent directors leads to better monitoring and CEO assessment, namely since the board should be able to exclude the role of exogenous shock before dismissing a CEO. I expect the coefficient for β_4 to be negative, meaning that turnover at firms with a higher number of independent directors should be more sensitive to exogenous shock.

H2 : Probability (CEO turnover$_{i,t}$) = β_0 + β_1 ROA$_{i,t-1}$ + β_2 Oil price$_{i,t-1}$ + β_3 BoardIndep$_{i,t}$ + β_4 Oil price$_{i,t-1}$ *BoardIndep $_{i,t}$ + β_5 CEO tenure$_{i,t}$ + β_6 CEO equity ownership$_{i,t}$ + β_7 Firmsize$_{i,t}$ + β_8 Boardsize$_{i,t}$ + β_9 CEO duality$_{i,t}$ + $\varepsilon_{i,t}$ (2)

Kaplan and Minton (2012) use the model of the interaction of stock performance and the GIM index as a measurement of governance. He expects that this interaction should have a positive effect on turnover with the assumption that turnover at poorly governed firms should be less sensitive to poor performance. Hence, following Kaplan and Minton (2012), I use the interaction between independent boards and firm performance to see if there is an impact on CEO turnover. I expect the interaction coefficient (β_3) will be negative, meaning that an increase in independent directors should be more sensitive to good performance thus turnover will be less likely to happen.

H3 : Probability (CEO turnover$_{i,t}$) = β_0 + β_1 ROA$_{i,t-1}$ + β_2 BoardIndep$_{i,t}$ + β_3 ROA$_{i,t-1}$*BoardIndep $_{i,t}$ + β_4 Oil price$_{i,t-1}$ + β_5 CEO tenure$_{i,t}$ + β_6 CEO equity ownership$_{i,t}$ + β_7 Firmsize$_{i,t}$ + β_8 Boardsize$_{i,t}$ + β_9 CEO duality$_{i,t}$ + $\varepsilon_{i,t}$ (3)

3.4. Descriptive Statistics

Table 2 shows the descriptive statistics of my observations. Among the 405 observations, the average ROA is 6.25% with a median of 6.23%. The average of oil price is $50.70 with a median $50.04. The length of CEO tenure is an average 7.85 years with a median of 6 years and their average for equity ownership is 1.02% with a median 0.21%. Lastly, the board size consists of 8 people on average with around 70% of their composition being independent directors.

Table 2.

Summary statistics

This table presents descriptive statistics for the variables used in this research. All variables are defined in Table 1.

Variable	Mean	Median	Std.dev
ROA_{t-1}	0.0625641	0.0623641	0.0621236
Oil Price$_{t-1}$	50.70703	50.04	28.40218
CEO Tenure	7.851582	6	6.811387
CEO Equity Ownership	1.017943	0.2138086	2.649528
Firm Size	7.910941	7.866997	1.254434
Board Indep	0.7183732	0.75	0.1492746
Board Size	8.39	8	1.978983

Table 3 presents the Pearson Correlation matrix for all independent variables used in my analysis. This matrix shows that oil price has a positive significant relation with the firm performance. Consistent with my prediction, exogenous shocks such as the fluctuation in oil price will surely affect the firm performance. Therefore, to obtain the real value of the performance of a firm, boards should exclude the effects of exogenous shock. Moreover, the correlation between independent directors and firm size and board size shows a positive significant relation. This means the larger the firm and the bigger board size, the more likely a board is to include in its composition more independent directors which results in better CEO monitoring. I also conducted a Variance Inflation Factor (VIF) test and the results of an inverse VIF (1/VIF) on all the variables is higher than 0.1, which indicates that there is less concern about the multicollinearity.

Table 3.

Correlation Matrix

This table presents Pearson's correlation coefficients among all independent variables used in this research. * denotes the statistical significance at the 5% level. All variables are defined in Table 1.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) ROA_{t-1}	1							
(2) Oil $Price_{t-1}$	0.2136*	1						
(3) CEO Tenure	0.0711	-0.1406*	1					
(4) Firm Size	0.0557	0.3388*	-0.1457*	1				
(5) CEO Equity Ownership	-0.0416	-0.0657	0.3211*	-0.3008*	1			
(6) Board Size	0.031	0.1006	-0.2335*	0.5436*	-0.22917*	1		
(7) Board Indep	0.0914	0.3443*	-0.1213	0.4540*	-0.2547*	0.3307*	1	
(8) CEO Duality	-0.018	-0.117	0.1920*	0.3741*	-0.0264	0.2260*	0.2754*	1

4. Results

Table 4 shows the summary of the Probit regression from equation (1), where the dependent variable is CEO turnover with binary value. Independent variables of interest are the firm performance which is represented by ROA_{t-1} and oil price$_{t-1}$, with control variables are CEO tenure, firm size and CEO equity ownership. Consistent with the first hypothesis, based on 405 firm year observations from 1996-2015, the result of the Probit regression shows that the ROA_{t-1} is negative and statically significant (10% level). This indicates that ROA_{t-1} is inversely related to CEO turnover; specifically, CEO turnover is less likely to occur when ROA_{t-1} is high.

The regression result also shows that the coefficient for oil price is insignificant. It means that oil price is not a determinant factor of CEO turnover. It is also consistent with the hypothesis that exogenous shock measured by oil price should not have predictive power to CEO turnover. Moreover, the coefficient for tenure is negative and statistically significant (1% level). This means that the longer the number of years a CEO has held their position as CEO, the less likely they are to be fired. From the marginal effect, I can see the magnitude that an increase of one year in tenure will decrease the probability that the CEO will be fired by about 7%. I attribute this to an increase in the ability of the CEO to manage over the extent of their tenure. CEO's with more experience have shown their ability to face both the good and bad times. They know how to survive in all market conditions.

Another control variable is firm size and it does explain the CEO turnover. The coefficient for the firm size shows positive and significant results (5% level). This means that the bigger the firm size, the more likely the CEO is to be fired. Lastly, the coefficient for the percentage of CEO equity ownership is insignificant, thus it does not explain the CEO turnover. The pseudo R^2 shows that ROA_{t-1}, Oil price$_{t-1}$, tenure, firm size and CEO equity ownership together explained the variance of CEO turnover by 58%.

Bertrand and Mullainathan (2001) find that executives tend to be rewarded by positive luck. Jenter and Kanaan (2015) also find that the CEO is punished by poor relative performance. Although my results are not consistent with both of the above studies, my research is examining the economic theory that says a CEO should be assessed by their ability, and the external noise that impacts this ability should be filtered out. My results are also consistent with Cornelli et al. (2013), who finds that boards try to avoid firing a CEO for bad luck.

Table 4

Analysis of the CEO turnover with firm performance and oil price.

This table reports the Probit regression result and Marginal effect. ***, **, and * denote the statistical significance at the 1%, 5% and 10% level.

DV: CEO turnover	Probit regression	Marginal effect (dy/dx)
ROA $_{t-1}$	-3.985*	-3.538*
	(2.236)	(0.191)
Oil Price $_{t-1}$	0.00778	0.00069
	(0.00518)	(0.00642)
CEO Tenure	-0.864***	-0.0767***
	(0.124)	(0.006)
CEO Equity Ownership	0.0551	0.0049
	(0.0841)	0.0074
Firm Size	0.253**	0.022**
	(0.12)	(0.01)
Constant	-1.643*	
	(0.914)	
Observations	405	
Pseudo R^2	0.578	

Table 5 presents the empirical finding of the sensitivity of CEO turnover to oil price when the number of independent directors is increased. In addition to all the control variables I used on the first regression, I added more control variables which are CEO duality and board size. I also added the interaction term which is Oilprice$_{t-1}$*BoardIndep. This coefficient is to measure the sensitivity of oil price to CEO turnover when there are independent directors. The result shows that the coefficient of β_4 is not significant, thus I reject my second hypothesis. Which means CEO turnover is not sensitive to exogenous shock when the number of independent directors is increased. However, the coefficient for β_1 is negative and significant (10% level). It means that CEO turnover is less likely to happen when there is an increase in ROA. From

the marginal effect coefficient, it shows that CEO turnover will be 37% less likely to occur caused by the increase in firm performance. Therefore, the board of directors are not considering oil price when it comes to decisions of retaining or replacing their CEO. They are more concerned about the firm performance. In other words, if the CEO is not bringing any value to the firm performance, then the CEO is more likely to be dismissed. In addition, similar to model (1), the coefficient for CEO tenure is still negative and statically significant (1% level). This means that CEO tenure is a factor that relates to CEO turnover. The longer tenure that the CEO has, the less likely the CEO is to be dismissed. The pseudo R^2 shows that ROA_{t-1}, Oil price$_{t-1,}$ board independence, CEO tenure, CEO equity ownership, firm size, board size and CEO duality, together explain approximately 59% of all variation in CEO turnover.

Table 5

Analysis of the sensitivity of independent directors and oil price to CEO turnover.

This table reports the Probit regression result and Marginal effect. ***, **, and * denote the statistical significance at the 1%, 5% and 10% level.

DV: CEO turnover	Probit regression	Marginal effect (dy/dx)
ROA $_{t-1}$	-4.293*	-0.372*
	(2.298)	(0.191)
Oil Price $_{t-1}$	0.020812	0.0018
	(0.02135)	(0.0019)
BoardIndep	1.871	0.162
	(1.792)	(0.154)
Oil Price $_{t-1}$ * BoardIndep	-0.208	-0.018
	(0.286)	(0.002)
CEO Tenure	-0.8819***	-0.0765***
	(0.127)	(0.007)
CEO Equity Ownership	0.0922	0.008
	(0.0907)	(0.0078)
Firm Size	0.205	0.0178
	(0.14)	(0.01)
Board Size	0.101	0.009
	(0.0787)	(0.0068)
CEO Duality	-0.433	-0.0376
	(0.349)	(0.0297)
Constant	-3.194**	
	(1.4596)	
Observations	405	
Pseudo R^2	0.59	

In addition to the second hypothesis, Table 6 presents the empirical findings to see if CEO turnover is sensitive to firm performance when there are independent directors among the board's composition. I add the interaction term of $ROA_{t-1}*BoardIndep$ as the measurement of this sensitivity. The result shows that the coefficient β_3 is negative and statically significant (5% level). Thus, this means there is a negative association between CEO turnover and firm performance for those firms with a greater fraction of independent directors on their board. CEO turnover is more sensitive to firm performance when there is monitoring from independent directors. The marginal effect coefficient shows that the probability of CEO turnover caused by firm performance is decrease by 63% when the percentage of independent directors is increased. Consistent with the first hypothesis, the results for oil price still show an insignificant coefficient, thus we can conclude that exogenous shock is not a factor that impacts CEO turnover. The control variables such as board size, CEO duality, CEO equity ownership, and firm size show insignificant results. The pseudo R^2 shows that ROA_{t-1}, Oil price$_{t-1}$, board independence, CEO tenure, CEO equity ownership, firm size, board size and CEO duality, together explain approximately 61% of all variation in CEO turnover.

Table 6.

Analysis of the sensitivity of independent directors and firm performance to CEO turnover.

This table reports the Probit regression result and Marginal effect. ***, **, and * denote the statistical significance at the 1%, 5% and 10% level.

DV: CEO turnover	Probit regression	Marginal effect (dy/dx)
ROA $_{t-1}$	-2.238	-0.178
	(2.423)	(0.191)
BoardIndep	1.25	-0.099
	(1.104)	(0.086)
ROA $_{t-1}$ * BoardIndep	-0.798**	-0.063**
	(0.354)	(0.254)
Oil Price $_{t-1}$	0.00768	0.00061
	(0.00602)	(0.00047)
CEO Tenure	-1.092***	-0.087***
	(0.175)	(0.007)
CEO Equity Ownership	0.0984	0.0078
	(0.0917)	(0.0072)
Firm Size	0.235	0.022
	(0.15)	-0.01
Board Size	0.131	0.01
	(0.0809)	(0.0062)
CEO Duality	-0.312	-0.025
	(0.361)	(0.0284)
Constant	-3.011***	
	(1.137)	
Observations	405	
Pseudo R^2	0.608	

5. Conclusion

The aim of this research is to examine whether the cause of firing a CEO is exogenous shock or is it in virtue of their abilities. Based on the sample of 405 firm-year observations during the period 1996-2015, this research provides evidence that exogenous shock is not a factor that drives CEO turnover. The results show that poor firm performance leads to CEO turnover. Moreover, my research shows that the CEO turnover is more sensitive to firm performance when the number of independent directors is increased.

These results are consistent with two alternative explanations. First, the results show that exogenous shock is filtered out when it comes to the decision of replacing a CEO. This suggests that the controllability principle has been applied which is that an individual should only be evaluated for results they can control. Second, the board is playing an important role in monitoring CEO behavior. Previous studies have suggested that independent directors are better at monitoring CEO behavior than dependent directors. Consistent with previous studies, the results show that with more independent directors, there is better assessment of the CEO and that they are not firing them because of exogenous shock (i.e. oil price), but based on their lack of ability which has resulted in poor firm performance.

This research provides additional insight into the already existing body of literature regarding CEO turnover and corporate governance. Even though my results are in contrast to Jenter and Kanaan (2015), who found that CEOs are fired because of factors beyond their control, I find my results are in line with the work of Gibbons and Murphy (1990) and Cornelli et al. (2013). In their study, they found market and industry shocks were filtered out by the board before deciding to replace the CEO. I extend the knowledge of previous literature by using the oil price as a new measurement of exogenous shock. I find in my study that the fluctuation in oil price is not related to CEO turnover. My research also contributes important insights to the practitioner and CEOs themselves by showing that their response to exogenous shock is not the main factor used to assess a CEO. The board is more concerned with a CEO's ability which is reflected in the firm performance. If the CEO is not bringing any value to the firm, they are more likely to be dismissed. Hence, even though exogenous factors such as falling of oil prices may be hitting the company hard, the CEO should still focus on their ability to weather the rough period of recession by, for example, changing their marketing strategy. If a CEO is able to boost their sales, then they will still be able to achieve their performance targets. This thesis is also contributing to the shareholders by providing an empirical evidence that independent directors has a better monitoring incentives. It could lead the shareholders to

get a better understanding on how to designing the best board of directors as their representatives in the company.

My research has the following limitations. First, this research is only examining on US oil companies. Therefore, the results cannot be generalized to a broader population. Second, I only exclude the reason for CEO replacement when there is evidence of the CEO's retirement. This could serve as an opportunity for future research. It would be good to know whether the reason behind the CEO's replacement is forced turnover or voluntary. Future research would also be able to add other industry samples in order to obtain more general results. Further research could also employ another alternative exogenous shocks, additional firm performance measurements, CEO characteristic variables and regulatory settings.

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