Life After Bankruptcy

An explorative study on how past bankruptcy experience of directors and CEOs affects a firm's risk-taking, performance and chance of survival

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Abstract

This paper examines the effects of directors' and CEOs' past bankruptcy experiences on firms' outcomes. We argue that for individuals who have been involved in a corporate bankruptcy, the experience could either bring about a learning effect ("*Hot-Stove* mechanism"), or confirm their pre-existing behavioural biases ("*Innate Risk-Taking* mechanism). We rely on the Upper Echelon theory developed by Hambrick and Mason (1984) as a base for our claims. We build on the literature that has used past bankruptcy experience to explain individuals' psychological traits and attitudes towards risk. Our hypotheses are tested on a sample of 97,319 Swedish private limited liability companies between 1998 and 2015. We find significant evidence that firms employing what we define to be bankruptcy experienced directors and CEOs have higher levels of leverage, hold less cash, have lower operating performance and have a lower probability to survive if compared to similar firms with directors and CEOs having no bankruptcy experience. The results are thus consistent with what we define as "*Innate Risk-Taking* mechanism". We believe that these findings are particularly relevant for capital investors of private firms with bankruptcy experienced directors and CEOs.

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1 Introduction

"Failure is simply the opportunity to begin again, this time more intelligently..."

- Henry Ford, Founder of Ford Motor Company

"The biggest risk is not taking any risk... In a world that is changing really quickly,

the only strategy that is guaranteed to fail is not taking risks."

- Mark Zuckerberg, Founder of Facebook

In the professional careers of business leaders, setbacks and failures are practically inevitable in the pursuit of success. A failure does not have to be fatal, but being unable to adjust, take new risks, and assimilate to a changing environment could be. A question can thus be asked: does one learn or not from past adversity to act differently in the future?

This becomes important as a growing stream of literature has documented that managers and directors have a considerable influence on corporate outcomes. As academics have explored why organisations act the way they do, a spotlight of curiosity in this field of literature has more recently been directed towards understanding which inherent leadership traits influence corporate outcomes. A well-known academic within this line of studies, Donald C. Hambrick, illustrates this as:

"If we want to understand why organisations do the things they do, or why they perform the way they do, we must consider the biases and dispositions of their most powerful actors"

- Hambrick (2007)

Stemming from this, a more focused area of literature has explored how experiences can influence leaders' and investors' behaviour. Many of these studies rely on theories and terminology derived from within the psychology literature and how it argues for the importance of experiences when understanding decision-making (Dittmar & Duchin 2016). Although the range of studied experiences involve corporate leaders' personal past in, for instance, the military, great depression era or early life, the professional experiences are arguably more important as they occur throughout ones' career and can decrease or intensify the influence of past personal experiences (Dittmar & Duchin 2016). One of such influential professional experiences is corporate bankruptcy which, as will be shown, has not received substantial attention considering the inherent negative impacts it

brings about to the individuals involved. Thus, this study focuses on the impact that past bankruptcy experiences of directors and chief executive officers (CEOs) can have on risk-taking, operational performance and survival of subsequent companies that they are part of.

Our study considers both directors and CEOs in order to capture the most influential corporate decision-making body. Both of these corporate leadership roles have been argued to be important for understanding the corporate decision-making process and resulting corporate outcomes. The operational nature and influence of CEOs' responsibilities in firm decision-making processes make the CEO role an interesting subject to study (Papadakis & Barwise 2002). Moreover, past research has also found that the board constitutes the most important decision-making body of the organization and can consequently impact the performance of the firm (e.g. (Judge & Zeithaml, 1992); (Ferreira, 2010)), therefore also making it an interesting subject to study. Our focus on both directors and CEOs is additionally shared by a similar study, namely Kallunki & Pyykkö (2013).

Furthermore, this study is performed on a sample of private Swedish limited liability companies. This fills a relevant gap in the academic literature that has predominantly studied the impact of past managerial experience on firm outcomes in contexts of public companies. Kallunki & Pyykkö (2013), which is based on a sample of private Finnish companies, emphasizes the implications this may have for interpreting results. On the one side, private firms' general level of corporate governance can be assumed to be lower than that of public firms as private firms do not have the same degree of public scrutiny. On the other, as CEOs and directors may also own parts of the firm, the corporate governance can either be stronger (as a result of reduced agency costs) or weaker (as these individuals may thus be more incentivized to take advantage of perks) (Kallunki & Pyykkö, 2013). For these reasons, private companies are an interesting setting to study.

We hypothesise that, for directors and CEOs who have been involved with a corporate bankruptcy, the experience can affect them in one of two opposing ways. Either the experience brings about a learning effect (what we define "hot-stove mechanism"), therefore inhibiting their subsequent risk-taking, or alternatively confirm their behavioural biases (what we define as "innate risk-taking mechanism"). We focus on the behavioural biases of overconfidence, optimism, illusion of control and sensation-seeking as these have been shown in the prior economic literature to explain irrational decision-making and to affect firms (Kallunki & Pyykkö, 2013). Using the Upper Echelon theory developed by Hambrick and Mason (1984) we are first able to connect past bankruptcy experience to individuals' psychological traits and attitudes towards risk, and secondly to connect these behavioural biases to specific firm outcomes. This paper's thus evolves to trying to answer the research question:

How does past bankruptcy experience of CEOs and directors affect a firm's risk-taking, performance and chance of survival?

Our results show that directors' and CEOs' past bankruptcy experiences do help explain the risk-taking, operational performance and survival rates of firms that they are subsequently involved with. In particular, we find significant evidence that firms employing what we define to be bankruptcy experienced directors and CEOs have higher levels of leverage, hold less cash, have lower operating performance and have lower probability to survive in the coming 5 years if compared to similar firms with directors and CEOs having no bankruptcy experience. We therefore find support for the "Innate risk-taking mechanism". This implies that, following an experience of bankruptcy, directors' and CEOs' innate behavioural biases prove to be present in addition to also being strong enough to affect their decision-making and inhibit a potential learning effect. This hinges on how previous research has shown that behavioral biases, as exemplified by past experiences, can influence firms' outcomes. We also find that firms with BE directors or CEOs have lower levels of CAPEX, a result that we argue could support both the "*Innate Risk-Taking* mechanism" and the "*Hot-Stove* mechanism".

The significant findings of this paper have a number of implications. Firstly, they provide further support for the idea that it is possible to use past experiences to explain firms' outcomes (Hambrick & Mason, 1984). Secondly, by its authors understanding, this study is the first to look at how past professional bankruptcy experience affects subsequent firms' outcomes on a sample of private Swedish limited liability companies. It therefore adds to the scarce literature that analyzes the effects of individuals' bankruptcy experiences on private companies. Thirdly, our findings argue for the importance of including directors' and CEOs' characteristics, and more importantly their bankruptcy experiences, when investigating corporate risk-taking, understanding company performance and (potentially also) when using bankruptcy prediction models (similar to Kallunki & Pyykkö, 2013). In particular, capital providers like shareholders and creditors should be aware of the increased level of risk when financing firms with bankruptcy experienced directors and CEOs.

The remainder of this paper is structured as follows: Section (2) presents a review of the prior and relevant literature as well as proposes our hypotheses. Section (3) describes the papers' scientific approach. Section (4) presents the data collection approach and sample selection. Section (5) develops the study's model. Section (6) reports the results of the study. Section (7) presents the paper's analysis and Section (8) concludes the study with implications and suggestions for future research.

2 Theoretical development and previous research

In order to investigate the effect of directors' and CEOs' bankruptcy experience on firms' risk-taking, performance and survival, we will commence with section 2.1 to review the literature documenting that board members are, to a great extent, involved in firms' decision-making processes. This will allow us to substantiate that board members, in addition to the more operationally-oriented CEOs, have influence on corporate outcomes. Additionally, this section brings into light the importance of understanding why they can impact firms' outcomes.

In section 2.3, we will then review the Upper Echelon Theory developed by Hambrick & Mason (1984) and the pursuant literature documenting how characteristics of managers and directors have shown to impact firms' outcomes. This review will be divided by the two branches of the Upper Echelon theory of, on the one side, more observable demographic characteristics and, on the other hand, more unobservable and psychologically-based characteristics. This allows us to explain why managers' and directors' characteristics and behavioural attributes can impact firms' outcomes. Essentially, it also sets the stage for us to connect *how* past experiences, like directors' past bankruptcy experience, may influence the corporate decisions.
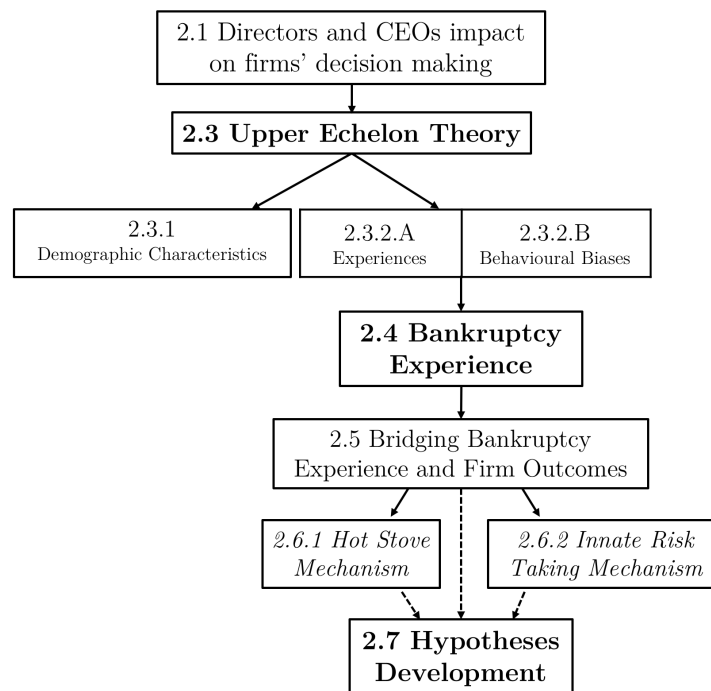
Figure 1 – Theoretical Development

Figure 1 presents the Theoretical Development for this study.

Next, in section 2.4, we will review how bankruptcy experience of board members and CEOs has been documented to have substantial impact on these individuals. This allows us to illustrate the

lack in academic research focusing on how such experiences' impact on directors and CEOs can in turn influence companies in which they are subsequently involved. This highlights the importance of our research question.

Laslty, section 2.6 will present the two opposing mechanisms that allow us to explain the potential effects of bankruptcy experienced directors and CEOs on subsequent companies that they are involved with. We will argue that such experiences either bring about a learning effect (which we define as the "*Hot-Stove* mechanism"), or alternatively confirm particular behavioural biases (what we define as the "*Innate Risk-Taking* mechanism"). Finally, this allows us to present our non-directional hypotheses in section 2.7.

2.1 Boards' effect on companies' performance

The common conception of board of directors' primary functions in firms is to advise and monitor the management of the firm (e.g. (Dong, 2008); (Adams & Ferreira, 2010)). To coordinate the separation of ownership and control, directors are often introduced by the shareholders to represent their best interest (Berle & Means, 1932). As argued by Donaldson & Davis (1991), board members provide advice and support to top managers, and thus represent a valuable resource for firms. While managers are generally considered to be responsible for the corporate decision-making, several studies have focused on proving how directors have the power and the abilities to steer managerial processes. For instance, Judge & Zeithaml (1992) argue that "boards can and do influence performance of the firm", either as a result of an institutional response or a strategic adaptation to external pressures. Based on their findings, Crow & Lockhart (2016) argue that more and direct strategic involvement by boards in managerial decisions can be significantly important for improved business performance. The importance of boards can therefore be substantiated. Meanwhile however, for this research papers' focus on bankruptcy and financial distress experience, considering directors' increased firm involvement during bankruptcies becomes particularly important.

2.2 Board members involvement in financial distress and bankruptcies

In the event that a Swedish limited liability company experiences financial distress, there are two possible routes: (1) liquidation bankruptcy[1] or (2) restructuring (Sundgren & Alexeyeva, 2017). Either the responsible representatives of the company itself or creditors can initiate a liquidation bankruptcy by petitioning a Swedish district court. If the bankruptcy petition has been approved, a trustee will be appointed to handle the bankruptcy liquidation (Sundgren & Alexeyeva, 2017).

In the event of a bankruptcy, the shareholders of a limited liability company in Sweden will not be personally liable for the company's obligations[2]. However, if a company has been ordered by a Swedish court to be liquidated and a shareholder is knowledgeable of this while partaking in

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[1] The Swedish Bankruptcy Code stipulate the process of a liquidation bankruptcy which shares the main relevant properties of chapter 7 bankruptcy in the US in addition to the liquidation codes of numerous other countries like Germany and the UK (Strömberg, 2000)

[2] 1 ch. 3 § Swedish Companies Act (2005:551)

decisions that reside on the assumptions that the company's operations are ongoing, they can be personally liable for any obligations entered into by the company following the ordered liquidation date[3]. This is of importance as the studied companies of this paper are private and, in many cases, the shareholders of the companies can be assumed to be on the board of the companies.

As for the board members of the company in particular, special regulations become important. The Swedish Companies Act (Aktiebolagslagen) states that if the board members have reason to believe that the company's own equity capital is less than half of the registered shareholders capital, they must allow auditors to review a newly established balance sheet for liquidation purposes[4]. If the board members fail to do this, in addition to or otherwise fail to call for a specially purposed general meeting, or otherwise fail to apply for a liquidation of the company to the district court, they may become personally liable for any mistreatments of the company or obligations entered into[5].

This has also been illustrated in prior literature. Ivanova & Pündrich (2017) refer to Eckbo, et al., (2016) in explaining how directors and executives can be held liable for failing to prevent a bankruptcy by, for instance, not restructuring the outstanding loans or not adjusting the financing and operational policies of the firm. As a result, board members are bound to become increasingly involved in firms when they experience financial distress. Fich & Slezak (2008) demonstrate this as they document how certain governance structures can better respond to distress situations by incorporating board characteristics in bankruptcy prediction models.

Meanwhile, research has shown that directors find their reputation being damaged as they are part of firms that experience adverse performance (Fahlenbrach, et al., 2010). For instance, outside directors, defined as board members that are not employed by the firm in which they hold a board seat, have experienced reputational damage and loss of other board seats during and after they have been board members of firms that face financial fraud lawsuits and restate earnings (e.g. (Fich & Shivdasani, 2007); (Srinivasan, 2005); (Gilson, 1990))[6]. Fahlenbrach, et al., (2010) contribute to this by focusing on an area that has not received much attention, namely the cost of having outside directors on the board. The authors find empirical evidence that outside directors have economically significant incentives to leave firms that face troubling performance. Equally well, as argued by Brickley, et al., (1999), CEO are more likely to be given directorships when retiring from firms that have experienced favourable economic performance. Consequently, as they try to avoid reputational damage and ensure continued career advancement, directors' involvement in firms' decision-making processes (together with CEOs) can be substantiated, particularly as a firm is experiencing financial distress.

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[3] 25 ch. 19 § Swedish Companies Act (2005:551)

[4] 25 ch. 13 § Swedish Companies Act (2005:551)

[5] 25 ch. 18 § Swedish Companies Act (2005:551)

[6] For a comprehensive review of the literature on director selection and reputation, see Withers et al., 2012

2.3 The Upper Echelon theory

The following section will present the decision-making process conducted by board members and CEOs through the lens of the Upper Echelon Theory developed by Hambrick & Mason (1984). Since its publication, the literature on how managerial traits may influence corporate decisions and outcomes has grown considerably to include decisions involving investments, capital structure, and mergers and acquisitions (Kallunki & Pyykkö, 2013). Considering the vast research documenting how board members have an influence on corporate outcomes, the Upper Echelon theory will serve as a platform theory for illustrating why board members may have an effect on firm decision-making.

Numerous studies within the socio-economic and psychological fields that explore decision-making processes have confirmed that individual characteristics have an effect on the decision outcomes (e.g. (Stumpf & Dunbar, 1991); (Plöckinger, et al., 2016)). Stemming from this line of research, Hambrick & Mason, (1984) is a prominent publication in the organisational literature arguing that corporate decision-making is significantly affected by the individual characteristics of the decision-makers. Through the Upper Echelon Theory, they establish a framework for why characteristics of top level decision-makers (upper echelon characteristics) have an impact on companies' strategic choices and the resultant performance outcomes, as illustrated in Figure 2 below.

Figure 2 – An Upper Echelon Perspective of Organizations
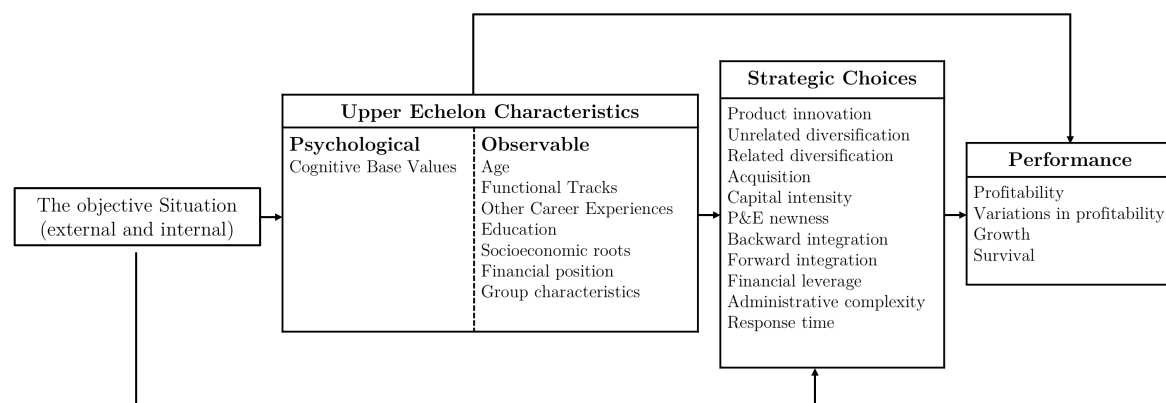
Figure 2 presents the Upper Echelon Perspective of Organizations by Hambrick and Mason (1984)

The Upper Echelon theory relies on the concept of bounded rationality, whereby decision-makers are constrained by the limited information available, time and capacity of the human mind to process information thoroughly (e.g. (Plöckinger, et al., 2016); (March & Simon, 1958)). With reference to Mischel (1977), Hambrick (2007) explains this as "the idea that informationally complex, uncertain situations are not objectively 'knowledgeable' but rather, are merely

interpretable." As such, decision-makers construct a simplification of the situation as it is too difficult to understand and exhaustively process the available information. Through this perceptual process, information is interpreted by the cognitive base and values of the decision-maker (Hambrick & Mason, 1984). These psychological characteristics are in turn shaped by the individuals' observable characteristics (e.g. (Hambrick & Mason, 1984); (Plöckinger, et al., 2016)). Therefore, both the observable and psychological upper echelon characteristics influence the strategic decision-making process.

Figure 2 demonstrates the range of relationships of the Upper Echelon theory. As suggested by Hambrick & Mason (1984), the upper echelon characteristics of the decision-makers are influenced by environmental factors and "stimuli" originating both internally and externally of the organization. In other words, these characteristics form a partial "reflection of the situation that the organization faces" (Hambrick & Mason, 1984).

2.3.1   Demographic characteristics

In the next section, we will outline the previous literature that has investigated how demographically observable upper echelon characteristics have an impact on companies' strategic choices and resulting performance outcomes. They investigate characteristics such as age, gender, education, number of directorships of board members, CEO duality, and independence of the board. These will later be used as control variables in our models.

Observable demographic characteristics – literature review

Firstly on the topic of gender, female board representation has received considerable interest as several studies have sought to study the impact of gender diversity on firm risk-taking behavior and performance. Adams & Ferreira (2009) find that that gender-diverse boards allocate more effort to monitoring and the average effect of gender diversity on firm performance is negative. They find that the presence of female directors, similarly to the presence of independent directors, could lead to over-monitoring in those firms. On a similar US sample, Sila, et al. (2016) find that boards with a higher proportion of female directors is no more or less risk-taking than a more male-dominated board. These contrasting results can be explained by the additional controls for reverse causality that Sila, et al. (2016) implement, and show how, to date of publishing, there is no consensus in the literature on the relationship between female board representation and performance. On the other hand, Faccio, et al. (2016), by studying the connection between CEO gender and corporate risk-taking, are able to claim that firms run by female CEOs have lower leverage, less volatile earnings, and a higher chance of survival. Their results are robust when controlling for the endogenous matching between firms and CEOs.

Consistent with the studies about gender proportions in the boardroom, Giannetti & Zhao (2016) explore how board diversity in terms of ethnicity, gender, age, directors' industry experience, and education causes greater stock return, higher fundamental volatility as well as higher executive turnover and higher director turnover. They do so on a sample of US public companies and are able to analyze total stock return volatility, fundamental volatility and idiosyncratic return volatility. They find no evidence to claim that firms with diverse boards take more risk in terms

of leverage, capital expenditures or acquisition decisions. Considering the recency of its publication, and the array of variables used by Giannetti & Zhao (2016) as proxies for board diversity, this study can be seen as one of the more comprehensive ones in this stream of literature.

Furthermore, a variety of studies have focused on using other board characteristics as an indicator of a range of observable corporate outcomes. Daily & Dalton (1994) study how the percentage of outside directors (directors not employed within the company) and CEO duality (whether or not the roles of the board chair and CEO are separate) are negatively related to the probability of failure. A literature review of papers investigating CEO duality and its effects on corporate performance by Krause, et al. (2014) finds, however, that the research on public companies appears to be inconclusive. Interestingly, De Maere, et al. (2014), are able to find conclusive results by analyzing a sample of private firms from Belgium, therefore also filling a relevant gap in the existing literature that explores the connection between board characteristics and corporate outcomes in private companies. They investigate how board characteristics such as CEO duality, board independence, board tenure, number of directorships and board turnover can be helpful in predicting bankruptcy for these firms. They find that separation of CEO and board chair is negatively related to bankruptcy probability. Additionally, they find that the number of directorships and tenure length are positively related to bankruptcy probability.

Similar to De Maere, et al. (2014), Darrat, et al. (2016) study corporate governance attributes and bankruptcy risk. They find that, on a sample of US public companies, having larger boards reduces the risk of bankruptcy. In addition, firms with a greater proportion of inside directors have a lower risk of bankruptcy if the firm requires more specialist knowledge, and the opposite is true in technically unsophisticated firms. Lastly, they are able to find that bankruptcy is more probable when the board is less diversified in gender as well as when the CEO is the chairman of the board.

Additional observable characteristics of age, education and career track have shown to explain corporate policies and risk-taking. Age of decision-makers has been suggested as a significant explanatory factor as younger managers have been argued to be more prone to risky strategies involving leverage, innovation and diversification (e.g. (Hambrick & Mason, 1984); (Plöckinger, et al., 2016)). This results mainly from the idea that older executives are more conservative as they have less physical and mental stamina (Child, 1974) and that they find financial and career security more important when being closer to retirement age (e.g. (Hambrick & Mason, 1984); (Carlsson & Karlsson, 1970)).

Hambrick & Mason (1984) additionally propose that the formal educational track can explain a decision-makers' knowledge and skills. Giannetti & Zhao (2016) substantiates this by explaining how different educational backgrounds provide directors with "different experiences and cognitive models". Bertrand & Schoar (2014) and Dittmar & Duchin (2016) find that MBA educated executives and CEOs are likely to pursue more aggressive policies and risk-taking in terms of higher leverage ratios. Finally, the functional tracks pursued by executives throughout their careers have been shown to have explanatory value in later firm roles. Custodio & Metzger (2014) find for instance that financially expert CEOs (having previous experience in the financial industry or in a financial role) are more risk-taking as their companies hold less cash and have higher levels of debt.

2.3.2 Experiences and behavioural biases

A particular observable characteristic as identified by Hambrick & Mason (1984) that is of interest for this research paper is past individual experiences. Previous studies have shown that the cognitive base and values of decision-makers reflect and are shaped by past experiences (Dittmar & Duchin, 2016). Hambrick & Mason (1984) name the psychological upper echelon characteristics of cognitive base and values as the decision-makers' "idiosyncratic givens" that they bring to an administrative situation. The cognitive base is in itself defined as "(1) knowledge or assumptions about future events, (2) knowledge of alternatives, and (3) knowledge of consequences attached to alternatives" (Hambrick & Mason, 1984). Additionally, values are in themselves defined as "principles for ordering consequences or alternatives according to preference" (Hambrick & Mason, 1984).

Due to the difficulty to quantify and measure psychological idiosyncrasies (also referenced as behavioral biases) in empirical research, Hambrick & Mason (1984) suggest using the observable characteristics as proxies for the psychological traits. Numerous studies have used past experiences to proxy for behavioral biases and explain their impact on firms' outcomes. A first review will be conducted in section **A** on the studies that have documented how past experiences affect these psychological traits and their combined effect on firms' outcomes. In this stream of research in a corporate context, the primary psychological characteristics that have been focused upon are overconfidence, over-optimism, the illusion of control, and sensation seeking (Kallunki & Pyykkö, 2013). Secondly, a review will be conducted in section **B** on the papers that have used other and more direct proxies for these behavioral biases and shown how they have impacted firms' outcomes. Thoroughly reviewing and substantiating the way in which behavioral biases of decision-makers are affected by experiences and have been shown to impact corporate policies is important as it allows us to set the stage to explain *how* past bankruptcy experience may cause directors and CEOs to act irrationally in subsequent firms' roles.

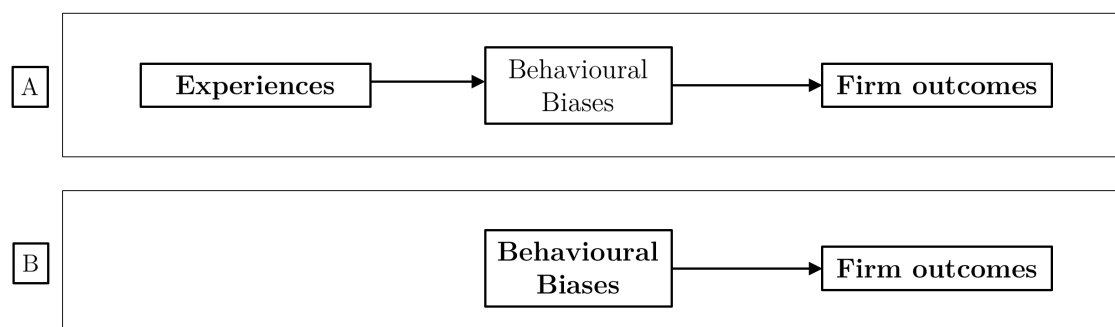**Figure 3 – Experiences and Behavioural Biases - Literature review structure**

Figure 3 presents the structure for the literature review on Experiences' and Behavioural Biases' effect on firms' outcomes.

A. Experiences as proxies for behavioural biases – literature review

Kallunki & Pyykkö (2013) is a central study to this research paper. Using a sample of CEOs and directors of Finnish private limited liability companies, their findings argue for an increased risk of financial distress in firms that have appointed a CEO or director with experience of prior personal payment defaults. To demonstrate this, the authors document that including information about CEOs and directors' experiences of past personal defaults in the Altman and Ohlson bankruptcy prediction models increases their predictive power. To explain this increased bankruptcy risk, the authors use the experience of past payment defaults as proxies for the managers to possess traits of overconfidence, overoptimism and the illusion of control. This follows from prior research by Kilborn (2002) and Sullivan, et al., (1999) who have been able document that these same traits are able to explain personal over-borrowing and credit-decisions. Kallunki & Pyykkö (2013) argues for their paper to be the first to extend the literature on managerial traits' effects on firm outcomes by documenting how these behavioural biases can lead companies into financial distress. This, they argue, is the result of the managers possessing the behavioural biases that lead to overly risky decisions.

Another central study to this paper is Dittmar & Duchin (2016). The authors contribute to this line of research by looking at how the succession of past adverse experiences have an effect on the corporate decision-making and policies. On a sample of US industrial companies, they document that firms managed by a CEO with previous and more recent negative corporate experience hold less debt, maintain more cash and invest less. In contrast to past studies' focus on past personal experiences, their study focuses on prior professional experiences that evolve throughout the careers of CEOs and involve negative events of bankruptcy or financial distress. These experiences, they argue, can either enhance or diminish the impact of overconfidence in subsequent decision-making. The authors also argue for their paper to be the first to look at how more recent professional experiences may have greater firm-specific impact as opposed to prior studies' focus on early-life and personal experiences. As a result, the authors claim that their findings "provide a possible explanation, rooted in the psychology literature, for the differences in management style across corporate executives who go through different experiences".

Both studies of Kallunki & Pyykkö (2013) and Dittmar & Duchin (2016) are important to this research paper. Firstly, considering Kallunki & Pyykkö's (2013) approach of using past experiences as explanatory variables for how behavioural biases can influence corporate policies, we will explore whether bankruptcy experience in a professional setting can explain how behavioural biases may or may not influence corporate outcomes. Similar to Dittmar & Duchin (2016), looking at past professional experiences is of particular interest as: (1) it has received considerable less academic attention and (2) professional experiences, in relation to personal experiences, occur throughout the career of directors and CEOs and can thus either enforce or diminish the impact of behavioural biases on corporate outcomes (Dittmar & Duchin, 2016).

Furthermore, other studies have investigated the impact that a range of past experiences in various environments have had on a variety of firm outcomes, in particular risk-taking in terms of financing and capital structure. Existing evidence suggests that if one has grown up during the Great Depression, one will have less faith in the external capital markets (e.g. (Graham & Narasimhan,

2004); (Schoar, 2007); (Malmendier & Nagel, 2011)). Using a sample of large US public firms, Malmendier, et al., (2011) document how CEOs experiencing an upbringing throughout the Great Depression most likely do *not* resort to debt financing and excessively prefer internal financing. Additionally, the authors find a positive correlation between CEOs having prior military experience and more aggressive corporate policies of higher leverage. Contrastingly, on a similar sample of public US companies (S&P 800), Benmelech & Frydman (2015) find that the firms of CEOs who have served in the military have lower investment levels and lower R&D expensing, do not have excessive leverage, are less likely to be involved in financial fraud and are able to perform relatively better during economic downturns. This, they find, contrasts to the prior psychology literature that associates military experience with increased overconfidence and risk-taking (Benmelech & Frydman, 2015). This, however, would support the findings of Malmendier, et al., (2011). Lastly, Schoar & Zuo (2011) draw attention upon how early work environments may influence the subsequent CEO's management styles. More in particular, the authors argue that managers whose careers commenced throughout a recession tend to have lower leverage and invest less in capital expenditures and R&D. Although some contradictions appear in the empirical results of past studies, they demonstrate the explanatory power of past experiences on firm outcomes with the interlinked effects of behavioral biases.

Referencing a number of these prior papers and studying a similar sample of US public companies, Bernile, et al., (2017) oppose the general presumption within this line of literature that a linear or unidirectional relationship exists between CEO's past experiences and firm risk. The authors find that the intensity of CEO's past experiences is a key determinant for the resulting effect on corporate outcomes. They document that CEOs manage firms more aggressively if they have experienced "not-too-severe" fatal disasters as opposed to CEOs who manage more conservatively after having experienced much more severe fatal disasters. The authors thus argue that "the intensity of life experiences can result in nonlinear effects on subsequent risk-taking" (Bernile, et al., 2017).

B. Other as proxies for behavioural biases – literature review

In many of these studies described above, past experiences of directors and CEOs have had an impact on their managerial traits (or their behavioral biases) and, in turn, on their managerial decision-making. As such, it is important to zoom in and understand how different managerial traits have shown to impact the firms they manage. The following section will thus explore the studies that have used other proxies for behavioral biases, rather than experiences, to explain their effects on various corporate outcomes. Worth noting, the existing literature has largely focused on CEO's behavioral traits and not explicitly on those of the boards.

Malmendier and Tate (2005) argue that managerial overconfidence can explain distortions in corporate investments. By proxying overconfidence with CEOs' stock-options that are held onto as they are well in the money, they are able to capture CEOs' overexposure to the idiosyncratic risk of their firms. As such, by investigating the personal investments by CEOs, they mark them as overconfident when they inherently overestimate the future returns of their companies' performance. They find, on a US sample of public companies, that investments are significantly more responsive to the company's cash flows when they are conducted by overconfident CEOs,

especially within equity-dependent firms. This follows the presumption that the availability of internal cash flow allows managers to invest more in comparison to the limitations encountered by managers to seek self-interested investments when relying on external capital markets.

After reviewing the prior literature referenced in this section, Dittmar & Duchin (2016) notice a consensus in that overconfident managers seek more aggressive policies, hence are more risk-taking. As part of their study, and similar to Malmendier and Tate (2005), they define an option-based overconfidence variable that indicates whether a CEO holds onto an own company stock-option, despite it being well in the money. They create an additional overconfidence indicator based on media articles that describe the CEO as confident and/or optimistic. As a result, Dittmar and Duchin (2016) are able to show that professional experiences, occurring throughout the career of a CEO, "attenuate the impact of overconfidence" as they find decreased leverage levels following negative professional experiences. The authors argue for this to be in line with two possible interpretations: (1) After experiencing financial distress, CEO's overconfidence weakens or (2) rather than the CEO's overconfidence being influenced, the effect of the their overconfidence on the corporate decision-making weakens when having experienced financial distress (Dittmar & Duchin, 2016).

Cronqvist, et al. (2012) note that, until their publishing, "most empirical studies assume, at least implicitly, that a firm's CEO does not impact corporate leverage decision." Residing upon the behavioral consistency theory (e.g. Funder & Colvin, 1991), the study focuses on how CEO's personal leverage levels and choices correlate with the corporate leverage policies. Documenting a "positive, and economically relevant, robust relation between corporate and personal leverage levels" of CEOs, their findings argue for manager's personal behavior having explanatory value in corporate financial policies. In line with studying the effect of personal risk-taking on professional corporate decision-making and overall firm-risk, Cain & McKeon (2014) also find a positive correlation between the personal risk-taking of CEOs and the corporate risk-taking measured through a variety of corporate policies. To proxy personal risk-preference, the authors identify CEOs with a private pilot-license as having a more prominent risk- and sensation-seeking trait. Interestingly, in comparison to Cronqvist, et al. (2012)'s personal wealth proxy for risk-taking, Cain & McKeon (2014) use a non-monetary proxy. As such, they argue that a CEO's personal risk-seeking attributes in a non-economic environment has explanatory value for firm risk and corporate policy selection.

Additional studies have shown similar investment distortions in inherently risky mergers and acquisitions as a result of behavioural biases of managers. In this line of research, managerial "hubris" has been regarded as synonymous to overconfidence (Malmendier & Tate, 2008). Roll (1986) find that bidding firms with hubris-influenced decision makers pay too much for the companies that they wish to acquire, thus demonstrating how personal psychological attributes can explain failed mergers (Malmendier & Tate, 2008). Malmendier & Tate (2008) provide additional evidence for the notion that overconfident CEOs overestimate their own company's ability to generate returns. They proxy overconfidence through (1) private investment decisions done by CEOs and (2) press articles that illustrate an external perception of the CEOs. They document that overconfident CEOs are more prone to making lower-quality acquisitions in the event that the firm has an abundance of internal capital.

In relation to how these past studies have proxied personal psychological attributes, Ben-David, et al. (2007) provide a unique approach, previously only used in laboratory experiments, to explain how managers' behavioural biases affect corporate policies. During six years the authors collect stock market predictions of top-level managers, whereby they can identify overconfidence as a degree of miscalibration in managers' beliefs concerning their own firm's performance. Having identified overconfident managers, the authors argue for how their miscalibration result from personal traits in addition to corporate characteristics. They document that overconfident managers use low discount rates to value future cash flows and invest in projects with low internal rates of return (IRRs). In particular, firms with overconfident Chief Financial Officers invest more and engage in more acquisitions, have higher levels of debt and are more heavily dependent on long-term debt. They conclude that managerial overconfidence should not only be regarded as a psychological interest but more importantly an integral modelling assumption for understanding firms.

Lastly, Hackbarth (2008) follows the same line of argumentation in that overconfidence and optimism should be considered together with traditional capital structure theory. He documents that managers with these behavioural biases (proxied by their perception of growth and risk) are prone to select higher debt levels and pursue new debt issuances more often in comparison to identical and unbiased managers. Additionally, by documenting how extreme managerial biases result in value-destroying implications for the firm, Hackbarth (2008) argues that managerial traits are able to explain significant variations in firms' capital structure.

As demonstrated, numerous studies have been able to show significant empirical evidence for how particular managerial traits have had an influence on a variety of corporate outcomes. This follows the section before, which demonstrated how past experiences have both been used to proxy as well as been shown to shape the behavioural biases of decision-makers. Meanwhile, as will be shown in the next section, the particular event of bankruptcy has received considerable academic attention with regards to the inherent impacts that such events can have on firms' stakeholders.

2.4 Bankruptcy experience

The literature on the subject of bankruptcies and financial distress has received considerable academic attention (Ivanova & Pündrich, 2017). Studies have documented how firm failures at the bankruptcy filing event date and in the financial distress period leading up to the event have resulted in negative spillover effects to non-bankrupt strategic alliance partners (e.g. (Boone & Ivanov, 2012); (Hertzel, et al., 2008)) as well as competitors (e.g. (Lang & Stulz, 1992); (Hertzel, et al., 2008)). In addition, suppliers (as well as customers to a lesser extent) have been shown to be affected in the event that the whole industry is also impacted by the bankruptcy (Hertzel, et al., 2008). In particular for suppliers, as suggested by Tittman & Wessels (1988), they are more likely to be negatively affected if they supply more unique and specialized products and an important customer experiences financial distress.

Beyond the firm's outside stakeholders, internal stakeholders such as directors, managers and executives, have shown to also be subject to negative effects resulting from bankruptcies. Baer, et al., (2017) refer to the well-studied literature building upon the major findings of Fama (1980) and

Fama & Jensen (1983) in illustrating how directors are incentivized to build upon a reputation for being experts in monitoring and advising. As Gow, et al., (2016) explains, this is because the effectiveness of directors' work is not easily observed by market participants. When firms in which directors and senior management are involved experience negative financial distress or bankruptcy however, this reputation, in addition to monetary compensation, may be at stake.

Analysing a sample of public companies between 1981-1987, Gilson & Vetsuypens (1993) find that almost a third of chief executives of firms filing for bankruptcy or restructured debts experience large reductions in salary and bonuses. Based on a sample of public firms experiencing extreme stock price decline, Gilson (1989) analyses the personal costs to senior managers (defined as CEOs, presidents, and board chairmans). These default-related losses are significant as the majority of the sampled firms that experience financial distress change senior managers, none of whom regain another senior management role in a public company in the next 3 years. Further advancing beyond these studies, Eckbo, et al., (2016) explains how Chapter 11 bankruptcy has evolved towards a more creditor-oriented process in which CEOs' personal wealth can be affected.[7] By comparing CEO compensation before and after bankruptcy, Eckbo, et al., (2016) find that two-thirds of CEOs leaving their companies experience a loss in compensation of a median present value of five times their pre-departure compensation. Lastly, Gow, et al., (2016) find significant evidence of strategic disclosures of past experiences in bibliographies. They find that directors are less likely to disclose past and current involvements of directorships in companies that experienced negative events such as accounting restatements, financial litigations or bankruptcies. As such, building upon and maintaining a reputation of expertise is monumental to directors within firms.

More recently, several studies have sought to further understand the effect that directors' past bankruptcy experiences might have on their subsequent firms' outcomes. As Ivanova & Pündrich (2017) explains, the subject of how past bankruptcy exposure affects decision-making has not received much academic attention. In their contribution to this line of research, Ivanova & Pündrich (2017) seek to understand whether past bankruptcy exposure of directors, executive officers or managers is of importance to creditors and whether it has any effect on both pricing and non-pricing terms of debt contracts. They try to explain this effect of bankruptcy exposure as a result of a reputational mechanism (defined as the increase in firm risk because of the presence of a "tainted" director) or the "*Hot-Stove*" mechanism (whereby directors are more conservative in financing policies as a result of an increased bias against risk). While prior studies have argued for both mechanisms to be the most prominent, Ivanova & Pündrich (2017) provide evidence for the reputational mechanism as firms with a bankruptcy exposed director or executive have higher credit spread and lower bond size. On the other hand, the authors are able to document higher levels of leverage and cash holdings for firm's with bankruptcy exposed directors or executives, providing partial support for what they call the "*Hot-Stove*" mechanism.

2.5   Bridging bankruptcy experiences and firm outcomes

As has been shown, bankruptcies can have considerable impact on the stakeholders surrounding a company. With reference to the research above, one group of stakeholders that are greatly affected

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[7] Similar findings have been documented by Ayotte, et al., (2013) and Jiang, et al., (2012)

are the managers and directors. Meanwhile, as highlighted by Ivanova & Pündrich (2017), there is an evident gap in the research that considers how directors' and CEOs' past bankruptcy experience can affect the corporate policies of firms that they subsequently join. To substantiate this, we believe the Upper Echelon theory presented above creates a framework that can establish the relationship between past bankruptcy experiences and later decision-making. Interlinking the two are the managerial psychological traits that are either affected or merely confirmed.

It has been shown that research has documented how past experiences affect or reconfirm individuals' behavioral biases. These papers have investigated psychological traits originating in directors' and CEOs' experiences from a diverse array of backgrounds, ranging from the military and Great Depression to general economic recessions. These studies have additionally found significant evidence for how experiences help explain directors' and CEOs' resultant influence on corporate outcomes like corporate risk-taking and capital structure decisions. For the purpose of this paper, only Kallunki & Pyykkö (2012) and Dittmar & Duchin (2016) have documented the importance of regarding behavioral biases when investigating past distress experiences' effect on subsequent risk-taking by directors and CEOs. Meanwhile, they arrive at contradictory results with regards to the impact that behavioral biases have on risk-taking.

With the Upper Echelon theory providing a framework for why past bankruptcy experience should affect corporate policies, we are thus left with a scarce number of papers investigating *how* this experience affect firms' outcomes. In particular, we see limited and contrasting results on whether a bankruptcy experience could bring about a learning effect (which we will define as the *"Hot-Stove* mechanism" in section 2.6.1), therefore inhibiting subsequent risk-taking, or alternatively, confirm or enhance overconfidence, optimism, illusion of control and sensation-seeking (what we will define as the *"Innate Risk-Taking* mechanism" in section 2.6.2). This paper's contribution to literature thus evolves as we aim to answer our research question. In the next section, we will therefore build a model that can help investigate and justify the direction of the effect of individuals' bankruptcy experience on firm risk-taking, performance and survival.

2.6 Effect of bankruptcy on firm outcomes

Prior papers (e.g. (Kallunki & Pyykkö, 2013); (Dittmar & Duchin, 2012); (Ivanova & Pündrich, 2017)) have sought to document the effect of bankruptcy experiences on subsequent directorships and decision-making in firms. Drawing upon the approaches used by these studies, we aim to explain the relationship between past bankruptcy experiences and specific firm outcomes. Either causing a learning effect, therefore inhibiting their subsequent risk-taking, or alternatively confirming their behavioural biases. Respectively, these will be referred to as the "*Hot-Stove* mechanism" and the "*Innate Risk-Taking* mechanism". These two alternative and opposing mechanisms will be explored further in the section below.

Figure 4 – *Hot-Stove* and *Innate Risk-Taking* Mechanisms
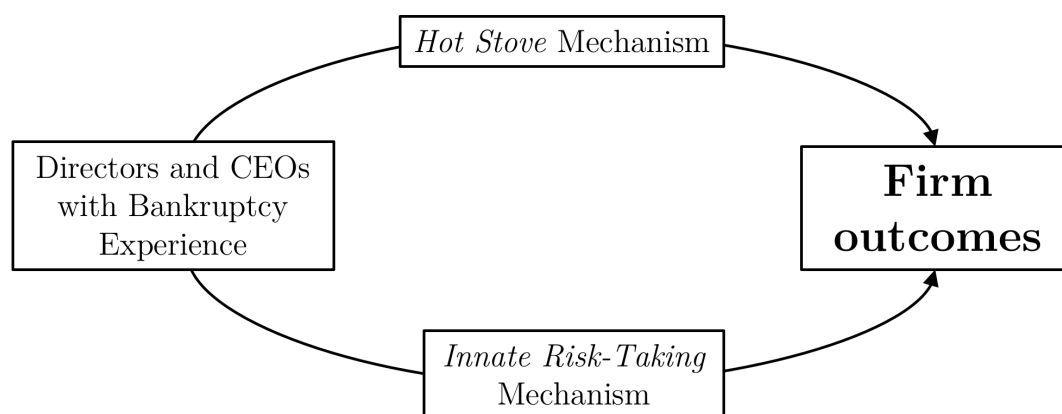
Figure 4 presents the "*Hot-Stove* mechanism" and the "*Innate Risk-Taking* mechanism", which will be used to explain the relationship between bankrutptcy experience in CEOs and directors and subsequent firms' outcomes.

2.6.1 Hot-Stove mechanism

The "*Hot-Stove* mechanism" (Denrell & March, 2001) would indicate that the experiences and learnings from past bankrupticies lead to a more conservative and educated rationale in future company involvements. The theory has been used in prior literature researching how past negative corporate events' affect future corporate decision-making (e.g. (Ivanova & Pündrich, 2017); (Dittmar & Duchin, 2016). Developed by Denrell & March (2001), the *Hot-Stove* theory explains how learnings and past experiences result in a bias against risky alternatives. They argue that this "bias against new and risky alternatives may be less properties of individuals, organizations, or cultures than of learning and of competitive selection and reproduction themselves" (Denrell & March, 2001). The authors therefore supply an alternative explanation to risk-aversion that prior

literature has defined as individual characteristics and attributes. They argue that learning from past experiences and selecting as well as reproducing prior experiences with positive outcomes is an alternative approach to explaining the phenomenon of risk-aversion. Vice versa, this implies that one will not reproduce prior action that have resulted in negative outcomes. Considering how the mechanism results in a learning effect as a result of past experiences, it will be used as a possible approach to explain how directors' risk-taking in subsequent companies diminishes when having had a bankruptcy experience.

2.6.2 Innate risk-taking mechanism

In contrast to the "*Hot-Stove* mechanism", another potential explanatory reason for the effect of past bankruptcy experience on risk-taking by board members in subsequent companies are their innate personal and psychological characteristics. We have chosen to define this as the "*Innate risk-taking* mechanism" whereby we argue that behavioral biases such as overconfidence, optimism, the illusion of control and sensation-seeking are prominent as risk-taking attributes and innate to individuals. In the prior research of section 2.3.2, these behavioural biases have been shown to lead to irrational behavior and distort individuals' risk-taking preferences, which in turn influences corporate policies.

Overconfidence and overoptimism center around erroneously evaluating one's own susceptibility to risk. Underestimating the volatility of the firm's future cash flows exemplifies an overconfident managerial trait whereas overestimating the average level of cash flows exemplifies an optimistic manager (e.g. (Kallunki & Pyykkö, 2013); (Shefrin, 2001)). Both behavioural biases have been extensively explored within the literature of psychology to understand uncertainty and judgment (Hackbarth, 2008). As individuals are strongly committed to a particular outcome and are under the belief that these outcomes are under their control, individuals are deemed as especially overconfident (Kallunki & Pyykkö, 2013). Sensation-seeking is by itself defined as "an individual's tendency to take physical, social, legal, and financial risks simply for the sake of the thrill" (e.g. Zuckerman, 1994, 1979); (Kallunki & Pyykkö, 2013)). Lastly, Kallunki & Pyykkö (2013) define the illusion of control as "overestimating the role of personal skills relative to luck in the determination of outcomes". These managerial traits argue for corporate decision-making being positively biased towards relatively more risky alternatives. With the "*Innate risk-taking* mechanism" we aim at being able to explain how, following an experience of bankruptcy, directors' and CEOs' innate behavioral biases prove to be present and also strong enough to affect their decision-making.

2.7 Hypotheses formulation

As highlighted above, we expect firms that employ what we will refer to as "Bankruptcy Experienced" (BE) directors and CEOs to have different levels of risk-taking and performance. Given that we hypothesize BE directors to experience a "*Hot-Stove* mechanism" or an "*Innate Risk-Taking* mechanism", we will develop our hypotheses in a non-directional manner. Hence, we hypothesize that BE directors will have an effect on firm outcomes, and we will interpret the direction of the effect according to either of the mechanisms developed above.

In particular, given Dittmar & Duchin's (2016) results, we hypothesize that:

Hypothesis (1): *Firms with BE directors or CEOs have a different level of risk-taking than firms with no BE directors or CEOs.*

In addition, given that higher risk-taking could also lead to higher (lower) returns, if individuals in the organization are (not) able to find optimal investment opportunities, we hypothesize that firms with BE directors or CEOs will either perform better or worse than similar companies with no BE directors or CEOs. Hence:

Hypothesis (2): *Firms with BE directors or CEOs have different performance than firms with no BE directors or CEOs.*

Lastly, given Kallunki & Pyykkö (2013) finding that firms employing individuals with personal bankruptcy experience have a higher probability of failure, we hypothesize that the effect of bankruptcy experience on directors and CEOs could be twofold, therefore:

Hypothesis (3): *Firms with BE directors and CEOs have different probability of survival in the future than firms with no BE directors and CEOs.*

3 Scientific approach

This study will use a deductive approach to test the hypotheses developed in 2.7. Following Robson's (2002) suggested approach, we recognize the presence of different stages through which our deductive study will progress. Firstly, we developed several hypotheses from theory which are testable propositions about the relationship of variables. Secondly, we will describe how the hypotheses are tested in operational terms, by laying out the model we employ and by describing how we create and measure the variables of interest. We will then test for the hypotheses that we laid down using different methodologies, starting with univariate analyses and moving on to multivariate analyses, adding robustness tests and controlling for statistical concerns. The outcome of our inquiries will then be further analyzed in section 7 and it will provide support for the hypotheses we developed early on.

A deductive approach is particularly relevant because we are trying to investigate and explain the causal relationship between different variables, such as the effect of directors' and CEOs' bankruptcy experience on the level of risk-taking, profitability and survival of a firm. A crucial part of the investigation of this causal relationship is to employ a consistent set of controls, therefore our study will use a highly structured methodology that has been previously employed in similar studies (Robson, 2002), ensuring reliability and credibility of our results. We also made sure that the final characteristic of deduction, generalization, is met: in order to be able to generalize statistically about regularities in our research question, we had to use a sample of a significant size to test our hypotheses on. Lastly, we will discuss in detail how to solve potential endogeneity problem arising in this kind of study. Following Larcker & Rusticus (2010) we will first describe the nature of the endogeneity problem, explore alternative research designs, and assess the potential impact of unobserved confounding variables using Frank's (2000) approach.

4 Data collection and sample selection

4.1 Data source

This study is based on data from Swedish Limited Liability companies (Aktiebolag) in the period 1998-2015. We gather data from the Serrano Database, a database with financial history on company level. Financial statement data is sourced from the Swedish Companies Registration Office (Bolagsverket). In addition, we obtain more general company information from Statistics Sweden (SCB), bankruptcy information from the Swedish Companies Registration Office, and group data from Bisnode's group register. The data is complemented with a dataset containing director and CEO appointments and relievement across the same sample of companies and time-frame. The Serrano Database is built on a framework that transforms and modifies the underlying register data into comparable calendar year values.

The database contains information about the group relationships during a specific calendar year, which is whether a company is independent, subsidiary or parent of a group. In the case of parent companies, Serrano Database shows financial statements for the parents after intra-group

transactions are eliminated, therefore not including consolidated group accounts. We argue for using group statements instead of parent statement as, when group accounts are available, using the parent statements would distort the financial outlook of specific groups. Hence, we complemented Serrano Database with consolidated group accounting, when available, retrieving data from the Swedish Companies Registration Office. In order to achieve consistency across the complemented data, we followed an approach similar to Serrano when dealing with shifted reporting periods and dropped companies with omissions and gaps in financial statements[8].

4.2 Sample selection and loss

The entire Serrano Database contains 10,028,214 firm-year observations, but certain exclusions had to be made to get to our final sample. We only included firms that were categorized by Serrano as "Limited liability companies (Aktiebolag)" across all of the firm-year observations between 1998 and 2015[9].

We decided to focus on *private* limited liability firms because it might represent an interesting population for such a study, given the research gap in this area. Similarly to Kallunki & Pyykkö (2013), we argue that the overall level of corporate governance and scrutiny for directors and CEOs in private firms is smaller than in public firms as they are not under the public review of investors and other stakeholders. Secondly, in private firms CEOs and directors are more likely to own parts of the firm, as "little separation of ownership and control presumably exists" (Eisenberg, et al., 1998). This leaves more room for the hypothesis that CEOs and directors are all equally involved in the decision-making process. We therefore excluded 1,070 companies that have been traded on a public market in Sweden in any of the years between 1998 and 2015[10].

Further, Serrano classifies companies according to their relationship with a group[11]. Given that subsidiaries' financials will be transferred into the consolidated group accounting of the group (represented by the parent company), we excluded all types of subsidiaries from the database. Our sample, therefore, consists only of private group companies and private individual limited liability companies.

Lastly, we decided to exclude companies that could be defined as *small companies* by the Book Keeping Act and the Annual Accounts Act (which is also based on the Fourth Council Directive 78/660/EC). They provide definitions of "small companies", that are companies not exceeding net turnover of more than 3,000,000 SEK, balance sheet total of SEK 1,500,000 and with less than 3 employees. We decide to exclude these microenterprises as we argue that these firms have an

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[8] Particular attention was devoted to financial statements with short/long accounting periods. We only included companies with full year reports and no gaps in data. Firm-year observations with a reporting period of less than one year were included only if they were the first one after the company was created, or the very last one before the company was liquidated or bankrupted, given that these events could happen at any date during the year.

[9] Bolagsveket. 2012. Organisationsnummmer.

[10] Data retrieved from Finbas, a high quality finance database, containing financial data such as daily end-of-day stock price data, corporate actions and fundamentals from the Nordic Stock Exchanges, MTF's and OTC markets.

[11] Companies are classified as (1) Independent companies, (2) Swedish Parent Companies, (3) Subsidiaries in a Swedish Group, and (4) Subsidiaries in a Foreign Group.

extremely basic governance function. We drop from our sample companies that across the observation period never reached sales of 3 million SEK, never had a balance sheet size above 1.5 million SEK and never had more than 3 employees. This approach allowed us to filter out consistently small companies, but to retain all those firm-year observations of companies that have grown overtime to a reach bigger size. As is common practice for studies in this area (Giannetti & Zhao, 2016), we also excluded firms in the financial industry, that is companies with a SNI 2007 code between 64110 and 66309 (Financial and Insurance Activities), but included firms with a 64202 code (Activities of non-financial holding companies), as some of the parents companies of groups in the dataset belong to this category. We also remove companies that have a missing industry categorization.

4.3   Data quality checks

We perform tests to make sure that the final dataset used in our test is correctly structured.[12] Through the adjustments, we obtained an unbalanced panel of data with no gaps and a with maximum of 18 observations for each firm (corresponding to yearly observations from 1998 to 2015). Moreover, all accounting variables used in the study are winsorized to the 1st and 99th percentile in order to limit the impact of extreme values in the statistical data and to reduce the effect of possibly spurious outliers.

Table 1 – Sample Size

	Firm-year observations	Number of firms	Max observations per firm
Leverage	1,055,913	97,317	17
Cash Holdings	1,055,913	97,317	17
CAPEX	1,055,913	97,317	17
ROA	1,055,913	97,317	17
ROA Volatiliy	705,374	82,153	13
Survival t+5	697,353	83,236	

Table 1 presents the number of firm-year observations, the number of firms and the maximum number of observations per firm that we obtained in our final sample. The maximum number of observations per firm is dependent on the way our measures are built. Even though our full sample contains a maximum number of 18 observations for each firm, accounting measures such as *Leverage*, *Cash Holdings*, *CAPEX* and *ROA* rely on accounting metrics from *t-1*. Moreover, *ROA Volatility* is built on 5 years rolling windows, therefore the maximum number of observations for each firm is 13. *Survival t+5* is only regressed cross-sectionally.

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[12] Numerous manual inspections of the data were continuously performed to ensure the accuracy of the indicators created. The online database Retriever Business was used, which collects copies of reports from the Swedish Companies' Registration Office (Bolagsverket).

5 Method

5.1 Measuring bankruptcy experience

We study how bankruptcy experiences throughout directors and CEO's professional lives affect subsequent corporate policies in their future appointments. To commence, in section 4 we first described the sample of companies we used to investigate the outcomes of these individuals' decision making. However, with our measure of bankruptcy experience we aim to capture a wider array of bankruptcies, for instance bankruptcy filings in smaller companies or subsidiaries of group companies. We will therefore rely on a dataset[13] of limited liability companies that have filed for bankruptcy during the period 1996-2014 to create a Bankruptcy Experience Indicator.

The dataset we use comprises of 95,921 firms that filed for bankruptcy in the period 1996-2014. For these firms, we map the structure of their boards (including directors, CEOs and chairpersons) starting from 1996 or from the date of their incorporation. We decide to exclude individuals that are appointed as "deputy board members", as they only become involved in the decision-making if ordinary members resign or are dismissed in the middle of the term.[14]

We use an approach consistent with what is used by Ivanova & Pündrich (2017) to define "Bankruptcy Experience". Our goal is to identify those individuals that have been through a bankruptcy filing or that have been part of a company in the period of distress before the same company filed for bankruptcy. The study by Dittmar and Duchin (2016) measures professional experiences of distress by looking at whether a manager was employed by a firm that experienced either one of four poor corporate outcomes (bankruptcy, bond downgrade, cash flow shocks and negative stock returns), therefore capturing a more wide array of experiences.[15] We argue that our measure captures a more narrow and precise definition of bankrutpcy.

Similar to Ivanova & Pündrich (2017), we first test a sample of bankrupt companies with at least 8 years of financial information before the year of bankruptcy in the period 1998-2015. We use an adjusted Altman Z Score model extended for firms that are not traded publicly (Altman, 2013) and calculate the Z' score for the firms in each of the years before bankruptcy. After removing outliers, our sample shows that firms show signs of financial distress on average 5 years[16] prior to bankruptcy. We are therefore able to assume that directors and CEOs involved in these companies during this period were to some extent exposed to distress.

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[13] Dataset provided by the Swedish Companies Registration Office and included in the Serrano package.

[14] Bolagsverket, 2017. Board of Directors.

[15] Dittmar and Duchin (2016) motivate their creation of four measures of poor corporate outcomes with the fact that bankruptcy in public firms is "relatively infrequent". Contrarily, in our sample of private firms we see a significant amount of bankruptcies in each of the observed years.

[16] We removed calculated Z' outliers. Removing values below the 1st and above 99th percentiles (Z'>-187.2 and Z'>44.4) resulted in an average Z' score 3.297 across the sampled years. Companies begin to show signs of being bankruptcy prone on average 4 years prior to bankruptcy, with a Z'-score of 2.47, below the 2.60 threshold for "gray zone" distress. In a more conservative approach, we use a threshold of 5 years.

After we set a BE cut-off date 5 years before bankruptcy for each firm, we mark as Bankruptcy Experienced (BE) all those directors or CEOs that have been involved in the bankrupt firm during what we consider to be the distress period. If an individual has stayed with the company up until the date of bankruptcy, then the date of bankruptcy will be taken as the starting date of their BE period. If an individual has participated in the bankrupt company during the exposure period, but left before the bankruptcy date, then the departure date will be taken as the starting date of their BE period.

Figure 5 – Creating a Bankruptcy Experience Indicator
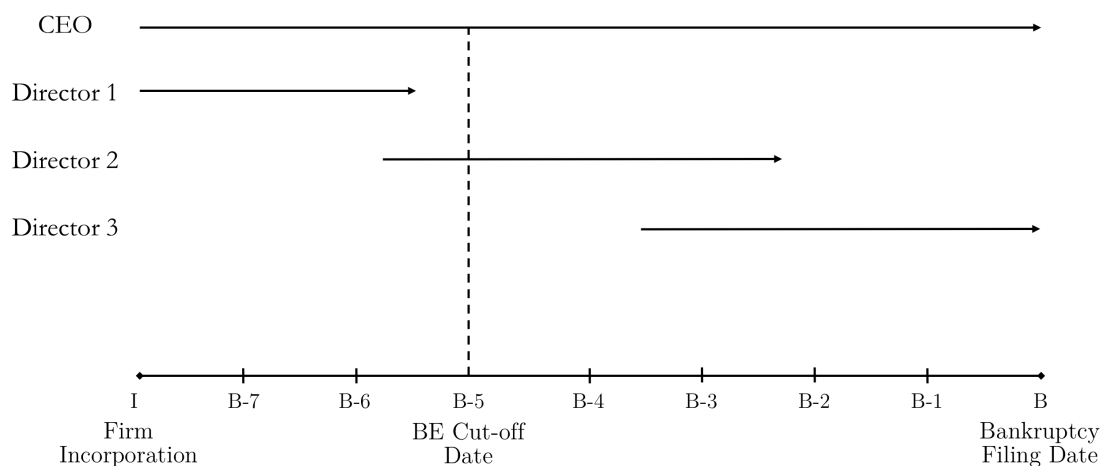
Figure 5 presents the rationale behind the creation of a Bankruptcy Experience (BE) indicator. Given a firm that filed for bankruptcy at a date B, we set the BE cut-off date at B-5 years. We map the board composition of the firm since its inception, using appointment and relievement dates. For the purpose of our analysis, we consider to be Bankruptcy Experienced all the directors and CEOs that have been involved in the firm during what we consider to be the distress period of B to B-5. In the example above, we mark *CEO*, *Director 2* and *Director 3* as BE. In particular, we assign each individual a date that marks the start of their BE period. For individuals that are in the board of the company at the date of bankruptcy filing, the date of bankruptcy marks the start of their BE period (*CEO*, *Director 3*). For individuals that are involved with the company during the period B to B-5, but leave the company before bankruptcy (*Director 2*), then their departure date coincides with the beginning of their BE period.

If an individual has had one or more bankruptcy experiences during their careers, we will consider them to be BE during the following years. The Bankruptcy Experience indicator created is also adjusted for "duplicate" effects: if a person has changed role within the board of the same company during the exposure period, the person will still be marked with a single bankruptcy experience with that company. Several checks in the data were performed to ensure the accuracy of the measure.

After marking all the individuals that have been part of the sample of firms that filed for bankruptcy and assigning them a BE date for each of the bankruptcies they have been involved with, we can proceed with merging this data with the dataset of firms described in section 4.2.

For all the companies in the final merged sample[17], we map the structure of their boards (including directors, CEOs and chairpersons) for each year starting from 1998 until 2015. In both datasets, each

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[17] The sample we use to investigate the decision making, described in section 4.

individual is identified through a randomized personal identification number[18] that allows for the matching to be done.

For each firm-year observation we are thus able to calculate the board size[19] and the number of individuals in that board that have obtained a bankruptcy experience before the beginning of that year or of that board appointment (if the board appointment is subsequent to the beginning of the year). A BE Dummy variable is then created, taking the value of 1 if at least one person in the board (comprising directors and CEOs) has a prior bankruptcy experience for that year. In addition, we also construct a BE Percentage measure, obtained by dividing the number of directors and CEO with a bankruptcy experience over the total amount of board members for a specific year.

Given that the sample used in the study only contains companies that have declared bankruptcy since January 1996, we acknowledge that there might be a time bias in the number of BE directors over time. The number of BE directors and CEOs in more recent years could in fact be higher than the number of BE directors and CEOs further back in time. We will control for this bias in our prediction models by implementing year fixed effects, as explained later on.

5.2   Corporate outcome measures

In this study we will use a set of measures for risk-taking, operational performance and survival to evaluate the effects of bankruptcy experience of directors and CEO. We will now focus on how these corporate outcomes can be captured and explained. The study will mainly rely on accounting measures as the firms in our sample are privately held and the availability of financial information is restricted.

Leverage

Leverage is a measure of riskiness of corporate financing choices. The intuition is that, given a shock to a firm's underlying business conditions, the higher the leverage, the greater the impact of the shock on the firm's net profitability, including a higher probability of default (Faccio, et al., 2016). Leverage is defined as the ratio of financial debt divided by the sum of total assets. Financial debt is measured as the sum of both short term and long term interest bearing debt. We expect the "*Hot-Stove* mechanism" to explain lower levels of leverage in firms with BE directors or CEOs, and the "*Innate Risk-Taking* mechanism" to explain higher levels of leverage in firms with BE directors or CEOs.

Cash Holdings

Cash Holdings (defined as the ratio of cash and short-term assets to the value of total assets) captures the firm's ability to meet its short-term obligations. Previous studies (Opler, et al., 1999) show consistent results with the view that management accumulates excess cash if it has the opportunity to do so, and that excess cash holdings are kept mostly for precautionary reasons.

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[18] The unique identifier is a number created by randomizing the Swedish personal identification number.

[19] Similarly to above, the measure includes only regular board members for the year, chairman and CEO.

Therefore, with this measure we aim to capture both types of behavior (*"Hot-Stove"* and *"Innate Risk-Taking"*), by looking at whether companies with a BE board hold, respectively, more or less cash in relation to the size of their balance sheets. We expect the "*Hot-Stove* mechanism" to explain higher levels of cash holdings in firms with BE directors or CEOs, and the "*Innate Risk-Taking* mechanism" to explain lower levels of cash holdings in firms with BE directors or CEOs.

CAPEX

We include a measure of Capital Expenditure following previous studies in the area by Giannetti & Zhao (2016) and by Ivanova & Pündrich (2017). Data limitations, with respect to the fact that the sample we are investigating consists of private companies, only allow us to measure Net CAPEX by calculating it as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year. To proxy for capital investments, we only take values when CAPEX is greater than zero, otherwise we manually set it to zero. We therefore expect the "*Hot-Stove* mechanism" to explain lower levels of CAPEX in firms with BE directors or CEOs, and the "*Innate Risk-Taking* mechanism" to explain higher levels of CAPEX in firms with BE directors or CEOs (consistently with Dittmar & Duchin, 2016).

ROA Volatility

ROA Volatility is the volatility of a firm's operating return on assets. We defined ROA as the ratio of operating profit or loss[20] to total assets. Consistently with studies investigating volatility of market returns for public companies, we focus on volatility of accounting returns given that all firms in our sample of data are privately held. Given that volatility of stock returns can be explained by the level of a firm's risk-taking (Giannetti & Zhao, 2016), we expect higher (lower) standard deviation of ROA to explain higher (lower) risk-taking and the riskiness of investment decision for the firm. Volatility is measured as the standard deviation of the accounting returns over a 5-year period: starting from 1998, standard deviation is measured over the next 5 years with rolling overlapping windows, meaning that the we were able to capture standard deviation of returns for each year up until 2011. We expect the "*Hot-Stove* mechanism" to explain lower levels of standard deviation of returns in firms with BE directors or CEOs, and the "*Innate Risk-Taking* mechanism" to explain higher levels of standard deviation of returns in firms with BE directors or CEOs.

ROA

We will consider Return on Assets (ROA) as our dependent variable to proxy for operational performance. In line with traditional theories, we assume a linear relationship between risk and return on capital (Modigliani & Miller, 1958). This measure will allow us to understand how more or less risk-taking in firms with a BE board leads to better or worse performance. ROA is defined

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[20] Operating Profit/loss is measured as: net sales + other operating income - production costs +/- items affecting comparability - personnel expenses - depreciation and amortization - other operating expenses.

as the ratio of operating profit or loss[21] to total assets. We therefore expect the "*Hot-Stove mechanism*" to explain lower levels of operational performance in firms with BE directors or CEOs, and the "*Innate Risk-Taking* mechanism" to explain higher levels of operational performance in firms with BE directors or CEOs.

Survival at t+5

Our last measure of risk-taking hinges on the notion that riskier firms are less likely to survive. For our analysis, we focus on creating and indicator for each firm-year observation that signals whether a company is surviving at least 5 years[22] after that specific year. For a firm to enter the study, we require at least 5 years of data since the inception of the firm. We mark as "non-surviving" only those companies that filed for bankruptcy between 2003 and 2015, therefore ignoring those firms that stop existing after dissolution, liquidation, after being acquired or after having participating in a merger. Consistently with Faccio, et al. (2016), we argue that this measure of risk-taking has the advantage of being unaffected by accounting manipulations. Again, with this measure we aim to capture whether bankruptcy experience in directors and CEO leads to higher or lower survival rates, therefore hoping to contribute to Kallunki & Pyykkö's (2013) findings. We therefore expect the "*Hot-Stove* mechanism" to explain higher survival rates in firms with BE directors or CEOs, and the "*Innate Risk-Taking* mechanism" to explain lower survival rates in firms with BE directors or CEOs.

5.3   Control variables

Although bankruptcy experience is the main variable of interest for this study, it is essential to control for other factors that may affect corporate risk-taking. As our empirical estimations assume that the unobserved factors can influence the measures described above, we rely on prior literature to identify a comprehensive list of control variables for our study, minimizing the chance that our findings are driven by time-variant omitted variable bias.

5.3.1   *Board characteristics*

We control for board size as decisions made by a large board can lead to compromises and, as a result, less extreme decisions and less risky outcomes (Cheng, 2008), consistently with recent studies by Ahmed & Duellman (2013), De Maere, et al. (2014), Darra, et al. (2016). The number of seats in the board used include those of regular directors and CEOs, and exclude deputy board seats. Again, we decide to exclude individuals that are appointed as "deputy board members", as they only become involved in the decision-making if ordinary members resign or are dismissed in the middle of the term.[23]

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[21] As above.

[22] Consistent to how we defined our Bankruptcy Experience Indicator, we believe that using a 5 years interval provides an horizon of time large enough for a company to enter into financial distress.

[23] Bolagsverket. 2012. Board of Directors.

We also control for Chairman-CEO separation, as the separation of the roles of Board Chair and CEO has been shown to enhance a firm's ability to provide resources such as advice and counsel and improve the monitoring role of the board. De Maere, et al. (2014) find that firms with boards led by an independent chairman are less likely to become bankrupt.

We control for the number of directorships held by the directors of the firm for each specific year. There are competing views about the relation between additional directorships held by directors and monitoring effectiveness. Most results are in line with Fama & Jensen's (1983) idea that a higher number of outside directorships held by directors result in greater monitoring expertise, as directors will learn and adapt monitoring techniques from other boards and look to establish a reputation as an excellent director. We measure this variable by calculating the total number of directorships held by the members of the board for a specific year and divide it by the size of the board.

Another control used is gender diversity in the board, measured as the percentage of female directors and CEOs over the total amount of board seats. Research by Adams & Ferreira (2009) suggests that gender-diverse boards allocate more effort to monitoring, therefore reducing corporate risk-taking and bankruptcy risk if compared to less gender-diverse boards (e.g. Darrat, et al., 2016).[24]

Additionally, we control for the CEO gender, as previous studies (such as Faccio, et al., 2016) have shown that firms run by female CEOs have lower leverage, less volatile earnings, and a higher chance of survival than otherwise similar firms run by male CEOs.

5.3.2 Firm characteristics

Consistently with other studies in this research area, we control for a number of variables that have been used in previous research.

We control for the complexity and life stage of the firm using firm size, measured as the logarithm of the book value of total assets[25] (e.g. (Faccio, et al., 2016); (Ivanova & Pündrich, 2017)) and firm age, measured as the natural logarithm of (1 + the number of years since incorporation of the firm) (e.g. (Sila, et al., 2016); (De Maere, et al., 2014); (Giannetti & Zhao, 2016)). Normally, the bigger and the older a company is, the more stable and less risk-taking it is. We therefore expect a negative relationship between these controls and the risk-taking measures considered.

Given that firms with larger investment opportunities and options for growth may take more risk Guay (1999), we use sales growth as a proxy for this and as a control for risk-taking (Sila, et al.,

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[24] Previous studies have also shown the impact of age of directors as a control variable when investigating firm outcomes (Giannetti & Zhao, 2016). However, we decide not to include this variable as we argue that averaging the age of the whole board would be useful in capturing the effect of age on risk-taking. Previous studies used as a benchmark (e.g. (Faccio, et al., 2016); (De Maere, et al., 2014)) also do not include this control.

[25] Additional proxies for size, such as number of employees and sales, have been tested. Due to their high and significant correlation with the total assets measure, these variable have been excluded.

2016). The variable measures the percentage growth in sales from *[t-1]* to *[t]*. We expect sales growth to be positively correlated to risk-taking measures.

Similarly to Faccio, et al. (2016), we control for tangibility, calculated as the ratio of fixed assets to total assets. We add a working capital ratio, measured as working capital divided by total assets, to control for liquidity and proxy for corporate discontinuance (Altman, 1968).

Lastly, we will not control for Industry as we believe that the implementation of firm fixed effects will wipe-out all dummy variables that are time-invariant (Plümper, et al., 2007). We will, however, use an industry classification[26] to implement a Propensity Score Matching mechanism in the dataset.

As described in 4.3, variables with continuous measures are winsorized at the 1st and 99th percentiles to avoid possible influences of outliers. A summary of the variable descriptions can be found in the Appendix (Table 8).

5.4 Model for measuring the effect of bankruptcy experience on firm outcomes

With the different measures of risk-taking, performance and survival that we have decided to investigate, we now build a model that will allow us to establish the relationship between bankruptcy experience in directors and CEO on firms' outcomes.

We create three different models to analyze the relationships between the independent and dependent variables.

$$\text{Risk-Taking} = \beta_0 + \beta_1 \text{ BE Percentage} + \text{Controls} + \text{Firm FE} + \text{Year FE} + \varepsilon, \text{Robust SE} \quad (1)$$

Model (1) uses the power of multiple explanatory variables in a Panel Regression with Fixed Effects. *Risk-Taking* is the dependent variable[27], *BE Percentage* is the independent variable, β_1 is the coefficient for that independent variable, ε is the error term. In this model we employ firm and year fixed effects and robust standard errors with clustering at firm level.

$$\text{Performance} = \beta_0 + \beta_1 \text{ BE Percentage} + \text{Controls} + \text{Firm FE} + \text{Year FE} + \varepsilon, \text{Robust SE} \quad (2)$$

Similarly to (1), Model (2) uses the power of multiple explanatory variables in a Panel Regression with Fixed Effects. *Performance* is the dependent variable[28], *BE Percentage* is the independent

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[26] Serrano provides us with an industry grouping according to 12 categories: Energy & Environment, Materials, Industrial Goods, Construction Industry, Shopping Goods, Convenience Goods, Health & Education, Finance & Real Estate, IT & Electronics, Telecom & Media, Corporate Services, and Other. Firms with no SNI07 industry classification were dropped from the sample.

[27] Proxied for by the variables *Leverage*, *Cash Holdings*, *CAPEX*, and *ROA Volatility*.

[28] Proxied for by the variable *ROA*.

variable, β_1 is the coefficient for that independent variable, ε is the error term. In this model we employ firm and year fixed effects and robust standard errors with clustering at firm level.

$$\text{Survival t+5} = \beta_0 + \beta_1 \text{ BE Percentage} + \text{Controls} + \text{Firm FE} + \text{Year FE} + \varepsilon, \text{Robust SE} \qquad (3)$$

Model (3) is a cross-sectional logit regression where *Survival t+5* is the dependent variable, *BE Percentage* is the independent variable, β_1 is the coefficient for that independent variable, ε is the error term. In this model we employ firm and year fixed effects and robust standard errors with clustering at firm level.

5.4.1 Statistical concerns

Our dataset is constructed as a panel of data (also known as cross-sectional time-series), which therefore allows us to observe the behaviour of companies over time while controlling for the variables we cannot observe or the measures that constitute individual heterogeneity.

Heteroscedasticity

We recall that OLS regressions require the variance of the error terms to be constant (homoskedasticity). If the error terms do not have constant variance, they are said to be heteroskedastic, which can be the case in a panel of data like the one we are using (Mehmetoglu & Jakobsen, 2016). We therefore run a Breusch-Pagan test to detect any form of heteroskedasticity, and we find presence of it[29]. To correct for this, we will use robust standard error estimation, relaxing the OLS assumption that standard errors need to be both independent and identically distributed. The use of this technique will not change the estimated coefficients, but will improve the accuracy of our p-values, given the change in the standard error estimation.

We also run a Hausman test to check whether a random effects or a fixed effects model is preferable to deal with our panel. Given that the unique errors are not correlated with the regressor[30], we decide to use a Fixed Effects (F.E.) model and to implement both entity (each individual firm) and time (measured by years) fixed effects. F.E. remove the effects of these time-invariant characteristics, so we can better assess the net effect of the predictors on the outcome variables (Mehmetoglu & Jakobsen, 2016).

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[29] In the Breusch-Pagan test, the null hypothesis is that the error variances are all equal, against the alternative that error variances are a function of one or more variables. Results of this test are shown in the appendix.

[30] In the Hausman test, the null hypothesis is that the preferred model is random effects, against the alternative of a fixed effects model. It tests whether the unique errors are correlated with the regressors or not (H_0). Results from this tests on our data show that we should reject the null hypothesis, and thus the need to use a fixed effects model. The results of the test are reported in the Appendix.

Causality concerns

It appears from previous studies in this area that the phenomenon we are trying to capture here is not exempt from endogeneity problems, as is usually the case in observational data, where the outcome and the explanatory variable are simultaneously determined (Larcker & Rusticus, 2010).

In fact, the association between risk taking and bankruptcy experience in directors might be driven by exogenous factors that affect both variables or one of them. For example, firms that already embed a higher risk factor might be more attractive for individuals that have already experienced bankruptcy in their past. It also seems natural to assume that firms that are experiencing distress will then only be able to attract individuals with a less-than-perfect track record. This is likely to cause a positive relationship between our independent and our dependent variable, and we refer to this problem as "selection-bias".

We will borrow theories from experimental studies on how to build treatment and control groups (Rosenbaum & Rubin, 1983) to mitigate this issue of non-random selection. We will use a Propensity Score Matching model to deal with the fact that we might have a confounding effect (i.e., an exogenous variable) that can be the cause of higher or lower risk-taking in firms, rather than directors and CEOs being bankruptcy experienced. Similarly to Faccio, et al. (2006), by using propensity scores we match our treatment sample (firms with a BE board) with a similar control sample (firms with no BE board), therefore mitigating the concerns related to non-random selection and be able to explain risk-taking as a consequence of whether the board is BE or not. In fact, Stuart (2010) argues that for efficient causal inference and good estimation of the unobserved potential outcomes, we need to compare treated and control groups that are as similar as possible. We will show the results of this matching method in section 6.3.2.

DiPrete & Gangl (2004) find that the propensity score matching method is effective because it treats all variables other than the treatment variable (BE board) as potentially confounding, therefore eliminating - or rather reducing - the possibility of bias from these variables. However, they claim that this method still presents limitations given that it requires that the assignment to treatment is unrelated to exogenous variables that affect the outcome variable. They suggest to use instrumental variables estimators (IV) to ultimately deal with the problem of endogeneity bias.

Given that we already included a comprehensive set of controls in our study and we incorporated fixed effects to mitigate the endogeneity problem, the IV estimation seems to be the last resort option to determine a causal relationship between our dependent and independent variables. However, Larcker & Rusticus (2010) suggest that in empirical accounting research the use of IV methods can lead to producing highly misleading parameter estimates and inferential tests. In fact, they claim that in most cases IV estimation is even less reliable than OLS.

Previous studies in this area have been using an array of instruments to proxy for the independent variable. In particular, research in the area of gender diversity on the board have used familiarity and connectedness of directors as instruments (e.g. (Sila, et al., 2016); (Faccio, et al., 2016)), nonetheless casting doubts on whether these instruments are truly exogenous and are able to explain a reasonable portion of the variation in the endogenous variable.

The absence of literature in the investigation of what motivates companies to attract and hire bankruptcy experience directors and CEOs make the identification of acceptable IV particularly difficult. The process also becomes increasingly difficult as we use a wide array of controls already explored in previous studies in the area. We will therefore follow Larcker & Rusticus' (2010) suggestion to assess how large the endogeneity problem has to be to change the results we get from our fixed effects regressions. Using the approach described in Frank (2000), in section 6.3.3 we will examine the potential impact of unobserved confounding variables, deriving the minimum correlations necessary to turn a significant result into a borderline insignificant result. This Impact Threshold for a Confounding Variable (ITCV) method will allow us to make inferences about the suspected endogeneity in our models.

6 Results

This study investigates the relationship between bankruptcy experience in directors and CEOs and its effect on firm risk-taking, operational performance and survival. In order to provide relevant insights into the firms included in the sample, this section starts by presenting descriptive statistics. Thereafter, the regression results are reported.

6.1 Descriptive statistics

The descriptive statistics are presented in two sections. First, all firm-related variables presented in section 5 are described, followed by the results from Pearson's correlation test.

6.1.1 Variable descriptives

Table 2 presents descriptive statistics for the variables included in the regression model, after all accounting variables used in the study are winsorized to the 1st and 99th percentile in order to limit the impact of extreme values in the statistical data and to reduce the effect of possibly spurious outliers.

Table 2 – Descriptive Statistics

	Mean	Median	St. Dev.	Min	Max
Leverage	0.2067	0.0935	0.2516	0.0000	0.9785
Cash Holdings	0.2387	0.1518	0.2509	0.0000	0.9829
CAPEX	0.0160	0.0000	0.0566	0.0000	0.3697
ROA	0.0643	0.0616	0.1839	-0.7911	0.5899
ROA Volatility	12.2466	7.4310	17.0446	0.3088	125.5413
Board Size	1.7966	1.2200	1.3093	1.0000	8.0000
CEO Duality	0.0396	0.0000	0.1950	0.0000	1.0000
Female CEO	0.0330	0.0000	0.1788	0.0000	1.0000
Female Percentage	0.1472	0.0000	0.3032	0.0000	1.0000
Avg. Number of Directorships	2.3494	1.3333	2.2948	1.0000	10.0000
Sales Growth	0.2486	0.0397	1.2183	-1.0000	9.5963
Size	7.9040	7.8288	1.3007	4.4773	11.7177
Age	2.4190	2.5649	0.9135	0.0000	4.0770
Net Working Capital	0.0843	0.0666	0.3448	-0.9982	0.9999
Tangibility	0.3249	0.2396	0.2907	0.0000	0.9824

Table 2 presents descriptive statistics for the variables employed in the study, in the full sample. *Leverage* is measured as the ratio of financial debt divided by the sum of total assets, *Cash Holdings* is measured as the ratio of cash and short-term assets to the value of total assets, *CAPEX* is measured as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year, *ROA* is measured as the ratio of operating profit or loss to total assets, *ROA Volatility* is the standard deviation of ROA over the next 5 years, *Board Size* is the sum of directors and CEO, *CEO Duality* is a dummy variable taking value of 1 if the CEO is the same person as the Chairman of the Board, *Female CEO* is a dummy taking the value of 1 if the CEO is female, *Female Percentage* is the percentage of female among the board and CEO, *Avg. No. of Directorships* is the average number of board appointments for the directors and CEO, *Sales Growth* is the growth in sales from the year before, *Size* is the logarithm of the balance sheet of the firm, *Age* is the age of the firm since incorporation, *Net Working Capital* is the ratio of working capital (measured as current assets - current liabilities) divided by total assets, and *Tangibility* is the ratio of fixed assets to total assets.

6.1.2 Pearson's correlations

The correlation of variables included in the regression model is tested using Pearson's correlation test. Table 11 in the Appendix shows that the correlations between variables are small. Not surprisingly, the highest correlation is -0.47 between the dependent variables *Leverage* and *Cash Holdings*. An interpretation of this is that as the amount of financing through interest bearing debt increases for a firm, the amount of cash held diminishes (Ozkan & Ozkan, 2004). However, the majority of the independent variables do not display a correlation statistic exceeding the range (-0.1, 0.1). Thus, collinearity does not appear to be an issue. We additionally run Variance Inflation

Factor (VIF) analyses[31], as is common practice even in panels of data (Baltagi, 2008). Average VIF values below 2 confirm that collinearity is not present.

6.2 Univariate results

Table 3 – Univariate Tests

	Number of observations	Mean	Difference	P-value of difference
Leverage (BE=0)	870,949	0.203801	-0.01904***	0.0000
Leverage (BE=1)	184,964	0.222843		
Cash Holdings (BE=0)	870,949	0.242716	0.02690***	0.0000
Cash Holdings (BE=1)	184,964	0.215819		
CAPEX (BE=0)	870,949	0.016088	0.00064***	0.0000
CAPEX (BE=1)	184,964	0.015445		
ROA (BE=0)	870,949	0.069383	0.03188***	0.0000
ROA (BE=1)	184,964	0.037503		
ROA Volatility (BE=0)	591,762	11.745940	-0.03697***	0.0000
ROA Volatility (BE=1)	113,612	15.442500		
Survival t+5 (BE=0)		0.953816	0.17768***	0.0000
Survival t+5 (BE=1)		0.776136		

Table 3 presents univariate results. We divide the sample in two groups, with BE=0 grouping observations where there is no director or CEO with previous bankruptcy experience, and BE=1 grouping observations where at least one director or CEO in the firm has a bankruptcy experience. We compare the levels of *Leverage*, *Cash Holdings*, *CAPEX*, *ROA*, *ROA Volatility,* and *Survival t+5* across the two groups. *Leverage* is measured as the ratio of financial debt divided by the sum of total assets, *Cash Holdings* is measured as the ratio of cash and short-term assets to the value of total assets, *ROA* is measured as the ratio of operating profit or loss to total assets, *CAPEX* is measured as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year, *ROA Volatility* is the standard deviation of ROA over the next 5 years, *Survival t+5* captures whether a company survives the next 5 years. *Survival t+5* is only computed cross-sectionally. The notation *, **, *** represent significance at the 10%, 5% and 1% respectively.

Table 3 reports the results of the mean difference in outcomes between firms with a BE board (where at least one person among directors and CEO has a bankruptcy experience) and firms with no BE director or CEO. Results show that across all the dependent variables that we chose to analyze, the mean is statistically different in the two groups. More specifically, results show that firms with at least one BE director or CEO have higher leverage, hold less cash, have a lower level of CAPEX, exhibit lower profitability, have a higher deviation of returns and are less likely to survive over the next 5 years. Our univariate analysis suggests therefore that firms with bankruptcy experienced directors and CEO have a higher tendency towards risk-taking, providing partial evidence for the existence of a "Innate Risk-Taking mechanism". However, to confirm that the

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[31] Results of the VIF Analysis are reported in the Appendix.

differences in risk-taking are actually related to the BE in directors and CEO and not dependent on other factors, a regression analysis is conducted. The results are presented in the subsequent section.

6.3 Multivariate results

The regression analyses presented here further investigate the relationship between BE and other firm specific factors and controls.

6.3.1 Panel fixed effects

In this first multivariate regression, we aim to predict the significance of having directors and CEO with a bankruptcy experience on the board on the outcomes for a firm. Table 4 shows the results of the six regressions we run.

We run five different fixed effects regressions, with robust clustering of standard errors at firm level. We implement fixed effects with respect to each firm and year[32]. Results show a statistically significant relationship between the dependent variables that proxy for risk-taking, performance and survival, and our BE independent variable, confirming the results we have observed in the univariate tests. In particular, we see that the variable that measures BE percentage in the board is positively correlated with leverage levels in the firm, negatively correlated with the levels of cash as a percentage of assets, negatively correlated with capital expenditure and negatively correlated with profitability. Only ROA volatility, used as a proxy of performance volatility, does not seem to be significantly correlated to BE percentage (p-value of 0.353).

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[32] Year F.E. are implemented by manually adding dummies for each year in the sample.

Table 4 – Fixed Effects Regression on Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Leverage	Cash Holdings	CAPEX	ROA	ROA Volatility	Survival t+5
BE Percentage	0.01762***	-0.02441***	-0.00338***	-0.00977***	-0.26708	-0.00561***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.353]	[0.000]
Board Size	-0.00078*	-0.00402***	0.00048***	-0.00980***	0.11652***	0.00046*
	[0.061]	[0.000]	[0.000]	[0.000]	[0.009]	[0.099]
CEO Duality	0.00375	-0.00275	-0.00050	0.00470**	0.27628	-0.00213
	[0.109]	[0.177]	[0.340]	[0.020]	[0.256]	[0.190]
Female CEO	0.00225	-0.00237	0.00228**	0.00239	-0.19522	-0.00340
	[0.503]	[0.367]	[0.004]	[0.452]	[0.631]	[0.167]
Female Percentage	-0.00480*	0.01587***	-0.00200***	-0.00847***	-0.07826	0.00328*
	[0.084]	[0.000]	[0.001]	[0.000]	[0.809]	[0.065]
Avg. No. of Directorships	-0.00108***	0.00018	-0.00208***			0.00003
	[0.000]	[0.406]	[0.000]			[0.845]
Leverage		-0.08907***	0.02954***	-0.15509***	5.82716***	-0.01384***
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cash Holdings	-0.10810***		0.01209***	0.16140***	-4.41797***	0.02511***
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
ROA	-0.11201***	0.09592***	0.00809***		-7.91707***	0.00061
	[0.000]	[0.000]	[0.000]		[0.000]	[0.577]
Sales Growth	0.00210***	-0.00435***	0.00393***	0.01605***	-0.18859***	-0.00047***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
Sizer	0.02184***	-0.00378***	0.00459***	0.06263***	-2.59092***	0.00119***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
Age	-0.02279***	-0.03182***	0.00145***	-0.01627***	0.58558***	-0.01458***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
CAPEX	0.18035***	0.06082***		0.07261***	-2.74762***	-0.00921***
	[0.000]	[0.000]		[0.000]	[0.000]	[0.000]
Net Working Capital	0.01265***	-0.10848***	-0.00043***	0.02171***	-2.37979***	0.00466***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Tangibility	0.27082***	-0.45415***	0.05817***	-0.03436***	-7.95000***	0.02091***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Lagged Survival at t-1						0.69952***
						[0.000]
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.2003	0.4000	0.0559	0.1124	0.0541	0.5188
No. of Observations	1,055,915	1,055,915	1,055,915	1,055,915	705,374	
No. of Firms	97,319	97,319	97,319	97,319	82,153	82,153

Table 4 presents multivariate results. In Regression (1) the dependent variable is *Leverage*, defined as the ratio of financial debt divided by the sum of total assets. In Regression (2) the dependent variable is *Cash Holdings*, measured as the ratio of cash and short-term assets to the value of total assets. In Regression (3) the dependent variable is *CAPEX*, measured as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year. In Regression (4) the dependent variable is *ROA*, measured as the ratio of operating profit or loss to total assets. In Regression (5) the dependent variable is *ROA Volatility,* the standard deviation of ROA over the next 5 years. In Regression (6) the dependent variable is *Survival t+5*, that captures whether a company survives the next 5 years. Regressions (1) to (5) are run for the whole panel of observations, with firm and year fixed effects. Regression (6) is a logit analysis and can only be run cross-sectionally. P-values, adjusted for heteroscedasticity and clustering at firm level (in the panel regressions) are reported in brackets below the coefficients. The notation *, **, *** represent significance at the 10%, 5% and 1% respectively.

Regression (6) differs slightly from the others as the variable "Survival at t+5" can only be analyzed cross-sectionally. We therefore implement a cross-sectional logit regression with fixed effects and standard error clustered at firm level. Consistently with the univariate results, we see that the probability of survival after 5 years is negatively correlated with the percentage of BE individuals in the board (p-value of 0.000). Again, we find proof of the "Innate Risk-Taking mechanism", meaning that firms run by individuals with a bankruptcy experience seem to have higher level of risk-taking (as proxied by higher leverage, lower cash holdings, and lower probability of survival) and lower profitability. We also find significance in showing how firms with a BE board tend to have lower level of CAPEX, a result that might seem counterintuitive. However, we argue that given the results obtained in regressions (1)-(4), the finding is consistent. In fact, given that firms with a BE board seem to take on higher risk and perform worse, we believe that these individuals are less able to find and exploit investment opportunities, therefore leading to decreased levels of capital spending.[33] In order to be able to better attribute the higher level of risk-taking, lower performance and decreased survival rates to these BE individuals governing the firms in our study, we need to revise our models to correct for selection-bias and causality concerns, as explained in section 5.4.

6.3.2 Propensity score matching

As described in 5.4.1, we employ a Propensity Score Matching (PSM) mechanism to mitigate concerns related to non-random selection. We follow Stuart (2010)[34] implementation of this methodology. We first match a control sample with a treatment sample by matching observations of firms that, during the same year and in the same industry, have similar level of profitability, have a similar balance sheet size, and have similar age[35] using a Coarsened Exact Matching method (Blackwell, et al., 2010). We then further apply a propensity score matching method on this restricted sample, in order to "force the other matching methods to only match in the region of common support" (Blackwell, et al., 2010).

PSM Univariate

Similarly to 6.2, we run univariate test on the matched sample of companies. With a number of firm-year observations reduced to 265,020, we find that results are consistent with the previous

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[33] A first interpretation of this results could provide support for what we define to be a "*Hot-Stove* mechanism". Consistent with Dittmar & Duchin (2016), we can illustrate that the reduced level of CAPEX is a result of a learning process, which cause a bias against risky alternatives in directors and CEOs. A second interpretation that is consistent with the "Innate Risk-Taking mechanism" is that, while these individuals possess the behavioral traits as exemplified earlier, these traits results in distortions in their abilities to evaluate good investment opportunities. Alternatively to the above, we could attribute these results to the way in which the variable is constructed. Given that the sample of private firms are not required to report a cash flow statement, our measure of CAPEX might not capture disposal patterns accurately, therefore biasing the results.

[34] Stuart (2010) suggests a 4-step process when performing matching methods: (1) Defining "closeness": the distance measure used to determine whether an individual is a good match for another. (2) Implementing a matching method, given that measure of closeness. (3) Assessing the quality of the resulting matched samples. (4) Analysis of the outcome and estimation of the treatment effect.

[35] We require exact matching in observations for the year and industry variables. For the remaining variables (*ROA*, *Size*, *Age*) we match observations belonging to the same decile.

test. Firms with at least one BE director or CEO have higher leverage, hold less cash, have a lower level of CAPEX, exhibit lower profitability[36], have a higher deviation of returns and are less likely to survive over the next 5 years. All the differences between the two groups are significant with a p-value of less than 0.001. These univariate results on the matched sample therefore confirm that the differences in outcomes are not due to observable differences in firm characteristics, and help us in making causal inferences on our hypotheses as if we were looking at a randomized experiment.

Table 5 – Univariate Tests on PSM sample

	Number of observations	Mean	Difference	P-value of difference
Leverage (BE=0)	161,477	0.215669	-0.00339***	0.0003
Leverage (BE=1)		0.2190081		
Cash Holdings (BE=0)	161,477	0.246277	0.03336***	0.0000
Cash Holdings (BE=1)		0.212916		
CAPEX (BE=0)	161,477	0.017082	0.00146***	0.0000
CAPEX (BE=1)		0.015624		
ROA (BE=0)	161,477	0.055023	0.00333***	0.0000
ROA (BE=1)		0.051689		
ROA Volatility (BE=0)	96,601	12.90977	-1.65951***	0.0000
ROA Volatility (BE=1)		14.56928		
Survival t+5 (BE=0)	100,272	0.947039	0.07289***	0.0000
Survival t+5 (BE=1)		0.874202		

Table 5 presents univariate results on the **propensity score matched** sample. We divide the sample in two groups, with BE=0 grouping observations where there is no director or CEO with previous bankruptcy experience, and BE=1 grouping observations where at least one director or CEO in the firm has a bankruptcy experience. We compare the levels of *Leverage*, *Cash Holdings*, *CAPEX*, *ROA*, *ROA Volatility*, and *Survival t+5* across the two groups. *Leverage* is measured as the ratio of financial debt divided by the sum of total assets, *Cash Holdings* is measured as the ratio of cash and short-term assets to the value of total assets, *ROA* is measured as the ratio of operating profit or loss to total assets, *CAPEX* is measured as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year, *ROA Volatility* is the standard deviation of ROA over the next 5 years x100, *Survival t+5* captures whether a company survives the next 5 years. The notation *, **, *** represent significance at the 10%, 5% and 1% respectively.

[36] Results from *ROA* univariate analysis should be interpreted with caution. We used *ROA* as one of the matching variables (section 6.3.2) as we needed to match companies based on their level of profitability. Blackwell, et al. (2010) instead argue that one should avoid including in the matching process the variables that may have been affected by the treatment of interest. We will therefore ignore the results from the multivariate analysis on *ROA*.

PSM Multivariate

As a second analysis of our matching technique, we run multivariate tests on the matched sample of companies. Results are shown in table 6 below. Regressions (1), (2), (3) confirm our full-sample multivariate results and show significance on our independent variable of interest. We also lose significance in regression (5). Results from regression (4) should be interpreted with caution, given that we used *ROA* to perform the matching techniques even though previous studies argue that one should avoid including in the matching process the variables that may have been affected by the treatment of interest (Blackwell, 2010). Therefore we decide to ignore the result for regression (4).

This results confirm the idea that differences in risk-taking, performance and survival are not due to observable differences in firm characteristics, and provide us with some evidence to rule out reverse causality concerns from the models investigated.

6.3.3 Impact Threshold for a Confounding Variable

The absence of literature in the investigation of what motivates companies to attract and hire bankruptcy experience directors and CEOs make the identification of acceptable Instrumental Variables (IV) particularly difficult. The process becomes increasingly difficult also because we already use a comprehensive set of controls widely explored in previous studies in the area. We will therefore follow Larcker & Rusticus' (2010) suggestion to assess how large the endogeneity problem has to be to change the results we get from our fixed effects regressions. Using the approach described by Frank (2000), we derive the "minimum correlations necessary to turn significant results into borderline insignificant results".

The model is based on the fact that, in order to impact the results we have found, an unobserved variable needs to be correlated with both the dependent and independent variable, controlling for other variables. Frank (2000) defines the Impact Threshold for a Confounding Variable (ITCV) as "the lowest product of the partial correlations between the dependent variable and the unmodeled variable and the partial correlation between the endogenous independent variable and the unmodeled variable that makes the coefficient statistically insignificant" (Larcker & Rusticus, 2010). If the impact of the threshold is high, the results from our regressions are robust to concerns about the omitted variable. We will calculate the ITCV for each of the endogenous independent variables, and we will take into account the impact of the inclusion of each control variable on the coefficient of the endogenous independent variable.[37] Results are shown in table 7.

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[37] The impact of each control variable is the product of the partial correlation between the endogenous independent variable and the control variable and the correlation between the dependent variable and the control variable, taking out partially the effects of other control variables.

Table 6 – Fixed Effects Regression on the PSM sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Leverage	Cash Holdings	CAPEX	ROA	ROA Volatility	Survival t+5
BE Dummy	0.00226***	-0.01406***	-0.00323***	0.01519***	-0.09256	-0.00445**
	[0.006]	[0.000]	[0.000]	[0.000]	[0.700]	[0.025]
Board Size	-0.00201***	-0.00298***	0.00020	-0.01052***	0.20521**	0.00030
	[0.002]	[0.000]	[0.276]	[0.000]	[0.016]	[0.614]
CEO Duality	0.00882**	0.00048	-0.00085	0.00343	0.26775	-0.00175
	[0.018]	[0.881]	[0.392]	[0.338]	[0.502]	[0.604]
Female CEO	-0.00209	-0.00176	0.00232	0.00711	0.62328	-0.00362
	[0.666]	[0.686]	[0.102]	[0.135]	[0.296]	[0.495]
Female Percentage	-0.00723	0.01419***	-0.00204*	-0.00558	0.29511	0.00179
	[0.136]	[0.001]	[0.090]	[0.278]	[0.662]	[0.704]
Avg. No. of Directorships	-0.00032	0.00084***	-0.00204***			0.00030
	[0.373]	[0.005]	[0.000]			[0.332]
Leverage		-0.08836***	0.02446***	-0.15344***	6.08773***	-0.01570***
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Cash Holdings	-0.11524***		0.01120***	0.17346***	-5.77050***	0.02490***
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
ROA	-0.10075***	0.08749***	0.00496***	0.01316***	-8.19705***	0.00363
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.171]
Sales Growth	0.00133***	-0.00233***	0.00365***		-0.18408***	-0.00058*
	[0.000]	[0.000]	[0.000]		[0.000]	[0.070]
Size	0.01954***	-0.00312***	0.00494***	0.05670***	-2.32382***	-0.00047
	[0.000]	[0.003]	[0.000]	[0.000]	[0.000]	[0.572]
Age	-0.00766***	-0.02494***	0.00557***	-0.01435***	1.50446***	-0.01761***
	[0.002]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
CAPEX	0.15737***	0.05546***		0.05429***	-3.30802***	-0.00282
	[0.000]	[0.000]		[0.000]	[0.000]	[0.650]
Net Working Capital	0.00807***	-0.09904***	-0.00050**	0.02392***	-2.65182***	0.00420***
	[0.000]	[0.000]	[0.014]	[0.000]	[0.000]	[0.000]
Tangibility	0.25673***	-0.41788***	0.05443***	-0.02837***	-8.70181***	0.02580***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Lagged Survival at t-1						0.66004***
						[0.000]
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.1801	0.3666	0.0535	0.0978	0.0538	0.5057
No. of Observations	265,020	265,020	265,020	265,020	158,132	
No. of Firms	78,539	78,539	78,539	78,539	58,796	58,796

Table 6 presents multivariate results on the **propensity score matched** sample. In Regression (1) the dependent variable is *Leverage*, defined as the ratio of financial debt divided by the sum of total assets. In Regression (2) the dependent variable is *Cash Holdings*, measured as the ratio of cash and short-term assets to the value of total assets. In Regression (3) the dependent variable is *CAPEX*, measured as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year. In Regression (4) the dependent variable is *ROA*, measured as the ratio of operating profit or loss to total assets. In Regression (5) the dependent variable is *ROA Volatility*, the standard deviation of ROA over the next 5 years. In Regression (6) the dependent variable is *Survival t+5*, that captures whether a company survives the next 5 years. Regressions (1) to (5) are run for the whole panel of observations, with firm and year fixed effects. Regression (6) is a logit analysis and can only be run cross-sectionally. P-values, adjusted for heteroscedasticity and clustering at firm level (in the panel regressions) are reported in brackets below the coefficients.

The notation *, **, *** represent significance at the 10%, 5% and 1% respectively.

Table 7 – ITCV Analysis

	(1)	(2)	(3)	(4)
Leverage	Coefficient	t-Statistic	ITCV	Impact
BE Percentage	0.002431	7.25	-0.0267	
Cash Holdings	-0.108098	-41.66		0.0148
Tangibility	0.270816	91.37		-0.0131
Avg. No. of Directorships	-0.0010799	-4.40		-0.0092
Age	-0.0227922	-16.72		0.0029
ROA	-0.1120074	-61.73		0.0025
Cash Holdings				
BE Percentage	-0.0244129	-12.55	-0.0931	
Tangibility	-0.4541533	-204.55		-0.0110
ROA	0.0959208	62.36		-0.0175
Net Working Capital	-0.1084829	-140.71		-0.0114
Leverage	-0.0890735	-43.01		-0.008
Age	-0.0318247	-27.55		-0.0036
CAPEX				
BE Percentage	-0.0033806	-6.22	-0.0579	
Avg. No. of Directorships	-0.0020844	-32.17		-0.0117
Tangibility	0.0581729	101.29		-0.0043
Sales Growth	0.0039273	44.58		-0.0036
Cash Holdings	0.0120903	29.78		-0.0021
Size	0.0045921	38.5		-0.0009
ROA				
BE Percentage	-0.0097745	-7.21	-0.0103	
Board Size	-0.009798	-24.4		-0.0160
Cash Holdings	0.1614021	61.61		-0.0089
Sales Growth	0.0160464	68.82		0.0087
Size	0.062631	94.59		0.0071
Age	-0.0162685	-13.79		0.0066
ROA Volatility				
BE Percentage	-0.2670766	-0.93	0.0276	
ROA	-7.917070	-32.75		0.0090
Size	-2.590916	-30.34		-0.0085
Net Working Capital	-2.379785	-24.36		0.0075
Tangibility	-7.950004	-27.35		0.0039
Cash Holdings	-4.417974	-16.64		0.0016

Table 7 presents and analysis of the impact of unobservable confounding variables. The table shows the effects of the presence of BE directors on the level of firm risk-taking, with an assessment of the impact of unobservable confounding variables based on Frank (2000). For each of the regressions run, we calculate the ITCV for the independent variable of interest (*BE Percentage*). The ITCV indicates the minimum impact of a confounding variable that would be needed to render the coefficients statistically insignificant, with ITCV defined as the product of the correlation between the x-variable and the confounding variable and the correlation between the y-variable and the confounding variable. To assess the magnitude of such confounding variable, column (4) includes the size of the impact of the five controls that have the biggest impact on the coefficient of the independent variable, after partialling out the effect of the other control variables.

The threshold value for *Leverage* is -0.0267 which suggests the correlation between this and the dependent variable and between the dependent variable and the unobserved and unmodeled variable needs to be around 0.1634 ($\sqrt{}$ 0.0267) for the results to be overturned.[38] In this regression, *Cash Holdings* has the biggest impact, 0.0148, meaning that we would need an unmodeled variable with a stronger impact than cash holdings to overturn the results for *Leverage.*

Similarly to above, the threshold value for *Cash Holdings* is -0.0931 which suggests the correlation between this and the dependent variable and between the dependent variable and the unobserved and unmodeled variable needs to be around 0.3051 ($\sqrt{}$ 0.0931) for the results to be overturned. In this regression, *Tangibility* has the biggest impact, 0.0111, meaning that we would need an unmodeled variable with a stronger impact than tangibility to overturn the results for *Cash Holdings.*

The threshold value for *CAPEX* is -0.05793, implying a correlation of around 0.2407 ($\sqrt{}$ 0.0579) for the results to be overturned, the threshold value for *ROA* is -0.01033, implying a correlation of around 0.1016 ($\sqrt{}$ 0.0103) for the results to be overturned, and the threshold value for *Volatility of ROA* is -0.0269, implying a correlation of around 0.1664 ($\sqrt{}$ 0.2769) for the results to be overturned.

In all of these regressions, the controls with the biggest impact have a lower value than the ITCV that we calculate, meaning that in order to overturn our results, we would need to find an unmodeled variable with more explanatory power than our controls. However, we can argue that since we included a comprehensive set of control variables, which are all associated with the dependent variable at the 1% significance level, we can confidently rule out the suspected endogeneity problem related to the independent variables in our findings.[39]

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[38] Note that because the relationship is negative, one of these correlations is expected to be negative.

[39] We draw this conclusion from Frank (2000), Larcker & Rusticus (2010) and the implementation of this model in the study by Wang & Hussainey (2013).

7 Analysis

A theoretical analysis of previous literature has led us to formulate the following hypotheses:

Hypothesis (1): *Firms with BE directors or CEOs have a different level of risk-taking than firms with no BE directors or CEOs.*

Hypothesis (2): *Firms with BE directors or CEOs have different performance than firms with no BE directors or CEOs.*

Hypothesis (3): *Firms with BE directors and CEOs have different probability of survival in the future than firms with no BE directors and CEOs.*

We have performed an analysis of financial risk-taking, operational performance and survival in a sample of Swedish private limited liability companies with bankruptcy experienced directors and CEOs. The results presented above provide support for the hypothesis that bankruptcy experiences of directors and CEOs are able to significantly explain our firm outcomes, measured in terms of leverage, cash holdings, profitability, CAPEX and firm survival after five years.

We aimed to explain bankruptcy experiences' effect on firm outcomes through either the "*Hot-Stove* mechanism" or the "*Innate Risk-Taking* mechanism". These two mechanisms are used to interpret whether directors' and CEOs' risk-taking in subsequent firm appointments diminishes or increases, affecting several outcome measures.

With our results we are able to establish that firms with bankruptcy experienced directors and CEOs have on average higher levels of leverage and tend to hold less cash with respect to the size of their balance sheets. The direction of the effect of our independent variable (BE Percentage) on the dependent variables *Leverage* and *Cash Holdings* in regressions (1) and (2), respectively, can be explained by the "*Innate Risk-Taking* mechanism". This implies that, following an experience of bankruptcy, directors' and CEOs' innate behavioural biases prove to be present and also strong enough to affect their decision-making. Contrastingly, Dittmar & Duchin (2016) find that past negative professional experience "attenuates the impact of overconfidence" as subsequent firms have a reduced level of leverage and higher levels of cash holdings. A possible interpretation for our results is thus that the impact of behavioral biases like overconfidence could be attenuated by the bankruptcy experience, yet are strong enough to inhibit a learning effect as would have been indicated by the "*Hot-Stove* Mechanism".

Our results also show that firms with BE directors or CEOs have on average lower levels of *CAPEX* with respect to comparable companies with no BE directors or CEOs. We have several explanations for these findings. A first interpretation of this result could provide support for what we define to be the "*Hot-Stove* mechanism". Consistent with Dittmar & Duchin (2016), we can illustrate that the reduced level of *CAPEX* is a result of a learning process, which would cause a bias against risky alternatives in directors and CEOs. A second interpretation that is consistent with the "Innate Risk-Taking mechanism" is that, as these individuals possess the behavioural traits as exemplified earlier, these traits result in distortions in their abilities to evaluate good investment opportunities. Alternatively to the above, we could attribute these results to the way in which the

variable is constructed. Given that the sample of private firms are not required to report a cash flow statement, our measure of *CAPEX*[40] might not capture disposal patterns accurately, therefore distorting the results.

The model where we used *ROA Volatiliy* to proxy for firm's operational risk-taking indicated significance on the BE Percentage measure at the univariate level, but the BE Percentage variable proved be insignificant at the multivariate level, which in our opinion is a result of adding controls and fixed effects to the model. We believe that the robustness of our previous regressions provide enough support for firms with BE individuals to be more risk-taking, therefore confirming Hypothesis (1) and establishing a clear direction to it.

Additionally, results from the regression where *ROA* is the dependent variable show that firms with BE directors and CEOs tend to have a lower operating return on their assets with respect to firms with no BE directors and CEOs. This result confirms Hypothesis (2) and further provide insight on results from regressions (1) and (2). Firms with BE directors experiencing lower returns is a surprising result if we consider that the same firms also experience higher levels of risk-taking. However, it may be possible that risk-reward theories apply only to rational individuals, whereas we claim that BE directors seem to be motivated by psychological attributes such as overconfidence, optimism, the illusion of control and sensation-seeking. Moreover, results from this regression also provide additional insights into regression (3), giving further support to the idea BE individuals are less able to find and exploit investment opportunities, therefore reducing the level of returns for their firms.

Lastly, results from regression (6), where *Survival t+5* is the dependent variable, contribute even further to our hypotheses, confirming not only that firms with BE directors have a higher level of risk-taking and lower returns, but also that these firms are less likely to survive in the next 5 years. This results support Hypothesis (3) and create room for further discussion of the potential significance of a BE variable in bankruptcy prediction models (similarly to Kallunki & Pyykkö, 2013).

In summary, all hypotheses developed in 2.7 are confirmed after robust tests are performed on a sample of Swedish private limited liability firms. These significant results from our tests support the view that an "*Innate risk-taking* mechanism" is in place among directors and CEOs. As such, personal behavioural biases, such as overconfidence, optimism, the illusion of control and sensation-seeking as reviewed by the prior literature, seem to be innate to individuals and further seem to inhibit a potential learning effect. Contrary to what is described by the "*Hot-Stove* mechanism", our results argue that directors and CEOs seem to be unable to learn from past experiences and unable to use previous bankruptcy experiences as a way to develop a bias against risk.

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[40]Net CAPEX is calculated as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year. Negative values of CAPEX are manually set to zero, as common practice in this scenario.

8 Conclusion & Implications

8.1 Conclusion

In this study we have investigated the relationship between past bankruptcy experiences of directors and CEOs and their effect on firms' outcomes. More specifically, we explored whether firms with bankruptcy experienced directors and CEOs have different leverage and level of cash holdings, different standard deviation of their returns, different performance and different survival rates with respect to firms with no bankruptcy experienced directors and CEOs. We test these hypotheses on a sample of 97,319 Swedish private limited liability companies during the time period 1998-2015. Using fixed effects and cross-sectional regression analyses, we predict the relationship between the dependent and independent variables as highlighted above. We find that our analyses are robust even after PSM implementation and appear strong to causality concerns.

We argue that for individuals that have been involved in a corporate bankruptcy, the experience could either bring about a learning effect (what we define "*Hot-Stove* mechanism"), therefore inhibiting their subsequent risk-taking, or confirm their overconfidence, optimism, their illusion of control and sensation-seeking (what we define as "*Innate Risk-Taking* mechanism"). Using the Upper Echelon theory developed by Hambrick and Mason (1984) we are first able to use past bankruptcy experience to explain individuals' psychological traits and attitudes towards risk, and secondly to connect these behavioral biases to specific firm outcomes.

Our results show that directors' and CEOs' past experiences of bankruptcy do help explain the risk-taking, operational performance and survival rates of firms that they are subsequently involved with. In particular, we find significant evidence that firms employing what we define to be bankruptcy experienced directors and CEOs have on average higher levels of leverage, tend to hold less cash, have lower operating performance and have lower probability to survive if compared to similar firms with no bankruptcy experienced directors and CEOs. We therefore find support for the "*Innate risk-taking* mechanism" which implies that, following an experience of bankruptcy, directors' and CEOs' innate behavioral biases prove to be present and also strong enough to affect their decision-making. This hinges on how the previous research presented in 2.3.2 has shown that behavioral biases, as exemplified by past experiences, can influence firms' outcomes. We also find that firms with BE directors or CEOs have lower levels of CAPEX, a result that we argue could support both the "*Innate Risk-Taking* mechanism" and the "*Hot-Stove* mechanism".[41]

To our knowledge, this is one of the few studies that analyzes the effects of individuals' professional experiences on private companies. As we have seen that directors and CEOs do not seem to learn from past adversity, we believe in the potential for further research to focus on the wide array of effects that may result from past bankruptcy experiences.

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[41] See Analysis of results in section 7.

8.2 Contributions to literature

The empirical results of this study contribute to the existing research in a number of ways. Firstly, they contribute to the literature that has investigated why individuals' characteristics can influence firms' decision-making and subsequent outcomes (Hambrick & Mason, 1984). Our findings provide support for the idea that it is possible to use past professional experiences as a proxy for the psychological factors that build up the cognitive base and values of the decision-maker (as has been done by Dittmar & Duchin, 2016). More specifically, our findings confirm the idea that boards influence firm performance (as proxied by our measure of returns), have the power to make financing decisions (as proxied by our measures of firm risk-taking), and have the ability to significantly steer the investment policies of an organization (as proxied by our measure of capital expenditure) (Judge & Zeithaml, 1992).

Moreover, our results partially contrast those of Dittmar & Duchin (2016). They find that firms operated by CEOs who experienced financial distress at another firm behave more conservatively, have less debt, save more cash, and spend less in capital expenditures. We argue that our partially contrasting results originate from (1) our inclusion of the ensemble of directors and CEOs in our analysis, (2) our focus on previous bankruptcy experiences only, and (3) our sample of Swedish private limited liability companies, versus Dittmar & Duchin's (2016) sample of public US firms. We therefore demonstrate that studying the effects of past negative professional experiences in different contexts can yield opposing results.

Furthermore, the literature looking at decision-makers' characteristics' effect on firms' outcomes has predominantly been done in contexts of public companies. By using a sample of private firms, our results provide further support for the findings of Kallunki & Pyykkö (2013), a study that is also based on a sample of private companies.

Lastly, our findings argue for the importance of including directors' and CEOs' characteristics, and more importantly their bankruptcy experiences, when investigating corporate risk-taking, understanding company performance and (potentially also) when using bankruptcy prediction models (similar to Kallunki & Pyykkö, 2013). As such, we believe that these findings are interesting for all stakeholders of private organizations in Sweden. Suppliers, customers and employees of firms having bankruptcy-experienced directors and CEOs, should all be aware of the firms' potentially worse performance and increased level of risk. In particular, capital providers like shareholders and creditors should be aware of the increased level of risk when financing firms with bankruptcy experienced directors and CEOs. Potentially, their involvement could even argue for an increased cost of capital for the firm.

8.3 Areas for future research

The findings of this paper certainly pave the way for further research in the area with regards to its interesting results and the scarce literature documenting the effects of individuals' professional experiences on private companies.

Firstly, we believe that our definition of "bankruptcy experience" can potentially have impacted the creation of the variable that captures the phenomenon of bankruptcy. Different assumptions made in defining BE directors and CEOs could affect the results of the study, and therefore we recommend future research to widen the findings of our study by using different proxies for defining a bankruptcy experienced director or CEO. Possibly, different outcomes may result from analyzing separately the individuals who leave a financially distressed company before a bankruptcy and those who remain with the company until the very end.

Secondly, we believe that the timeliness and magnitude of the bankruptcy experiences in CEOs and directors should be taken into consideration when trying to capture the effect of these experiences on individuals' risk attributes and firm outcomes. As previous research has found (Bernile, et al., 2017), the intensity of individuals' past experiences is a key determinant for the resulting effect on corporate outcomes. Additionally, more recent bankruptcy experiences could bring about stronger effects on decision makers, as argued by Dittmar & Duchin (2016).

Lastly, to explain the impact of behavioural biases on firm outcomes, this paper resides upon the prior research that has been able to measure psychological traits more directly and their inherent effect on corporate decision-making. Further research opportunities may exist in trying to understand which specific behavioural biases are prominent as a result of past bankruptcy experience.

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10 Appendix

Table 8 – Variables Description

Variable Name	Variable Description
Dependent Variables	
Leverage	Leverage is defined as the ratio of financial debt divided by the sum of total assets. Financial debt is measured as the sum of both short term and long-term interest-bearing debt.
Cash Holdings	Cash Holdings is defined as the ratio of cash and short-term assets to the value of total assets.
CAPEX	Net CAPEX is calculated as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year. We only take values when CAPEX is greater than zero, otherwise we manually set it to zero.
ROA	ROA is defined as the ratio of operating profit or loss to total assets. Operating Profit/loss is measured as: net sales + other operating income - production costs +/- items affecting comparability - personnel expenses - depreciation and amortization - other operating expenses.
ROA Volatility	We define ROA as the ratio of operating profit or loss to total assets. ROA Volatility is the standard deviation of the accounting returns is calculated over a 5-year period: starting from 1998, σ(ROA)x100 is measured over the next 5 years with overlapping rolling windows.
Survival t+5	Indicator that takes value of 1 is the company is surviving at least 5 years after that specific year. We mark as "non-surviving" those companies that filed for bankruptcy before the end of the year taken into consideration.
Independent Variables	
BE Dummy	BE Dummy takes value of 1 if the board of the company for that specific year has at least one director or CEO that has accumulated at least one bankruptcy experience before the beginning of that year.
BE Percentage	BE Percentage takes the number of directors and CEO that have accumulated at least one bankruptcy experience before the beginning of that year, divided by the total number of directors and CEO on the board for that year.
Board Characteristics	
Board Size	Board Size takes the value of the number of seats in the board for a specific year. It includes seats of regular directors and CEO, and excludes supplementary board seats.
CEO Duality	CEO Duality takes the value of 1 if the CEO and Chairman of the Board are the same person, for a specific year.
Female CEO	Female CEO takes the value of 1 if the CEO is female, for a specific year.
Female Percentage	Female Percentage takes the value of the number of female directors and CEO, divided by the total number of directors and CEO on the board for a specific year.

Avg. Number of Directorships	Avg. Number of Directorships takes the value of number of directorships held by the directors and CEO of the firm, divided by the total number of directors and CEO on the board for a specific year.

Firm Controls

Sales Growth	Sales Growth measures the percentage growth in sales from *[t-1]* to *[t]*
Size	Size is the natural logarithm of total assets at the end of the year.
Age	Age is the natural logarithm of age of the firm (measured as the difference between date of incorporation and a specific year) + 1.
Net working capital	Net working capital is the ratio of working capital (measured as current assets - current liabilities) divided by total assets.
Tangibility	Tangibility is the ratio of fixed assets to total assets for a specific year.

Table 9 – Hausman Test

chi-square	Prob>chi-square
22,553.87	0.0000***

Table 9 presents the results of the Hausman test. The test is used to investigate whether fixed effects or random effects are more appropriate to control for unobserved effects on the panel of data. The test rejects the null hypothesis that both random and fixed effects could be used, hence giving us support for using Fixed Effects. The table above is the Hausman test on the dependent variable *Leverage*. Hausman tests were performed on all dependent variables in the study and results are consistent, therefore not presented.

The notation *, **, *** represent significance at the 10%, 5% and 1% respectively.

Table 10 – Breusch-Pagan Test

chi-square	Prob>chi-square
179,984.05	0.0000***

Table 10 presents the results of the Breusch-Pagan test. The test is used to investigate to detect any form of heteroscedasticity. The null hypothesis is that the error variances are all equal, against the alternative that the error variances are a function of one or more variables. Given that the null hypothesis is rejected, we will use robust standard error estimation, relaxing the OLS assumption that standard error need to be both independent and identically distributed. The table above is the Breusch-Pagan test on the dependent variable *Leverage*. Breusch-Pagan tests were performed on all dependent variables in the study and results are consistent, therefore not presented.

The notation *, **, *** represent significance at the 10%, 5% and 1% respectively.

Table 11 – Pearson's Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) BE Percentage	1														
(2) Board Size	0.0251*	1													
(3) CEO Duality	0.0005	0.1986*	1												
(4) Female CEO	-0.0040*	0.1336*	0.0712*	1											
(5) Female Percentage	-0.0120*	0.0851*	0.0394*	0.3246*	1										
(6) Avg. Number of Directorships	0.3845*	0.2743*	0.0425*	0.0156*	-0.0035*	1									
(7) Leverage	0.0268*	-0.0086*	-0.0075*	-0.0184*	-0.0272*	0.0380*	1								
(8) Cash Holdings	-0.0391*	-0.0194*	-0.0082*	0.0335*	0.0659*	-0.0496*	-0.4589*	1							
(9) ROA	-0.0572*	-0.0324*	-0.0002	-0.0105*	-0.0154*	-0.0634*	-0.1620*	0.1596*	1						
(10) Sales Growth	0.0732*	0.0526*	0.0027*	0.0062*	0.0183*	0.1438*	0.0159*	-0.0069*	0.1202*	1					
(11) Size	-0.0155*	0.2501*	0.0866*	0.0065*	-0.0690*	0.1914*	0.1543*	-0.1651*	0.1372*	-0.0292*	1				
(12) Age	-0.1459*	-0.0315*	0.0198*	-0.0122*	-0.0647*	-0.2114*	-0.0400*	-0.0093*	-0.0692*	-0.2912*	0.2202*	1			
(13) CAPEX	-0.0025*	-0.0104*	-0.0085*	-0.0099*	-0.0171*	-0.0059*	0.1951*	-0.1164*	0.0217*	0.0956*	0.0747*	-0.0638*	1		
(14) Net Working Capital	-0.0423*	0.0065*	0.0160*	-0.0285*	-0.0571*	-0.0031*	0.0800*	-0.3145*	0.0562*	-0.0439*	0.2123*	0.1305*	-0.0188*	1	
(15) Tangibility	-0.0028*	-0.0069*	-0.0069*	-0.0272*	-0.0565*	0.0620*	0.5020*	-0.4446*	-0.0936*	-0.0173*	0.2789*	0.0559*	0.2376*	-0.0673*	1

Table 11 reports the results of a Pearson's correlation matrix. The correlation coefficients are calculated on the final sample containing 1,055,913 firm-year observations, belonging to 97,317 firms over the period 1998-2015. The table does not include results from the correlations of *ROA Volatility* and *Survival t+5* in order to not reduce the sample size. The main independent variable *BE Percentage* measures the percentage of directors and CEO with a bankruptcy experience over the total number of directors and CEO. The dependent variables are *Leverage*, measured as the ratio of financial debt divided by the sum of total assets, *Cash Holdings*, measured as the ratio of cash and short-term assets to the value of total assets, *ROA*, measured as the ratio of operating profit or loss to total assets, and *CAPEX*, measured as the change in Property, Plant and Equipment plus depreciation, scaled by total assets at the beginning of the year. The correlation table also includes controls used in the study, such as *Board Size*, calculating the sum of directors and CEO, *CEO Duality*, a dummy variable taking value of 1 if the CEO is the same person as the Chairman of the Board, *Female CEO*, a dummy taking the value of 1 if the CEO is female, *Female Percentage*, measuring the percentage of female among the board and CEO, *Avg. No. of Directorships*, calculating the average number of board appointments for the directors and CEO, *Sales Growth*, measuring the growth in sales from the year before, *Assets*, measuring the logarithm of the balance sheet of the firm, *Age*, indicating the logarithm of the age of the firm since incorporation+1, *Net Working Capital*, defined as the ratio of working capital (measured as current assets - current liabilities) divided by total assets, and *Tangibility*, as the ratio of fixed assets to total assets. The notation * represents significance at the 5% level.

Table 12 - Collinearity Diagnostics

	VIF	sqrtVIF	Tolerance	R-Squared
Leverage	1.58	1.26	0.6324	0.3676
Cash Holdings	1.66	1.28	0.6069	0.3931
CAPEX	1.09	1.04	0.9175	0.0825
ROA	1.14	1.07	0.8787	0.1213
Board Size	1.22	1.10	0.8211	0.1789
CEO Duality	1.05	1.02	0.9548	0.0452
Female CEO	1.14	1.07	0.8757	0.1243
Female Percentage	1.14	1.07	0.8741	0.1259
Avg. Number of Directorships	1.21	1.10	0.8265	0.1735
Sales Growth	1.13	1.07	0.8743	0.1257
Size	1.44	1.20	0.6930	0.3070
Age	1.18	1.09	0.8480	0.1520
Net Working Capital	1.29	1.14	0.7736	0.2264
Tangibility	1.77	1.33	0.5661	0.4339
Mean VIF	**1.29**			

Table 12 presents collinearity diagnostics for the variables included in the regression models. Additional VIF analysis including the effect of the variable Year (used in Fixed Effects regressions) have been run and results are consistent with above.