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1 Introduction

1.1 Statement of the problem

A growing body of research shows that CEO departure from the firm is usually associated with the departure of other executives directly below the CEO in the corporate hierarchy (e.g. Friedman & Saul, 1991; Fee & Hadlock, 2004; Hayes et al., 2006). The ultimate aim of the present study is to examine the determinants, moderators and especially performance consequences of turnover among upper-echelon organization members after a new CEO has been appointed.

For the purpose of examining the antecedents, moderators and effects of the turnover among corporate officers following a transition in the CEO's position, it does seem essential and meaningful to highlight the significance of the role of the non-CEO senior executive personnel in the organizational context. Numerous studies conducted over the last decades have shown the particular importance of the top management team for tactical decision-making and strategic response, as well as for organizational operations as such (Messersmith et al., 2013). The structure and composition of the TMT is one of the crucial determinants for organizational success, seeing that top management team members are responsible for the supervision and decision-making processes within the company. As such, they can directly affect firm's business performance by means of developing and implementing strategies, building an appropriate corporate culture, as well as promoting organizational mission and goals (Gupta & Govindarajan, 1984; Hambrick & Mason, 1984; Helmich & Brown, 1972; Pfeffer & Davis-Blake, 1986). Moreover, as reported by Carpenter et al. (2004), the fact that TMT connects the particular organization with its task environment even strengthens the important position of the members of senior management team within the firm.

According to the most recent meta-analysis on turnover rates and organizational performance (Park & Shaw, 2013) as well as numerous other studies on this topic conducted over the past decades (e.g. Messersmith et al., 2013), the relationship between turnover among top executives and the subsequent organizational performance is negative, moderated by numerous internal and external factors.

However, prior research (e.g. Keck, 1997) indicates that under specific circumstances, alterations in the management ranks may be beneficial for the company. Combining these two opposite views, some researchers (e.g. Kesner & Dalton, 1994) hypothesize that moderate levels of turnover are the key to success.

Based on the premise that top executive turnover resulting from a change of the CEO induces changes in company's performance, the present analysis is primarily concerned with investigation of performance consequences of the turnover among upper-echelon organization members that occurs after the CEO succession. Thereby, the relationship between turnover in upper level management positions and firm's performance is expected to be moderated by high-tech (vs. non-high-tech) industry, the number of replaced executives having a seat on the board of directors and the incoming CEO origin. Moreover, it is controlled for company's prior performance, age of the departing managers (CEOs, CFOs and COOs) at the time when they left the respective company, industry type, company size and the year of the new CEO appointment in order to obtain accurate results.

Concerning the research gap, there is only limited and rather weak evidence in the existing scientific literature relating to the replacement of top managers directly resulting from the appointment of a company's new CEO, showing the relationship between changes in the composition of the TMT and/or replacement of company's COO/CFO and organizational performance. The main focus of the studies concerning top executive turnover is set on the analysis of consequences on firm profitability resulting from the departure of company's CEO. Alternatively, scientific researchers focus at the investigation of performance consequences connected with the turnover of company's top management team members. Yet other studies are concerned with the relationship between the change of CEO and the consequent departure of the non-CEO senior executive personnel from the firm. The present study is unique in the sense that the companies under study are all affected by the same event – the CEO succession. The performance consequences of top executive turnover are then examined in these very specific settings, so far neglected in prior research. To my knowledge, there is no research focusing on the analysis of performance consequences of the turnover among upper-echelon organizational members that would define these changes in the management ranks as a direct *result of*

leadership transition in the company. More precisely, the present study analyzes performance effects of the departure of organization's top executives, namely CFOs, COOs and the TMT members, that is induced by a new CEO appointment. The study is also original in terms of the distinction among three different turnover events, meaning that it investigates the consequences of the turnover among company's top three highest-paid executives, turnover among CFOs and turnover among COOs separately. The decision to examine CFO and COO departure from the firm as separate events is contingent on the very special position that the individuals executing the role of CFO and COO have in the company, determined by their power to directly influence company's financial results. Prior research considers company's TMT team as one entity and examines changes in the structure and composition of the top management team without setting its focus on individual changes in the CFO and/or COO position respectively. From a more general perspective, the existing literature concerned with the upper echelons research (e.g. Carpenter & Fredrickson, 2001) defines company's TMT as the two highest levels of its management, usually including, among others, the CFO and the COO of the firm.

By means of statistical analysis, this research aims to investigate whether it is beneficial for the company that has recently gone through a CEO change to change its non-CEO senior executive personnel as well. Despite the fact that the more recent literature supports the belief that managerial turnover has adverse implications on organizational effectiveness, there is some research evidence to suggest that in some cases reshuffle in the management ranks has positive impact on firm's operating behavior. It is thus interesting and very relevant to analyze and determine the specific conditions under which changing of the guard at the top turns out to be beneficial or, on the contrary, harmful for the company. Therefore, the ultimate aim of this study is to contribute to the current research on the top executive turnover in the wake of new CEO appointments and to fill the recognized research gap by means of new relevant findings.

1.2 Purpose and significance of the research

Due to diverging opinions about the determinants, moderators and consequences of the top executive turnover following a new CEO appointment, it is reasonable and much needed to further analyze the underlying aspects influencing the replacement at the top ranks as well as to examine the various effects of post-succession managerial turnover. Responding to the above described research gap and building on the existing research findings, the central research question can be formulated as follows: *What are the performance consequences of the turnover among upper-echelon organization members that occurs after the CEO succession?* With the view of examining the relationship between rates of post-succession managerial turnover and subsequent organizational performance, alterations in the management ranks are divided into TMT turnover, CFO departure and COO departure. Each of these turnover events is then examined individually. In addition, the relevant scientific literature suggests that this relationship is moderated by various factors. Consequently, I formulate the sub-question specifying the moderating factors influencing the relationship between top executive turnover and firm performance as follows: *Which factors moderate the relationship between managerial turnover and organizational performance?* Thereby, the effect of high-tech industry, number of departing executives that were also active as directors and CEO origin on the turnover-performance relationship is analyzed and evaluated. Taking into consideration contradictory evidence in the existing literature, I do not develop any particular assumption concerning the relationship between managerial turnover and subsequent firm performance. Similarly, the effects exercised by the selected moderating factors are investigated without predefining specific assumptions. As a result, I prefer to formulate research questions rather than hypotheses.

The existing literature on the topic of organizational implications of top executive turnover is inconclusive. Considering the fact that company's top managers influence and partly determine the enterprise value, it seems essential to examine the underlying factors determining alterations in the top ranks as well as to study the consequences of post-succession top executive turnover. The main purpose of the research question, thus, is to examine the antecedents, moderators and primarily implications of managerial turnover following a new CEO appointment. By answering the above

specified questions, the current research aims to provide better understanding of how the TMT structure and composition affects and determines company's performance and how the post-succession departure of a firm's COO and CFO influences organizational efficiency.

In terms of statistical analysis presented below, the alterations in top management ranks are divided into three individual situations, namely the change of the top management team members, the change of the CFO and the change of the COO respectively. Out of these three events expected to determine organizational efficiency, only the COO departure shows positive significant influence on firm following performance. After testing the existence of a relationship between the independent variables and the dependent variable, three potential interactions were included. The moderating effects of the industry type, the number of departing executives with a seat on the board of directors and the incoming CEO origin were hypothesized and tested. However, none of these three interaction terms proved to be of a statistical significance. In terms of the control variables included in the analysis, all twelve models demonstrate positive significant influence of firm prior performance on its consequent performance. On the contrary, the six remaining controls – CEO age, CFO age, COO age, firm size, industry type and the year of the new CEO appointment – do not meet statistical significance.

The rest of the paper is organized as follows. First, previous studies conducted in this research area over the past decades are summarized. Then, the methodology applied in the study is explained, the actual analysis results are presented and the resulting implications for organizations and their managers are discussed.

2 Literature review

The following literature review part summarizes findings from previous research, focusing on the reasons for the CEO succession and the circumstances that imply a new CEO appointment; underlying concepts and theories as well as evidence in the literature concerning the changes in the top management ranks after a new CEO appointment; reasons for changes in the composition of the

TMT; factors and conditions that determine and moderate the post-succession turnover in the management ranks and its subsequent effects on organizational behavior; and the organizational implications of the managerial turnover following a CEO replacement.

2.1 Context of CEO turnover

Prior to the detailed analysis of the antecedents, moderators and consequences of the TMT turnover after a new CEO appointment, it is meaningful to analyze and briefly describe the context of the (forced) departure of the current CEO from the company. What are the hidden forces behind the CEO succession? Which circumstances and events provoke a new CEO appointment?

Referring back to the previous literature, Kesner & Dalton (1994) analyze the determinants of CEO departure and support the common-sense theory that says that the decline in efficiency is the main factor causing the current CEO's exit from the company. Consequently, his/her replacement induces an increase in efficiency. The authors point out that the replacement of the serving CEO is one of the most frequent responses of the organization to the long-lasting periods of economic stagnation or decline. Facing difficult financial situation, the organization strives for a change by the medium of a new CEO appointment.

Referring to the power circulation theory of control Jackall (1988), Ocasio (1994) and Ocasio & Kim (1999) point out that CEOs have to deal with battles for power and control that are aroused by both insiders and outsiders competing for the prestige associated with the position of the CEO.

The available evidence in the literature indicates that company's TMT consists of competitive managers desiring authority, success and recognition and trying to reach and maintain certain status. Pfeffer (1992) underlines the fact that the current CEO's leadership may be threatened by non-CEO executives' aspirations to power. Moreover, as reported by Ocasio (1994), in the case that doubts about the CEO's skills and competences coincide with the availability of a suitable successor, it is highly probable that a replacement of the existing CEO will follow. In addition, the results of the studies concerned with the appointment of a successor for the departing CEO (e.g. Dalton & Kesner,

1985; Friedman & Singh, 1989) indicate that insider succession is usually preceded by longer lasting times of decline in the economic efficiency. Parrino (1997) extends this hypothesis and argues that this is also the case when the CEO does not exit the company on the voluntary basis, but is rather obligated to leave. While some authors explain this phenomenon as the result of managerial entrenchment (Boeker & Goodstein, 1993) others claim that it can be interpreted as the result of internal fights for power between TMT members (Shen & Cannella, 2002).

As reported by Shen & Cannella (2002), the event of outsider succession (rather than insider succession) is often perceived as the consequence of a failure to manage the company efficiently. Thereby, this lack of success or power can be attributed to the entire TMT, rather than to the CEO as an individual (Boeker & Goodstein, 1993). The appointment of an outside CEO brings about doubts concerning the capabilities of the senior executives as well as negative feelings towards the new CEO and overall unpleasant atmosphere within the TMT (Gouldner, 1954).

2.2 Changes in the composition of the TMT after a new CEO appointment

2.2.1 Underlying concepts and theories

One of the underlying theories behind the research concerning the turnover among the company's most powerful executives is the upper echelon theory developed by Hambrick & Mason (1984). This fundamental concept lays the grounds for further analysis of executives' characteristics which are, to some extent, linked to organizational outcome, seeing that they shape the decision making process and significantly affect the decisions undertaken by the entity as a whole. As proposed by Hambrick & Mason (1984) and supported by numerous other authors (e.g. Dooley & Fryxell, 1999; Hambrick et al., 1996), organizational strategic behavior and the resulting performance is determined by the actions of the entire TMT, rather than by those carried out by the CEO as an individual. Moreover, as indicated by Wagner et al. (1984), the formation and structure of the top management team is strongly affected by the replacement of people at the highest level of responsibility. This shift in personnel in

turn influences the actions taken by the firm and thus shapes the business performance (Virany et al., 1992).

2.2.2 Evidence in the literature

Referring to the existing literature, there is increasing evidence that CEO departure from the firm is usually associated with the departure of other members of the TMT. Fee & Hadlock (2004) document a higher likelihood of the turnover among TMT members in the event of a new CEO appointment. These findings are also supported by Hayes et al. (2006) who suggest that rates of turnover among managers tend to grow during periods of the CEO replacement and interpret this phenomenon as a result of complementarities between executives in the top management team. Friedman & Saul (1991) suggest that the event of CEO succession is not only associated with dismissal of top managers initiated by the newly appointed CEO, but also directly linked to changes in the nature of the social environment within the company, implying voluntary departure of TMT members from the firm.

As reported by Barron et al. (2011), turnover in the top management team is affected and determined by the concrete circumstances of the specific case of the CEO succession, rather than by the departure of the former CEO as such. This view is also supported by the existing body of literature. Vancil (1987), among others, defines follower succession as an intended and envisaged action, whereby he refers to the contender succession as the representation of a change, possibly indicating shift in the TMT composition. Shen & Cannella (2002) extend this interpretation by an assumption that those managers who do not identify themselves with the upcoming action plan exit the company. The results of the study of Friedman & Saul (1991) emphasize that the specific aspects of the succession event (such as the new CEO origin) determine the extent of changes in leadership at the top. The authors claim that it is vital to analyze and understand TMT members' response to changes in CEO position, as it may significantly affect the subsequent organizational performance.

Kesner & Dalton (1994) note that the research on the TMT turnover and on its consequences for a firm's operating behavior is not conclusive. Researchers' opinions about the need for substitution of

top executives when the company is facing difficult times diverge widely. Some argue that extensive replacement of personnel in upper level management positions is a precondition for a positive trend reversal and thus cannot be avoided in case that the company endeavors to reshape its strategy. Others, however, are skeptical about this proposition and underline its limitations by claiming that the organization goes through periods of increasing disorder as the level of managerial turnover increases.

Numerous studies carried out in the 1970s and 1980s support the view that it is necessary to replace (some of) the members of the top management team in order to be able to emerge from a long phase of decline in profitability. Previous research suggests that when putting all its efforts into achieving a turnaround, the organization should start with a turnaround in the composition of the TMT so that it can be successful. According to Hofer (1980), the transformation of the structure of the existing TMT team is the basic prerequisite for an effective reversal in operational performance. The author's explanation is based on the premise that the upper-level managers who are working for the company for several years usually share the same vision about the future of the company as well as the same opinion about the strategies used to get where they intended to go. There is an assumption that the knowledge and skills of senior executives became obsolete and that the practices used by the company are already outdated. Therefore, it is vital to take on new executives bringing fresh ideas and new perspectives in order to see things in a new light.

As reported by Kesner & Dalton (1994), several researchers agree with Hofer's (1980) opinion about the need for a turnover in the upper level management positions. Relying on the results of their study examining the cases of more than fifty firms that succeeded in reversing the negative business trend, Schendel et al. (1976) conclude that a set of correct measures initiated by the newly appointed managers at the top of the company is a vital precondition for the upswing. The results of the research conducted by Bibeault (1998) indicate that managers in companies experiencing a downturn are commonly laid off, as they are either not able to deal with the ongoing issues or they lack the required competences and are thus themselves (part of) the issue. Moreover, he underlines the fact that three-fourths of executives that initiate the change are newcomers. Starbuck & Hedberg (1977) highlight the need for a turnover in the TMT, claiming that the first step to achieve a turnabout is to reshape the way

the company perceives problems and consequently deals with them. Since these views and practices are typically represented by firm's top executives, it is unavoidable to change the composition of the top management team in order to change them.

2.3 Determinants of the turnover in the TMT after a new CEO appointment

In their research, Shen & Cannella (2002) point out that there are various aspects that can induce turnover among members of the TMT and that, when taking into account the related circumstances, it can result in either boost or decline in performance. The underlying causes of post-succession executive turnover are manifold (and often difficult to exactly determine) and range from the intended departure from the firm after reaching the standard pension age to the forced departure from the company induced by the newly appointed CEO. Moreover, there are numerous reasons for executive's voluntary departure such as the availability of better-paid or more interesting position elsewhere, associated with improved career prospects and/or the opportunity for personal growth and positive development, or his/her disagreement with the resolution concerning the nomination of the company's new CEO. Fee & Hadlock (2004) suggest that companies tend to reshuffle their TMTs in order to eliminate inferior top executives on a regular basis. Thereby, their individual performance and contribution to the corporate performance as well as their suitability for the team is assessed.

In terms of determinants of the turnover in the TMT, Kesner & Dalton (1994) suggest that the replacement of company's CEO as such cannot be seen as the direct cause of the replacement of the TMT members. In fact, it is usually the ongoing negative situation combined with the aspiration to achieve the desired reversal of the trend that result in CEO succession and in turn lead to the TMT turnover. Kesner & Dalton (1994) suggest that the likelihood of turnover resulting from the CEO succession increases in the event of a preceding decline in performance experienced by the company prior to the actual replacement of its CEO. Indeed, the results of the study conducted by the authors indicate that pre-succession organizational performance determines the level of post-succession executive turnover, such that lower business performance indicates higher rates of manager turnover.

Nevertheless, it is the prevailing opinion in the relevant scientific literature that the shift in executive personnel is, in the most cases, the ultimate result of the nomination of a new CEO (Shen & Cannella, 2002). In their research, Kesner & Dalton (1994) theorize that the successor origin determines the extent of turnover among non-CEO top executives after a new CEO appointment, meaning that the outside succession provokes higher levels of TMT turnover than the inside succession. Karaevli (2007) underlines the positive relationship between the level of CEO outsidership and the extent of changes made in the TMT composition in the wake of his/her appointment. Friedman & Saul (1991) suggest that especially in the case that the company is going through a period of decline in performance, outside successors induce high rates of turnover of the non-CEO senior executive personnel, resulting either from their dismissal initiated by the CEO, or from the turbulences following the CEO appointment, triggering voluntary departures from the company. According to Fee & Hadlock (2004), turnover within TMT is to some extent contingent on corporate performance, however the likelihood for a departure of (a group of) corporate officers increases in the times of CEO succession, especially in the event of outsider succession.

The results of the study conducted by Boyne et al. (2010) confirm that organizational performance influences the turnover of senior executive personnel in a negative way and that the level of turnover increases in the periods after a new CEO appointment. The underlying reason is that the incoming CEO associates weak performance with the limited abilities and competences of top managers and he/she thus initiates their replacement. Hilger et al. (2013) suggest that not only weak organizational performance, but also unsatisfactory personal performance raises the probability of executive's forced departure from the company. Wagner et al. (1984) observe a negative relationship between organization's financial efficiency and the extent of subsequent changes in the management team composition.

Numerous research studies conducted in the past show that the turnover among top managers after the arrival of a new CEO clearly demonstrates his/her energy and power. Park et al. (2014) even hypothesize that CEO celebrity manifesting his/her dominance increases the probability of management dismissal (and at the same time decreases the probability that the CEO himself/herself

leaves office). From the general perspective, the appointed CEO ultimately aims to improve firm's performance by means of developing and adopting a new plan of action. In order to reach this fundamental goal, he/she perceives the replacement of executive personnel that is no longer effective or valuable for the organization by a group of more qualified or innovative executives as the best and most straightforward approach (Friedman & Saul, 1991; Helmich & Brown, 1972; Kesner & Dalton, 1994; Wiersema, 1995). Especially for the contender or outsider successor, the appointment as CEO of the company tends to be directly associated with the mission to satisfy the urgent need for strategic shift and reorientation. Therefore, with the view of introducing radical changes, the newly nominated CEO endeavors to make changes in the composition of the top management team directly after his/her appointment, as this is usually the first concern (Helmich & Brown, 1972; Wiersema, 1995). Such conduct is in accordance with the evidence in the literature. Referring back to the work of Hambrick & Mason (1984), Keck & Tushman (1993) and Wiersema & Bantel (1993) highlight the fact that executives who have been working for the success of the company for many years are affected and somehow limited by their knowledge and involvement. For this reason, successful implementation of changes and of new strategies calls for substantial adjustments in the work force.

Wiersema & Bird (1993) emphasize the significance of TMT demographic makeup as another predictor of senior manager turnover and suggest that heterogeneity on aspects such as age, team tenure, and the prestige of the visited university determine changes in the management ranks. Wagner et al. (1984) observe a positive relationship between the probability of executive departure and the team member's demographic dissimilarity in terms of person's age and date of entry. Godthelp & Glunk (2003) theorize that managerial turnover at the individual level is contingent on the individual- as well as team-level demographic heterogeneity.

The next antecedent of TMT turnover are issues related to the executive compensation. Pay dispersion, dissatisfaction with the level of remuneration and the involved degree of uncertainty lead to higher turnover activity (Messersmith et al., 2011). Moreover, wage gap between managers in equal positions either within or outside the company is another reason for the voluntary departure of corporate officers from the company (Kale et al., 2014).

The power dynamics at the top of the corporate hierarchy (Park et al., 2014), the succession following the departure of long-tenured CEO from the company (Friedman & Saul, 1991), as well as higher outsider control of the board and changes in the firm's strategic focus (Barker et al., 2001) are other causes of higher turnover activity within TMT. In addition, the environmental aspects such as munificence, stability and complexity also determine the extent of TMT turnover (Wiersema & Bantel, 1993).

2.4 Moderators of the performance consequences of the turnover in the TMT after a new CEO appointment

From a general point of view, there are various aspects inside and outside the organization moderating the link between turnover of the upper-echelon organizational members and the following firm performance. The most important ones are described below in more detail, including, among others, average organizational tenure of the TMT, environmental munificence, tenure of the departing CEO, prior firm performance and environment conditions.

The results of the most recent study on this topic carried out by Messersmith et al. (2013) indicate that as the average organizational tenure of the top management team members increases, the negative influence exerted by top executive turnover on firm performance decreases. Moreover, the authors examine several industry characteristics and observe a similar pattern also in the case of increasing environmental munificence. In an earlier study, Shen & Cannella (2002) analyze the moderating effects of tenure of the leaving CEO on organizational performance, suggesting that the replacement of a CEO with both too long and too short organizational tenure can have negative implications in terms of firm subsequent performance. The authors explain this hypothesis by means of the influence of CEO tenure on organizational inertia and the disorganization associated with the change of company's current CEO. In addition, they rely on evidence provided in prior studies to suggest that in the framework of a new CEO appointment, factors such as size of the company, governance structure and industry environment may affect organizational performance. Concerning former studies conducted in the 1990s, Kesner & Dalton (1994) suggest that prior organizational performance may influence

subsequent performance in the sense that pre-succession performance determines the extent of post-succession TMT turnover. These changes in leadership, in turn, shape firm profitability. The earlier research carried out by Virany et al. (1992) examines the executive succession and organization outcomes in turbulent environments. The authors argue that especially in turbulent environments succession may turn out to be crucial for improving or sustaining the organizational performance. Therefore, the environment conditions (stable vs. turbulent) may be an important factor moderating the relationship between turnover and performance.

Going a bit beyond the scope of this research, in their recent meta-analytical study, Park & Shaw (2013) suggest considering several moderating factors when assessing the effects of overall turnover on firm performance. The results obtained from their analysis indicate that the negative relationship between levels of total turnover and organizational performance may be influenced, among other factors, by the type of turnover in the sense that voluntary turnover and turnover resulting from the reduction in force strengthen the negative relationship between turnover and performance more significantly than involuntary turnover. Earlier meta-analytic review of Hancock et al. (2013) primarily focuses on the turnover among employees, rather than the top executives, as a suitable predictor of firm performance. The authors find out that this relationship is moderated by several variables, such as industry, location, job level, firm size, turnover type and performance measurement method. In addition, Shaw et al. (2005b) investigate the link between voluntary turnover and firm performance. The results of their study indicate that, to a modest extent, personnel performance serves as a mediator between voluntary turnover and financial performance. Even though all of these studies deal with the relationship between workforce turnover and firm performance, it can be assumed that some of the above-mentioned variables may also influence the relationship between managerial departure and firm subsequent performance.

Despite this wide range of factors that may influence firm profitability in the top executive turnover context, the main focus of the relevant studies concerned with the elements that influence the extent of the turnover and moderate the resulting consequences of alterations in the management ranks is set on

the effects exercised by the origin of the newly appointed CEO. In what follows, the moderating effect exercised by the CEO successor type is thus discussed in more detail.

2.4.1 CEO successor type as the moderator

Shen & Cannella (2002) suggest that the event of CEO departure followed by the loss of some of the most important managers demonstrates the behavioral relationships between top executives and that such joint turnover can have various consequences on the resultant organizational performance, depending on the successor origin. The main focus of their research is set on the analysis of the particularities of the event of CEO succession, whereby the authors underline the significance of the successor type as the predictor of the TMT turnover. They define three different cases of CEO succession – the follower, contender and outsider succession – and analyze the impact of the successor type on the departure of non-CEO top managers as well as the ultimate effect of the joint departure of top executives on company's performance. Thereby, each successor type does not only manifest the circumstances under which the former CEO had been succeeded, but it also influences and determines efficiency of company's following operations in an extensive way.

The authors suggest that the framework of CEO's succession, referring to the circumstances under which the incoming CEO took the place of his/her predecessor, is one of the most fundamental determinants moderating the TMT turnover resultant from the CEO departure as well as the effects of the turnover on the corporate result. This phenomenon can be explained by the fact that there is a direct relation between the unique features of the succession event and the successor type. It is therefore straightforward that different successor types affect the post-succession executive turnover differently, as they may determine for example the extent of the turnover. Consequently, the successor type moderates the relationship between the change in the structure of the TMT and organizational behavior (Shen & Cannella, 2002).

According to Shen & Cannella (2002), it is rather improbable that the TMT turnover resultant from the *follower succession* will substantially shape business performance of the firm either in a positive or a

negative way. There is evidence from research that the event of follower succession is to a large extent characterized by managers' expected departures after reaching the pension age. Hence, this is an example of a succession situation that is characterized by continuous and peaceful replacement of all members of the TMT. Another kind of the turnover among top executives after a new CEO appointment is the one caused by the *contender succession*. In this case, the newly appointed CEO comes into the company with new goals, visions and intentions to introduce and implement significant changes. The expected outcome of such attempts is restructuring of management team that may result in either forced or voluntary departures from the company. As a consequence, the time periods after the executive turnover may be associated with improvements in business performance. Indeed, the results of the research carried out by Shen & Cannella (2002) reveal that a positive effect of the TMT turnover on company's operational performance can be identified, as far as the succession by a contender is concerned. Moreover, the authors of the study also underline the positive relationship between the contender (as well as the outsider) succession and the non-CEO executive turnover after a new CEO appointment. This finding is of particular importance since the post-succession turnover has been adopted as a factor signaling process of strategic transformation in the previous literature (Friedman & Saul, 1991; Helmich & Brown, 1972). From the general perspective, Sakano & Lewin (1999) suppose that change of management at the top of the corporate hierarchy brings about the strategic and organizational changes, introduced from the top down. The third type of the turnover classified by Shen & Cannella (2002) is the TMT turnover in a wake of *outsider succession*. Outsider successors share some of the general features and functions with contender successors, as their appointment is likewise associated with innovation and anticipated success. The typically very tense relationship between non-CEO top managers and the newly elected CEO makes the composition of the top management team predestined for adjustments and changes. Generally, restructuring follows in two ways; it is either encouraged by the CEO with the ultimate aim to replace superfluous senior executives by new managers bringing valuable expert knowledge, experience and fresh energy (Helmich & Brown, 1972; Wiersema, 1995), or is caused by the individual TMT members, as an expression of frustration, disagreement with the new CEO nomination and/or concern about their personal future in the company (Friedman & Saul, 1991). As a result, Shen & Cannella (2002)

emphasize that the turnover of the firm's most important personnel succeeding the appointment of an outsider has negative effects and can be associated with drop in operational output.

Barron et al. (2011) build upon the theoretical concepts developed by Shen & Cannella (2002) and analyze three distinct events of contender, follower and outsider succession aligned with the departure of other top management team members from the firm. The authors suggest that the consequences of the departure of the most powerful executives on strategic changes and organizational performance vary depending on the successor type as well as on the fact whether other executives also exit the firm. Specifically, the authors find out that discontinued operations are conditional on the collective departure of the CEO and other top executives from the company; that CEO departure and discontinued operations are correlated only in the event of contender succession; and that in the event of outsider succession, the probability of discontinuing operations increases only in the case of loss of other important personnel.

In their research, Kesner & Dalton (1994) analyze and compare the two distinct events of insider and outsider succession. They point out that for the purpose of organizational turnaround, the insider successor might be less inclined to change the structure and the composition of the TMT than the outsider successor. As a result of this reasoning, the findings of the study carried out by the authors suggest that succession by an outsider causes higher turnover activity when compared to the insider succession.

Similar results can be also found in a study concerned with management turnover for the top corporate officers carried out by Fee & Hadlock (2004). The authors find out that the probability that a non-CEO senior manager exits the company increases in the times of CEO departure, especially in the events of outsider succession. The freshly elected outside CEO is more inclined to replace the current executives directly below him/her in the corporate hierarchy in order to create a new team of executives, seeing that he/she does not feel particularly connected with the current team. As a result, it can be hypothesized that the CEO origin moderates the relationship between turnover and performance. The authors also underline that these findings may suggest that the assessment of top executives'

performance happens on a collective basis, implying that a poorly performing team is treated as an entity and is thus usually replaced by entirely new team of executives.

Moreover, Kesner & Dalton (1994) underscore the effects of outsider succession on voluntary departure of managers, which may result from the disagreement with company's decision as well as from concerns about the new situation in the company. However, the likelihood that a new CEO appointment arouses similar feelings is much lower in the event of insider succession. Thereby, it is important to point out that the insider successors are expected to continue with the plan of action of his/her predecessor, while the outsider successors tend to bring significant changes to the current strategy.

2.5 Consequences of the turnover in the TMT after a new CEO appointment

In terms of organizational implications of the change in the structure and composition of the TMT team, some researchers (e.g. Keck, 1997) argue that organizational performance increases after the TMT turnover, while the more recent literature (e.g. Messersmith et al., 2013) suggests that the exact opposite is true. Yet, others (e.g. Virany et al., 1992) claim that there is no relationship between TMT turnover and firm's performance after a new CEO appointment, when studied in isolation.

The existing literature on the topic of TMT turnover and its organizational implications is inconclusive (Kesner & Dalton, 1994). On the one hand, there is some evidence in the literature to support the opinion that the extensive post-succession top executive turnover initiated by the newly appointed CEO is an inevitable step in organizational efforts aimed at implementing changes and thus improving performance. On the other hand, the results of numerous studies imply that the direct consequence of changes in the TMT composition following the CEO succession are turbulences resulting in even more severe decline in operations.

Relying on the upper echelons theory (Hambrick & Mason, 1984), Shen & Cannella (2002) analyze the consequences of changes in the composition of the TMT resulting from the appointment of a new

CEO on company's operating behavior. As reported by the authors, the evidence in the existing literature suggests that company's performance after the new CEO appointment is highly contingent on the framework of the succession, and not on the occurrence of the situation of CEO departure as such.

Shen & Cannella (2002) make an important contribution to the existing research relating to post-succession executive turnover and its impacts on business development by revealing their findings indicating that the turnover among top executives not only determines organizational future, but its effects vary significantly depending on the successor origin. While the results demonstrate that the replacement of executives at the top company level positively influences firm's performance (measured as the return on assets) in contender succession, it has a negative influence in the event of outsider succession. Moreover, the authors find out that the detrimental influence on organizational performance caused by the outsider succession can be attributed to a large extent to the substantial increase in executive turnover rate after the appointment of a new CEO. This implies that even though the appointment of an outside CEO as such can be the right decision, the damage caused by the departure of valuable personnel is bigger than any potential benefits that can be derived from his/her appointment.

In terms of positive impacts of TMT turnover on organizational behavior, Barker et al. (2001), claim that the reshuffle in the TMT induces the much-needed upturn in poorly performing companies, seeing that high rates of turnover are directly related to considerable organizational changes (e.g. in terms of structure, strategy and control). Virany et al. (1992) highlight the positive consequences of the replacement of the upper-echelon organization members on organizational efficiency, particularly in unstable environment. By means of alterations in leadership at the top, the company can improve its TMT members' abilities and intercommunication processes, which in turn enables the corporate officers to analyze the situation correctly and act accordingly.

Kesner & Dalton (1994) emphasize the significance of the concept of escalating commitment for the assessment of attempts for organizational turnabout. They underscore the fact that company's top

executives might be so confident about the efficiency of the plan of activities that they are no more able to objectively judge the accuracy of their decisions. As a result of the early commitment, it is very likely that managers are willing to keep spending organizational resources for exactly those business activities that have led to decrease in operational performance. Eventually, this type of behavior may destroy the company as such. However, the likelihood of similar behavior determined by the commitment to the past decisions and operations is considerably lower for newly appointed outside managers. It can be expected that they are more able to assess the current company situation without bias. As a result, TMT turnover has beneficial implications for the company.

With regard to the negative consequences associated with the TMT turnover, there is a large body of research supporting this view. As is documented by the increasing amount of more recent literature on the effects of TMT turnover (Messersmith et al., 2013; Hancock et al., 2013; Hausknecht & Trevor, 2011; Nyberg & Ployhart, 2013; Park & Shaw, 2013), the increasing levels of (collective) replacement of top executives decrease organizational efficiency. Some authors explain the decline in performance following the departure of corporate officers as the result of deterioration or loss of human and social capital that represents one of the most valuable organizational resources (Messersmith et al., 2013; Shaw et al., 2005a, b; Dess & Shaw, 2001; Shaw et al., 2013). The results of the study conducted by Fee & Hadlock (2004) also indicate that the TMT disposes of valuable human capital that is characteristic and unique for the particular team of managers.

Messersmith et al. (2013) incorporate the concept of loss of human and social capital that is associated with the departure of personnel in their study concerned with the collective-level turnover. The main focus of the authors' analysis is set on the examination and determination of the effects of various levels of TMT turnover on the consequent organizational operating behavior. Thereby, they first analyze the relationship between both variables and then test whether there are moderators influencing the relationship between them. From a general perspective, they find out that a major reshuffle of personnel at the top ranks is harmful for the organization. The findings of the study carried out by the authors indicate that excessive turnover at the TMT level erodes firm's performance. Thereby, this phenomenon can be explained by the fact that companies with a constant team of top managers are

more likely to successfully create and follow a suitable strategy thanks to the collective human and social capital that is guided and adjusted to the personal abilities of the organizational members as well as to the external requirements. However, according to the results of their study, the negative relationship between TMT turnover and organizational performance is non-linear, showing a decreasing tendency at higher rates of turnover. Moreover, this effect may be moderated by several aspects; the authors find out that high tenure of the members of the TMT as well as the environmental munificence weaken the negative effect.

Besides human capital, Leana & Van Buren (1999) underscore the particular relevance of social capital for organizational efficiency and warn against the negative implications related to its loss. Thereby, the authors define social capital as an organizational resource indicating the nature of relationships among organizational members that are determined by the amount of mutual trust and the degree of clear orientation towards common goals shared by the individuals.

Several researchers support the belief that one of the biggest issues related to the change in the structure and composition of the top management team is that the turnover may destroy the system of social connections that has been established in the company (Cao et al., 2006; Dess & Shaw, 2001; Shaw et al., 2005a). As a result, this reduction in social capital is identified with negative consequences such as lacking communication between individuals within the firm and problems with forming strategic partnerships outside the firm. Especially the events of high turnover activity may significantly deteriorate overall performance level as they destroy or exhaust the key resource of social capital. This in turn results in limited unification of the human capital, decreased knowledge-sharing both inside and outside the organization and reduced trust from organizational members (Messersmith et al., 2013).

According to Kesner & Dalton (1994), the turnover among top executives is directly linked to the changes in informal connections and relationships, whereby the negative perception by managers staying in the company of such event becomes ever stronger as the number of departing executives increases. Widespread replacement of senior executives arouses bad feelings and causes worries about

the position, competences and authority among the non-departing managers. Thus, the consequence of extensive turnover among the TMT members caused by the CEO succession is a barrier to achieving a positive reversal in the trends of the preceding periods. This view is in accordance with more recent research. Hilger et al. (2013) propose that dismissal of senior executive personnel is harmful for the organization due to the perception by those executives who remain in the company of such happening. It is very likely that the forced departure causes negative feelings and disruption within the team, ultimately having negative impact on firm's performance.

Messersmith et al. (2013) refer back to Kor & Mahoney (2005) and Grant (1996) and emphasize the importance of firm-specific and team-specific knowledge for organizational success as well as the problem of loss of such valuable knowledge resulting from the TMT turnover. Research has proven that as far as the members of the top management team are concerned, higher firm- and team-specific knowledge leads to better operating performance. As the people disposing of in-depth knowledge of the organization exit the firm, their know-how is no more available. Therefore, the turnover in the upper level management positions is in many cases directly linked to the loss of individual implicit (also known as tacit) knowledge. Incoming executives' missing general knowledge that is usually shared at the team level is one of the most important issues related to the turnover, since this kind of knowledge is necessary for mutual sharing and incorporating information, experience and know-how that is not familiar to all involved managers. Supporters of this theory suggest that increasing levels of TMT turnover can exhaust this valuable organizational resource which in turn may lead to a downturn in performance.

According to Shaw et al. (2005a), the adverse consequences of TMT turnover on the business performance are twofold; firstly, it induces deficiency of firm-specific skills and knowledge connected with the loss of important personnel and, secondly, it generates changes in the existing social structure of the firm. Taking these arguments into consideration, it seems vital for the successful existence of an organization to secure and expand human and social capital at the TMT level by means of promoting experience and knowledge sharing. However, widespread replacement of the upper-level managers works against these attempts and is thus harmful for the firm. Specifically, Shaw et al. (2005a) explain

that TMT turnover is disadvantageous for organizational performance for two particular reasons. The first reasoning is that high levels of turnover may restrict the growth of the important organizational capital. The second reasoning is that the TMT turnover may destroy or exhaust the already existing sources of human and social capital.

While the substitution of individual corporate officers is an advantageous approach from both TMT and organizational point of view, Messersmith et al. (2013) rely on the existing literature and claim that widespread replacement of upper managers (at the collective level) hurts operational performance, particularly when assessed from a human and social capital viewpoint. More generally, Hausknecht & Trevor (2011) claim that the consequences of turnover at the collective level (when compared to turnover at the individual level) on firm's performance not only occur right away, but they also last for longer periods. In addition, Hilger et al. (2013) mark that even individual dismissal of management team members can be relatively costly for the organization because of the compensation for the dismissed manager as well as the expenditures related to the search and appointment of his/her successor.

Meier & Hicklin (2008) are also concerned with diverse effects of varying levels of TMT turnover and explain the concept of "diminishing damage" which is based on the premise that organizational growth is being hampered as the rates of turnover move upwards from their low. The authors demonstrate that at some point the loss of additional managers resulting from the ever increasing levels of turnover changes from more and more detrimental to more and more insignificant. The results of the study carried out by Shaw et al. (2005b) support the argument that the negative impact of high turnover activities on organizational performance will be weakened at high levels of TMT turnover. Referring to the evidence in the literature, Messersmith et al. (2013) theorize that there is a negative relationship between turnover at the TMT level and organizational performance, whereby the negative effect of initial increase in the level of turnover weakens with the increasing rates of turnover. This hypothesis is also supported by the results of their research.

Several other researchers also suggest that the discussed variables demonstrate a non-linear relationship. Kesner & Dalton (1994) hypothesize that the relationship between TMT turnover and firm's post-succession business performance is curvilinear, claiming that both extremely high and low levels of turnover are detrimental for organization. While the widespread replacement may cause disruption, low turnover is not always desired, as it increases personnel-related costs and decreases the innovation potential. For that reason, a moderate extent of replacement of senior executives is essential for efficient introduction of organizational change. Yet, extensive replacement at the top ranks can have damaging consequences for the organization. However, according to the results of their analysis, there is no evidence of a curvilinear relationship between managerial turnover and post-succession performance.

Nevertheless, there is evidence in the literature that moderate levels of the TMT turnover have favorable impact on the operating behavior, seeing that they can help to boost performance as a result of improved innovativeness, flexibleness and versatility (Abelson & Baysinger, 1984; Dalton & Todor, 1979). Research suggests that negative implications are associated with both too low and too high levels of turnover. Supporters of this view believe that particularly low turnover activities contribute to a performance decrease resulting from the inability or unwillingness of the TMT members to improve their existing competences and think outside the box. Moreover, it is very likely that executive officers working for the company for several years stick to the (outdated) decisions that are based on their previous experiences and obsolete knowledge. This scenario might be especially dangerous for the future of the company, ending up with a downturn. Messersmith et al. (2013) also argue that in the case that the company misses the opportunity to substitute some of its top executives it may face serious problems related to the degradation of human and social capital. There is evidence in the existing literature (Miller, 1991) that when being in the same company for a long period of time, managers can become "stale in the saddle", meaning that they fail to adjust firm's structure and strategy such that it corresponds to the changing environment, which in turn leads to a decrease in financial performance. Moreover, balanced reshuffle in higher management positions helps to eliminate inefficient managers, to prevent stagnation and to support the development of new and

innovative ideas (Walsh & Ellwood, 1991). Some research even suggests that the replacement of the upper-level managers is not equally advantageous for companies operating in different industries; it may turn out to be a very appropriate strategy in branches with fast changing knowledge requirements (Virany et al., 1992; Keck, 1997). In his work, March (1991) suggests that low turnover rates are especially beneficial for companies that follow exploitation rather than exploration strategy. On the other hand, however, extensive levels of TMT turnover have contradictory effects on firm's operating behavior because they engender loss of human and social capital (Hausknecht & Trevor, 2011). Referring to the studies promoting the positive effects of the moderate levels of the turnover at the TMT level, Messersmith et al. (2013) suppose that both too low and too high rates of turnover lead to a decline in organizational performance. Thereby, they refer back to Hausknecht & Trevor (2011) who cite some other researchers proposing an inverted-U curvilinear relationship between the turnover among TMT members and organizational effectiveness, meaning that low rates of turnover increase firm's performance but a reversed effect can be observed as the level of turnover increases.

Yet, there are theories in the literature suggesting that there is no direct link between the replacement of the upper-level managers and firm's operating performance. As reported by Kesner & Dalton (1994), one of these theories is the so-called ritual scapegoating. Proponents of this theory identify the times of downturn as periods that last only a short while and are followed by a boost in performance. For this reason, the (post-succession) positive turnaround is characterized as a common phenomenon rather than the result of replacement of incompetent executive(s). Their involuntary departure is the company's manifestation of disagreement with and/or disappointment about the current situation, where the manager(s) can be identified as the 'scapegoat(s)'.

3 Methodology

3.1 Databases

Similarly to numerous other studies conducted in this research area, the present analysis applies secondary data that is drawn from large financial databases. The two principal data sources used to fulfill the main purpose of this paper – examination of the performance consequences of the changes in leadership at the top that occur as a direct consequence of a new CEO appointment – are Execucomp and Compustat databases. Thereby, the necessary information on the new CEO appointment and the alterations in the management ranks among top executives is derived from Execucomp and the data on firm performance (return on assets) is gathered from Compustat. In what follows, both databases and their corresponding suitability for the purpose of this research are described in more detail. In terms of the choice of Execucomp, the database is suitable for answering the formulated research question, providing several benefits. From a general perspective, Execucomp database includes information about upper-level managers in the publicly traded companies in the United States (S&P 1500 firms) during a period of several years. This panel data set contains thorough data on individual corporate executives, including their total compensation. As reported by Messersmith et al. (2013), companies are obligated to disclose individual compensation of at least five most highly paid managers. As a result, numerous researchers (e.g. Bloom & Michel, 2002; Carpenter & Sanders, 2002; Fredrickson et al., 2010; Henderson & Fredrickson, 2001; Main et al., 1993) refer to the group of the highest-paid executives as the TMT, seeing that this group represents, by its very nature, the most important organizational personnel. With the aim of promoting comparability between individual companies, I take into account data on the CEO and the three highest-paid non-CEO executives in each firm and define this group of individuals as the TMT. A more precise definition of the structure and composition of the TMT can be found in the section describing selected variables. Moreover, Execucomp distinguishes between CEO and non-CEO senior executive personnel and thus enables to assess year-to-year changes in the leadership at the top, identifying the distinct events of CEO departure and replacement of the non-CEO top managers. In addition, the database also specifies whether the senior executive served as a director, CFO or COO of the company

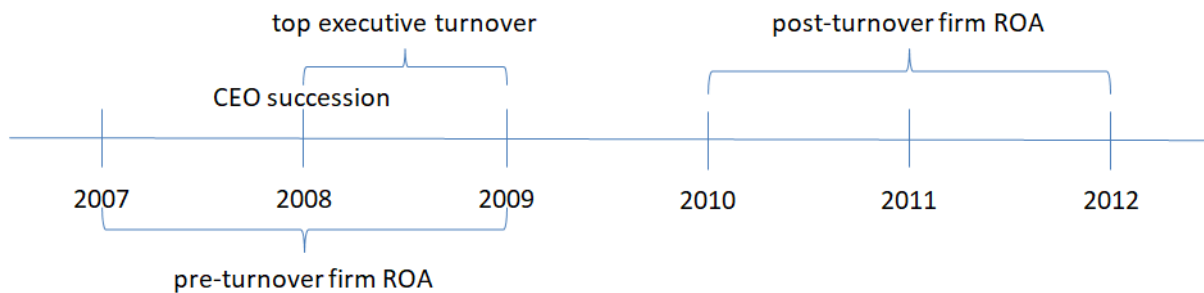
respectively. Availability of this information enables clear determination of turnover among company's executives serving on the board of directors, as well as Chief Financial and Operating Officers, which is also of particular interest for this study. The data on firm performance is obtained from Compustat, a database consisting of financial and market data on publicly traded companies, covering a time span of numerous years. The database contains, among others, information regarding total assets and income before extraordinary items – two variables that are essential for calculation of firm performance, measured as return on assets. The panel data allows assessing fluctuations in firm performance and thus enables defining companies as having improving or declining performance.

3.2 Data and sample

The population for this research is large, publicly traded companies in the United States. The available Execucomp dataset contains information on corporate officers for the period from 2002 through 2016. The initial sample consists of 2791 publicly traded companies, resulting in a panel of 162,221 firm-year observations. However, a closer look at the dataset reveals that the fiscal year 2016 contains disproportionately low number of observations and is therefore excluded from further analysis. Considering the research question and the ultimate goal of this paper, the event of CEO succession is the basic prerequisite for the sample. Therefore, as the first step in the analysis, it is necessary to sort out those companies that experienced a new CEO appointment during a particular time period, precisely the time horizon between 2003 and 2011. The choice of this time span is contingent on the definition and measurement of top executive turnover and subsequent organizational performance. As explained in more detail in the subchapter dedicated to variables and their measurement, assuming that the CEO change happens in 2008, one can assign responsibility for the post-succession managerial turnover that occurs within subsequent 2-year period (years 2008 and 2009) to the freshly appointed CEO. In order to assess performance consequences of this event, it is essential to determine average firm return on assets over the three years after the turnover period (namely the years 2010-2012) and thereby to control for firm performance before the turnover period (namely in the years 2007, 2008 and 2009), which explains the undertaken restriction of the sample (see Figure 1). Following this

reasoning, it is necessary that the new CEO appointment occurs between the years 2003 and 2011, seeing that there is no data available neither for the assessment of pre-turnover firm performance for the CEO appointments that occur before the year 2003, nor for the measurement of post-turnover firm performance for the CEO appointments after the year 2011.

Figure 1: Logic behind the time span



After several modifications (e.g. deleting observations due to missing data), the adjusted Execucomp dataset is merged with the Compustat dataset that includes, among others, information regarding firm financial performance. The Compustat dataset contains data on 21,493 firms during the years 2001-2016, creating 185,689 firm-year observations in total. Similarly as in the case of Execucomp, the first and the last year are not taken into account, seeing that the amount of observations corresponding to the two respective fiscal years is relatively little. In the following, the sample is further limited to those observations where there is complete information on firm ROA for six subsequent fiscal years, with the view of determining organizational performance. Merging the two datasets into one single data base and further adjustments yield a final sample of 1310 unique firms, representing companies with complete data that experienced a CEO change within the given time span, namely from 2003 to 2011.

3.3 Research design

There are some aspects of the research design that help meaningfully supplement the general definition of the adopted approach. Firstly, the research design applied in the present study is panel, also known as longitudinal, indicating a data set in which the performance of individual firms is

observed across time. Thereby, correlations between turnover rates and average organizational performance across several years are paramount. Moreover, the data structure is lagged, implying time distance between the assessment of the turnover rates of the most important managers and the evaluation of subsequent firm profitability. The structure of time lags of the variables measuring managerial turnover is applied because firm performance is measured using data from the preceding years. As explained by Boyne et al. (2011), application of a lagged structure is relevant and appropriate seeing that the effects of the magnitude of alterations in the upper level management positions directly below the CEO in the corporate hierarchy on firm profitability might be visible one or more years after the actual reshuffle of the management team.

3.4 Variables and their measurement

3.4.1 Dependent variable

Firm performance (ROA)

As already mentioned several times, the main focus of this study is set on the analysis of the effects of turnover in upper level management positions on organizational efficiency. Thereby, firm financial performance after the top executive turnover that is induced by the CEO succession is measured as return on assets (ROA), calculated annually for all companies in the sample. The choice of ROA as the variable representing firm performance is based on its understandability and wide acceptance as accounting measure of organizational performance in the related research (Zajac, 1990). Moreover, this accounting-based measure of firm profitability shows medium and longer-run consequences of happenings, actions and changes in the company (Hilger et al., 2013). Seeing that this study relies on data available in two particular financial databases, return on assets is calculated as income before extraordinary items divided by total assets in a given fiscal year as reported by Compustat.

The measurement of ROA, representing financial performance of a firm, refers back to the existing research. In a study concerned with performance consequences of CEO succession carried out by Shen & Cannella (2002), the authors refer back to Kesner & Dalton (1994) and explain that with the view of

smoothing variations in return on assets that are characteristic for each fiscal year and capturing the consequences of the leadership transition completely, it is essential to consider average ROA during the period of the first three post-succession years. In addition, more recent studies (e.g. Messersmith et al., 2013) also rely on performance data covering a multiple-year period in order to avoid biased results that may be caused by significant year-to-year variations. Similarly to the approach employed by Shen & Cannella (2002), I calculate the post-turnover firm performance as the average ROA during the first three years following the (second year of the) two-year period of the TMT turnover. This implies that TMT turnover that occurs in the years 2008 and 2009 predicts firm performance in the years 2010-2012 (see also Figure 1). The time horizon of three consecutive years was chosen to assess the performance consequences of the alterations in the management ranks, long enough to capture the direct effects of the turnover, but short enough not to be influenced by other (unrelated) aspects.

In accordance with the work of Kesner & Dalton (1994), in terms of measuring firm financial performance, this study relies on data on six subsequent fiscal years. Specifically, three years for the performance following the post-succession TMT turnover (dependent variable *ROA_new*) and three years for the performance in the three preceding years (control variable *ROA_old*).

As explained by Hausknecht & Trevor (2011), the applied approach of measuring organizational performance is a reasonable one for the purpose of this paper, as it takes into account both direct and longer-run performance consequences that may be caused by collective organizational turnover. This fact is also emphasized by Messersmith et al. (2013) who remark that the utilized method allows for evaluation of performance consequences over time, such that the temporary decreases in performance related to the introduced shift in company strategy are not judged as the direct outcome of changes in leadership at the top.

3.4.2 Independent variables

Before defining the independent variables used in the present analysis, it seems meaningful to examine and describe the underlying situation of CEO succession, shared by all companies in the

sample, more closely. As reported by Barron et al. (2011), the prevailing view in the relevant literature is that the event of CEO succession covers both the departure of the current CEO from the formal *post* of CEO and from the *firm* as such. Indeed, it is often the case that the departing CEO assumes another leadership position within the company – either his/her previous position or an entirely new function, the very common example being the Chairman of the Board of Directors. Referring to the approach commonly used in the existing research, I do not differentiate between the case when the CEO actually exits the company after leaving office and the case when he/she continues holding other posts in the firm, and I refer to both scenarios as CEO change. Thereby, the relevant variable for the analysis is the date when the newly appointed Chief Executive Officer enters his office (*becameceo*).

With respect to the factors that are expected to exert a significant influence on firm's post-turnover performance, three independent variables can be determined in this study: top management team turnover (*num_execleft*); COO departure (*COO_left*); and CFO departure (*CFO_left*) from the company. The definition and measurement of each of these variables is provided below.

3.4.2.1 TMT turnover

Prior to the definition of the TMT turnover and the explanation of its measurement, the interpretation and clarification of a firm top management team is essential. With reference to the study conducted by Barron et al. (2011), the definition of the company's top management team is based on the total compensation – including salary, bonuses, other annual and restricted stock grants and long term incentives – reported by Execucomp. Specifically, the members of the TMT are the three highest-paid non-CEO top managers in the respective company. Except of the research of Barron et al. (2011), a comparable method can be found in the previous literature, such as the work of Fee & Hadlock (2004) and Hayes et al. (2006). In addition, the assessment of the TMT in this study is also contingent on the data available in the Execucomp data set. Referring to other studies conducted in this research area, defining TMT based on the total compensation of the corporate officers is a widely used method especially in studies using financial statements as their primary data source. Some researchers

determine the composition of the TMT by means of assessing those five managers, including the CEO, that receive the highest compensation, as specified in the financial statements of the respective company (e.g. Carpenter et al., 2001 and Carpenter et al., 2003). Others, similarly to the approach adopted in this study, define TMT as consisting of those executive officers that are declared as the top five in the Execucomp database (Bertrand & Schoar, 2003). Taking into account evidence in the literature, the determination of the composition and the size of the top management team is in accordance with other related studies.

With regard to the turnover in the management ranks, I use the approach applied by Barron et al. (2011) and conclude that in the case that the name (or the respective ID) of the manager does not appear in the record of the company's top three non-CEO corporate officers receiving the highest compensation in the subsequent year, the manager exited the company. Seeing that this study is concerned with post-CEO-succession managerial turnover, the period of two subsequent years following the departure of the CEO is of particular interest. In other words, in the case that the CEO exits the specific company in 2008, the changes in the list of the top three corporate officers in 2008 and 2009 are examined (see also Figure 1 for better understanding). TMT turnover is then defined as the sum of those executives that left the company in one of the two years following the CEO succession. This way of measurement of post-succession TMT turnover is in line with the approach applied by Shen & Cannella (2002) and Kesner & Dalton (1994). As the authors explain in their work, a time span of two years after the new CEO appointment is chosen in order to entirely capture the consequences of the transition in the CEO's position on the turnover among upper managers (Wagner et al., 1984) and the time usually necessary for the newly appointed CEO to get in the lead and to assume control of the company (Gabbro, 1987). Hayes et al. (2006) also argue that the impact of CEO replacement on the probability that a particular manager or a group of managers exits the company endures for approximately two years.

As far as the turnover patterns of the firm's most important personnel are concerned, each and every change in the list of the top three highest-paid non-CEO executives is classified as TMT turnover and included in the analysis, without taking into consideration the reason for the departure of the

individual manager from the company that is indicated in the Execucomp. Regarding the fact that Execucomp distinguishes only between four individual reasons for executive departure, namely “deceased”, “resigned”, “retired” and “unknown”, whereby the data on the reason is missing by numerous observations, I consider this method to be appropriate.

3.4.2.2 COO turnover

Contrary to the description of the TMT, the definition of a firm COO (and CFO) is self-explanatory and does not require any further explanation. In terms of the definition and measurement of COO turnover, the departure of the manager serving in this position is determined as follows. Just as in the case of the TMT members, the manager is assumed to leave the company provided that his/her name could not be associated with the position of the COO in the respective year. In the statistical analysis, the change of COO is defined in the case that, within a predefined period of time, two (or more) different executives serving as COOs in a particular company could be identified in the database. On the contrary, there is no change of company’s COO if there is only one officer in this position during a given time horizon. Again, the actual reason of the departure is not of particular interest.

3.4.2.3 CFO turnover

The definition and measurement of CFO turnover is analogous to the approach adopted for the determination of COO turnover (see above).

3.4.3 Moderators

From a general perspective, there are numerous aspects inside and outside the firm that moderate the relationship between the turnover of the upper-echelon organizational members and the subsequent organizational performance. However, as already discussed in the literature review part, researchers (e.g. Barron et al., 2011) mainly focus on the effects exercised by the CEO origin. The present analysis

extends the scope of existing research by means of investigating the effects of two additional moderating factors – board membership of the departing executives and high-technology industry.

I suppose that the strength of the relationship between managerial turnover and subsequent organizational performance is dependent on three main factors: the CEO origin referring to the fact whether the CEO is an insider or an outsider – *insider*; the fact whether the departing managers (including CFOs and COOs) were also active as directors – *execdir*; and the fact whether the particular company is operating in high-tech or non-high-tech industry – *hightech*. As a result of these interactions, the change of TMT would yield different performance consequences (1) in the case that the incoming CEO is an insider (vs. when he/she comes from outside the firm); (2) in the case that the CFO/COO/ the departing corporate officers are also on the board of directors (vs. when the CFO/COO/leaving managers are not board members); and/or (3) depending on the industry (high-tech vs. non-high-tech), represented by the SIC code, the company is operating in.

The influence of the three above-described moderating factors on the relationship between each independent variable and the dependent variable can be determined by means of interaction terms. For example, the moderating effect of CEO origin on the relationship between turnover in upper level management positions and organizational performance is defined as the interaction terms: TMT turnover (*num_execdirleft*) x CEO origin (*insider*); CFO departure (*CFO_left*) x CEO origin (*insider*); and COO departure (*COO_left*) x CEO origin (*insider*) respectively. The moderating effect of the fact whether the departing executive holds a directorship position in a specific year and the moderating effect of industry characteristics on the relationship between changes in the leadership at the top and firm performance is assessed analogously.

3.4.3.1 Successor type

With reference to the existing literature (e.g. Shen & Cannella, 2002; Barron et al., 2011), successor type is expected to moderate the relationship between top executive turnover and organizational performance. As explained by the authors, successor type determines the specific circumstances that

shape the subsequent turnover process and thus affects the extent of the actual turnover among top executives. These changes in the management ranks, in turn, influence firm post-turnover performance. Similarly to the approach applied by Kesner & Dalton (1994), this study differentiates between two types of successors, namely insiders and outsiders. In terms of distinction between CEO insider vs. outsider, insider succession (internal promotion) occurs when the name of the freshly appointed CEO can be found in the set of company's top executives (as reported in Execucomp) for a period of at least two years before his/her appointment as CEO. Otherwise, the incoming CEO can be characterized as an outside successor and it is the event of external recruitment. This approach is applied by Barron et al. (2011) and it enables to eliminate those situations when a candidate from outside the enterprise concerned first takes over a lower position in the corporate hierarchy. After this transition phase, the candidate is usually nominated as the new CEO. In the analysis, the coding of CEO origin (successor type) is binary, whereby the variable "*insider*" defines those CEOs that fulfill the above mentioned criteria. A similar approach is adopted by Virany et al. (1992), whereby the authors specify the distinction between insider and outsider successors taking into consideration the individual's employing company one year prior to the new CEO appointment.

3.4.3.2 Number of departing executive directors

There is an assumption that the number of executive officers serving as directors that left the particular company may considerably influence the relationship between top executive turnover and subsequent firm performance. Numerous researchers (e.g. Shen & Cannella, 2002) suggest that formation and construction of the board of directors are significant determinants of organizational financial performance. Moreover, Vafeas & Vlittis (2012) underline that firm performance is to a wide extent contingent on the accurate choice of the members of board of directors, as they can significantly determine the aspects of corporate management and thus influence its quality. Therefore, taking into consideration particular responsibilities of the firm's executives that have a seat on the board of directors and the specific role that they play in the company, it seems self-evident that a departure of a manager exercising such position cannot be equated with a departure of an executive that is not active

as a director. The variable specifying number of directors that left the company (*num_execdirleft*) defines all those relevant executives exiting the company within two years after a CEO succession that served on the board of directors during the reported fiscal year. The information on executive directorship (expressed by means of binary variable *execdir*) can be drawn from Execucomp database.

3.4.3.3 High-tech vs. non-high-tech industry

The type of the industry in which the company operates is also included as a moderator of the influence of turnover of executives directly below the CEO in the corporate hierarchy on the following firm profitability. As pointed out by Virany et al. (1992), the replacement of the upper-echelon organization members may turn out to be more beneficial for those companies that operate in unstable, constantly changing markets. This phenomenon can be explained by the fact that companies operating in these volatile markets aim to stay updated and thus seek to introduce changes, innovations and modernizations more often. In order to fuel the company with valuable human capital bringing new ideas, the CEOs tend to replace the top executives more often. By means of the management reshuffle, the company can improve its TMT members' abilities and intercommunication processes, enabling the managers to analyze the situation correctly and then act in an appropriate, suitable way (Virany et al., 1992). From the other perspective, March (1991) underlines the fact that especially companies following exploitation rather than exploration strategy should focus on retaining their upper-echelon organization members, as this may have positive consequences on firm performance. Seeing that the high-tech industry is fast-changing, characterized by high instability on the demand side and ever developing technological requirements on the supply side, and taking into consideration that companies operating in this industry usually pursue exploration strategies, managerial turnover might have more positive consequences for the companies operating in high-tech environment.

As far as the distinction between high-technology and non-high-technology firms is concerned, SIC codes are employed to assign companies to one of the two groups. From a general perspective, SIC codes are commonly utilized in scientific research to determine high-tech companies. In their study, Kile & Phillips (2009) provide a list of individual three-digit SIC code combinations to identify

corporations operating in high-tech industries, on the basis of their main business activities. Based on the results of the research conducted by the authors, they created a framework for a correct classification in terms of high-tech vs. non-high-tech industries. Seeing that appropriate categorization is a prerequisite for accurate conclusions regarding the moderating effect of industry on the relationship between top executive turnover and subsequent firm profitability, I rely on the study of Kile & Phillips (2009) that includes, to my knowledge, the most recent and reliable analysis on this matter. Figure 2 presents the SIC codes and the corresponding names of those industries that can be classified as “high-technology”. In the statistical analysis, the companies operating in high-tech environment are defined by means of a binary variable *hightech*.

Figure 2: High-tech industries

SIC Code	Industry Name
283	Drugs
357	Computer and Office Equipment
366	Communication Equipment
367	Electronic Components and Accessories
382	Laboratory, Optic, Measure, Control Instruments
384	Surgical, Medical, Dental Instruments
481	Telephone Communications
482	Miscellaneous Communication Services
489	Communication Services, NEC
737	Computer Programming, Data Processing, etc.
873	Research, Development, Testing Services

Source: Kile & Phillips (2009)

3.4.4 Control variables

As far as control variables are concerned, it is necessary that other factors affecting organizational efficiency are covered in the evaluation of the relationship between turnover and performance in order to avoid false and erroneous findings. Each variable that is anticipated to exert significant influence on firm post-turnover performance is included in the regression as a control variable. Specifically, these

variables are firm prior performance (*ROA_old*), age of the departing managers, namely CEOs, CFOs and COOs, at the time when they exited the respective company (*ceo_age*, *cfo_age* and *coo_age*), firm size (*size*), industry type (*industry_type*) and the year of a new CEO appointment (*dum**). By means of including these control variables in the analysis it can be assured that the results of the regressions are not being biased by the correlation of both the independent variable (turnover in upper level management positions) and the dependent variable (firm performance) with a third variable such as industry type (Wonnacott & Wonnacott, 1981). This implies that the identified turnover-performance relationship is statistically valid.

3.4.4.1 Firm prior performance (pre-turnover firm ROA)

The first and the most significant control variable is firm prior performance. Existent literature indicates that organizations are autoregressive systems (O'Toole & Meier, 1999), which implies that firm current performance is largely contingent on its previous rates. For that reason, it is very likely that the results obtained from the analysis are biased in the case that firm prior performance is excluded from equations defining firm performance. Past performance may exert a significant influence on the effect of the turnover of non-CEO executive personnel on organizational efficiency. Boyne et al. (2011) refer back to Meier & O'Toole (2002) and explain the choice of firm prior performance as the control variable. They suggest that the probability that the performance consequences of the turnover of senior executives are contingent on the performance of the respective firm before the change is very high. Seeing that previous performance determines current performance to a large extent, it is necessary to control for this very relevant factor.

Referring to previous research, in their work concerned with performance consequences of CEO succession, Shen & Cannella (2002) calculate pre-succession company ROA as the average firm return on assets over the period of three subsequent years preceding the event of a new CEO appointment. As explained by the authors, incorporation of this control variable in the analysis helps to prevent the problem of regression to the mean (Brown, 1982). Similarly to the approach applied by

Shen & Cannella (2002), I control for firm prior performance and include pre-turnover firm ROA (*ROA_old*) as one of the seven control variables in the analysis. It is calculated as the average ROA over the three years before the completion of the two-year period of turnover in the management ranks. This means that in the case that the new CEO is appointed in 2008, years 2008 and 2009 are defined by the top executive turnover in the wake of that new CEO appointment and performance consequences of this event are then determined by means of calculating the average of firm ROA in the three upcoming years (2010-2012). Firm prior performance, similarly, covers a period of three subsequent years and is in this case assessed as the average organizational performance in the previous years, namely 2007, 2008 and 2009. Specifically, this three-year period can be closer defined as one year before the CEO succession, the year of the CEO succession that is also the first year of the two-year turnover period, and one year after the CEO succession that represents the second year of the two-year turnover period (see also Figure 1).

I suppose that firms showing high performance before and during the period of reshuffle in the management ranks will continue to perform successfully also after the change of the senior executives. Similarly, companies initially recording a negative business performance are anticipated to perform badly after the period of alterations in the guard on the top as well.

3.4.4.2 Firm size

The next aspect known to generally influence organizational performance is the firm size (*size*). Therefore, I include a control for this factor in the analysis and calculate the size of the company as the natural logarithm of the total number of employees within the respective firm as stated in the available Compustat database. The underlying reason for logging the variable before entering it into the actual regressions is a large variance in size of companies included in the database (Barker et al., 2001). This very common way of measurement can be also found in the existing literature (e.g. Shaw et al., 2005b; Messersmith et al., 2013).

3.4.4.3 Industry type

The control variable defining industry type relies on the SIC code classifications. Specifically, the first two digits of the SIC code classify the major industry group, whereby the 11 different divisions are agriculture, mining, construction, manufacturing, transportation, wholesale, retail, finance, services, public administration, and non-classifiable (Siccode, 2017). With reference to existing research conducted in this area, e.g. Park & Shaw (2013) divide all companies in their final sample into one of 11 distinct groups characterized by different industry types. Analogously, the control variable *industry_type* is categorized into 11 groups based on the first two digits of the SIC code also in the current study. The number of companies operating in each specific industry is depicted in the Figure 3. As the table shows, there are six companies that could not be assigned to any of the ten concrete industry types (defined as non-classifiable) and there is no firm in the final sample representing public administration. The information on the representation of the other industry types can be found in the table below.

Figure 3: Industry types

industry_type	Freq.	Percent	Cum.
agriculture	3	0.23	0.23
construction	18	1.37	1.60
finance	240	18.32	19.92
manufacturing	529	40.38	60.31
mining	54	4.12	64.43
nonclassifiable	6	0.46	64.89
retail_trade	109	8.32	73.21
services	175	13.36	86.56
transportation	139	10.61	97.18
wholesale_trade	37	2.82	100.00
Total	1,310	100.00	

With the view of incorporating non-numeric data types into regressions, it is essential to work with categorical data that symbolize distinct categories. Therefore, in the Stata analysis, industry types are defined by dummy variables ind1-ind9, whereby ind1 stands for agriculture, ind2 for construction, ind3 for finance, ind4 for manufacturing, ind5 for mining, ind6 for non-classifiable industry, ind7 for retail trade, ind8 for services, ind9 for transportation and ind10 for wholesale trade. However, there are

only nine industry types (ind1-ind9) included as control variables in the regressions (see Appendix 3: Regressions). This is the case because of the so-called “dummy variable trap”, describing the situation in which the explanatory variables are (multi)collinear. As a result, it is enough to define nine industries in order to be able to classify ten different ones, meaning that in the case that the company does not operate in the industry1-9, it is straightforward that it is operating in the industry10. Hence, deleting the ind10 from the regressions is reasonable. Otherwise, one of the variables ind1-ind10 would be omitted because of collinearity. The variable omitted in the regression can be then considered as the base value and the coefficients of the other dummy variables show how the respective variable differs from this base variable. Changing the base value from ind10 to any other industry type (except of the ind6) does not change the regression results in terms of the (non)significant influence of the industry type exerted on the firm performance. The specific case of the six companies that represent ind6, standing for non-classifiable industries, is discussed in the results section in more detail.

3.4.4.4 Year of the CEO change

It is essential to control for the year of a new CEO appointment with respect to the fact that it is possible that the firm performs significantly better in one financial year than in another, as a result of various external factors that are beyond the control of the company and its managers, such as financial crisis. Despite the fact that organizational efficiency is highly determined by managerial decisions, it is to a certain extent affected by general market characteristics, varying from one year to another. As suggested by Kaplan (1993), including a year dummy variable in each regression can help to control for fluctuations in the market or in the economy. With reference to Kaplan (1993), for the purpose of controlling for the year of the change of the CEO in this study, one dummy variable (*dum**) for each year in the sample (2003-2011) is created and controlled for in the regression analysis.

3.4.4.5 Age of departing managers

In terms of the age of departing managers, this variable enables basic differentiation between dismissals and ordinary retirements of top executives. In their research, Shen & Cannella (2011) point out that the assessment of circumstances behind CEO replacement is rather problematic, seeing that companies are usually not willing to reveal the true reason of manager's departure from the firm. Prior evidence from the academic literature suggests that the age of departing CEOs can be identified as a determinant of the distinction between retired and dismissed individuals. Thereby, the authors usually use the age of 65 as a benchmark for determining the reason of executive's departure (e.g. Shen & Cannella, 2011). This implies that CEOs who left the company at the age of 65 or higher are defined as retired and those who exited the company before reaching the standard retirement age are considered as dismissed. It has to be pointed out that dismissal of a highly ranked officer is expected to be the result of his/her poor individual performance, associated with possible decline in organizational efficiency. In order to control for the fact whether the manager left the company at the age of 65 or higher, three variables controlling for the age of departing managers (CEOs, CFOs and COOs) at the time when they exited the company is included in the analysis, namely *ceo_age*, *cfo_age* and *coo_age*. Referring to existing research, variables controlling for a manager's age are also included in previously conducted studies (e.g. Fee & Handlock, 2004; Hayes et al., 2006), whereby the authors also underline the fact that managers usually retire around the age of 65. From a general perspective, especially CEOs (but also CFOs and COOs) can be characterized as top executives of higher age holding senior positions within the company, who are expected to exit the company because of their health conditions rather than with the view of pursuing their careers elsewhere. Therefore, it seems reasonable to assume that managers departing from the company at the age of 65 or higher retire in order to hand over the reins to their successors.

3.5 Statistical analysis

In order to put the above stated assumptions regarding turnover-performance relationship to the test, multiple linear regression analysis with post-turnover firm ROA as the dependent variable was used,

applying data on 1310 large U.S. companies experiencing a change of CEO during the period 2003 to 2011. Thereby, it was controlled for other factors that are likely to influence firm performance – firm prior performance, age of the departing CEOs, CFOs and COOs at the time when they exited the company, industry type and firm size. The results of the regressions stated below refer uniquely to the final sample of companies without lacking information.

With the view of assessing individual influence of the three distinct events of managerial turnover on the outcome variable (firm ROA), explanatory variables were inserted into separate regressions independently, one after another, in the following order (see Appendix 3: Regressions): number of executives that left the company (reg1), the change of CFO (reg2), and the change of COO (reg3). Subsequently, the effect of the three moderating factors was examined. In the nine regression equations with moderators (reg4-reg12), the moderators – high-tech industry, number of departing executives that are members of the board of directors, CEO origin – and their interaction with the respective independent variable were entered subsequently. Thereby, the seven control variables – firm prior performance, age of top managers (CEOs, CFOs and COOs) leaving the company, industry type, firm size and the year of CEO turnover – were entered after the respective independent variable/ interaction term in all regressions.

4 Results

4.1 Regression results

For the regression outputs, please see Appendix 3: Regressions (reg1-12).

4.2 Description of the results

The following subchapter discusses the results of the conducted statistical data analysis with the ultimate aim to provide adequate answers to the main research question - namely what are the

performance consequences of the post-CEO-succession turnover of the upper-echelon organization members. Specifically, the three main regressions (with three different independent variables: number of departing executives – *num_execleft*; the change of CFO – *CFO_left*; and the change of COO – *COO_left*), the interaction effects between managerial turnover and the three chosen moderating factors (whether the company operates in high-tech industry – *hightech*; whether the departing managers were also serving as directors – *num_execdirleft*; and whether the newly appointed CEO is insider – *insider*), as well as the influence of the seven control variables (firm prior performance – *ROA_old*, age of the departing executives at the time when they left the company – *ceo_age*, *cfo_age*, *coo_age*, industry represented by the SIC code – *ind1-ind9*, the firm size – *size*, and the year of the CEO change – *dum**) are examined, presented and interpreted.

A linear relationship between three distinct events and firm performance was estimated. However, such relationship has proven to be statistically significant only in one of the three hypothesized events. The present findings demonstrate a positive significant relationship between the change of a COO and organizational profitability. Yet, they do not validate the significance of the other two hypothesized events – the departure of the TMT members and the change of the CFO – on firm ROA. Moreover, seeing that the moderating factors are not significantly associated with the post-turnover performance, the mediating role of industry, number of departing executive directors and CEO origin is not supported. In addition, six out of seven control variables – age of the managers leaving the company, industry type, firm size and the year of the CEO change – fail to reach the expected level of statistical significance. As expected, firm previous performance is positively correlated with its subsequent, post-turnover performance.

The main effects of the three distinct events following the new CEO appointment – the TMT turnover, the CFO departure and the COO departure – on firm ROA were tested in the regressions 1-3. Subsequently, the interactions with high-tech industry, the number of departing executives that served on the board of directors and the CEO origin were tested in models 4-12. Outcomes of all regressions suggest that the change of the members of the senior management team preceded by a change of the company's CEO, with the exception of the COO, has no significant impact on firm subsequent

efficiency measured as ROA. The regression results clearly demonstrate that the COO change, together with the firm prior performance, is positively correlated with firm ROA following the turnover among executives directly below the CEO in the corporate hierarchy, resulting from a leadership transition.

By looking at the outcomes of the regressions (reg1-12, see Appendix3: Regressions), that constitute the main results of this research, the most important conclusions can be summed up as follows.

Overall, the p-value (Prob > F) of the F-test (for example $F(23, 1259) = 8.04$ in reg1) is smaller than 5% (Prob > F = 0.0000 < 0.05) in all regressions 1-12, showing strong model significance and thus demonstrating good results. The p-value indicates that the constructed model is an appropriate one, suggesting that at least one coefficient is a non-zero number. From a more general perspective, this test allows evaluation of the proposed model and indicates whether the applied set of predictors is relevant for the model. As a result, the Null Hypothesis (H_0 : coefficients for the variables of the model are equal to zero) can be rejected, implying that the chosen variables do correlate with firm post-turnover performance.

The value of the R-squared indicates how much of the variability of the dependent variable (firm post-turnover performance) is accounted for the variance of the variables in the model. So, put simply: R-squared determines how “good” the conducted regressions are. The R-squared values in the regressions depicted below are relatively low – around 13%, ranging from 12.80% for example in reg1 to 13.21% in reg12. These results indicate that approximately 13% of the variability of firm ROA is explained by the variability of the variables in the model. Considering the obtained results, it can be assumed that some important predictors may be omitted in the model. The problem may lie for example in failing to take into consideration other relevant variables, such as different general situation on the specific markets corresponding to the particular years, or in neglecting different parts of the firm’s lifecycle.

In terms of the two-tail p-values test, comparison of the values in the column $P > |t|$ with 5% tests the hypothesis whether there is a correlation between predictor and the dependent variable in the

corresponding row. In the case that the p-value is lower than 0.05 (for the 95% confidence interval), it can be concluded that the specific variable has a significant influence on the dependent variable – firm ROA. Alternatively, 99% ($p < 0.01$) or 90% ($p < 0.1$) confidence levels can be used in the statistical analysis. However, here the focus is on 95% confidence level, as this approach represents the most common one. The p-values in the column $P>|t|$ are higher than 0.05 in all twelve regressions, except of the p-values of the variables *ROA_old* and *ind6* in both the three main regressions and the nine regressions with the interaction terms. Moreover, the p-value of the variable *COO_left* is smaller than 0.05 in two out of four regressions where the departure of the COO is included (reg6 and reg12). This implies that the only three variables that significantly correlate with firm post-turnover performance are firm prior performance, the departure of the COO from the company, and the industry type. Seeing that the p-value of each of these three predictors has always the same (positive) sign across all regressions (meaning that the number sign does not change from a positive to a negative one when looking at the particular models), it can be concluded that there is a positive correlation between each predictor and the dependent variable. However, the results concerning *ind6* require closer attention. It is essential to take into consideration that *ind6* stands for non-classifiable industries that are represented by the SIC code 9900-9999 and that there are only 6 companies out of 1310 (less than 0.005%) that represent this industry type. The results obtained for the variable *ind6*, namely the p-value = 0.000 in all twelve models, is not unexpected regarding the fact that the firms in this “industry” are considerably different from all the other firms in the sample. A closer look at the business activities of the six firms belonging to the non-classifiable industry type does not reveal any significant characteristics that are common to all of them. As a result, no conclusion can be drawn with regard to the effect of *ind6* on organizational efficiency.

At this point, it is also important to underline that if I would choose *ind6* instead of *ind10* as the reference variable, meaning that the dummy variable *ind6* would be omitted in the regression analysis, the regression results regarding the effect of industry type on firm performance would change considerably (more detailed information on this matter can be found in the description of the control variable industry type). More precisely, under these circumstances, the results indicate that all industry

types (*ind1-5* and *ind7-10*) have significant influence on organizational performance ($P > |t| = 0.000$ for all industry types in all twelve regressions). However, such results are misleading and do not reflect the real correlation between the specific industry type and the dependent variable. In fact, these results have to be interpreted with reference to the variable chosen as the base value, which is in this case a variable representing non-classifiable industry type that differs from the remaining industry types significantly. It seems therefore reasonable to choose as the baseline the industry type that is more representative for the sample. This implies dropping e.g. *ind10*, rather than *ind6* from the regression model.

As an alternative to the p-values test described above, the t-values test can be also used to judge the regression outcomes. By means of examining the t-values, it can be stated whether the corresponding predictor variable influences the dependent variable. In the case that the t-value of the regressor is higher than 1.96 (for a 95% confidence interval), it can be suggested that the variable has a significant influence on the dependent variable – in this case firm performance. The relevance of the variable is the greater, the higher the t-value is. By looking at the results of the regression analysis, the t-values can be interpreted as follows. Similarly as in the case of the p-value test, the only three variables exercising significant influence on corporate post-turnover performance are firm prior performance, departure of the COO from the company and the industry type.

Overall, based on the regression results, it can be concluded that the firm prior performance as well as the departure of the COO from the company that is preceded by a change of the firm's CEO have significant positive influence on firm performance after the turnover among upper-echelon organization members. Even though the results also suggest that the variable *ind6* has a significant influence on firm ROA, it can be assumed that such results are caused by other factors. For the reasons outlined above, the positive significant relationship between *ind6* and firm ROA will not be discussed in any further detail.

After discussing the (non-)significant influence of the predictor variables on the dependent variable, it is equally important to take a closer look at their coefficients. From a broader perspective, the

coefficients of the predictor variables indicate how much Y (post-turnover ROA) changes when X (moderator or control variable) increases by one unit. In addition, they show the direction of the relationship between the two variables, which can be either positive or negative.

In the third regression for the moderator *hightech* (reg6, see Appendix 3: Regressions), the coefficient value for the variable representing COO departure (*COO_left*) is 0.1836718. It is a positive value, suggesting that the departure of the firm's Chief Operating Officer following the change of the CEO in the respective company causes an increase in the profit generated by that company. Moreover, the p-value for this variable is significant (0.025), which shows that the variable *COO_left* does indeed have an effect on the company's profitability after the turnover of the upper managers, induced by the CEO succession. For the interaction term *COOhightech* (generated as *COO_left* * *hightech*) the coefficient value is -0.2644065, indicating a negative relationship between *COOhightech* and ROA. However, the variable *COOhightech* has no significant influence on ROA (p-value = 0.125). In addition, by looking at the regression results, it can be seen that the impact of COO departure from the company on corporate performance is not affected by its interaction with the moderating factors – *hightech*, *num_execdirleft*, and *insider* – and that it remains positive in all regressions (whereby it is significant in reg6 and reg12). Following the same logic, the coefficients for other independent variables, moderators and control variables can be interpreted.

4.3 Descriptive (correlations and descriptive statistics) table and results table

Table 1 shows the means, standard deviations and the Pearson correlation coefficients between the pairs of variables that were used in the analysis.

Table 1: Descriptive table (correlations and descriptive statistics table)

VARIABLES	mean	std.dev.	1	2	3	4	5	6	7	8	9	10	11	12
1. ROA_new	0.1061018	0.9771684	1.0000											
2. num_execleft	1.791603	1.042309	0.0375	1.0000										
3. CFO_left	0.3267176	0.4691921	-0.0126	0.2257	1.0000									
4. COO_left	0.1587786	0.3656091	0.0565	0.2181	0.0501	1.0000								
5. hightech	0.2282443	0.4198612	-0.0282	-0.0046	0.0353	-0.0092	1.0000							
6. num_execdirtleft	0.5374046	0.6153543	0.0243	0.4256	0.0633	0.1276	-0.0725	1.0000						
7. insider	0.2648855	0.4414407	0.0020	0.0045	0.0226	-0.0094	0.0815	0.0241	1.0000					
8. size	1.475015	1.856791	0.0063	0.1734	0.0388	0.0115	-0.1636	0.1142	0.0872	1.0000				
9. ROA_old	0.0736997	0.3605337	0.0370	-0.0697	-0.0002	-0.0421	-0.0986	0.0194	0.0887	0.1974	1.0000			
10. ceo_age	0.0206107	0.1421313	-0.0072	0.0278	0.0046	0.0430	0.0008	-0.0280	-0.0371	0.0090	-0.0298	1.0000		
11. cfo_age	0.0045802	0.0675474	-0.0049	-0.0000	0.0091	0.0069	0.0256	0.0467	-0.0379	-0.0470	-0.0645	0.0798	1.0000	
12. coo_age	0.0030534	0.0551945	0.0022	0.0108	0.0201	0.0519	0.0362	0.0189	-0.0023	0.0264	-0.0425	-0.0080	-0.0035	1.0000

The results are reported in Table 2, containing the outputs of all twelve regressions and showing the relationship between the dependent variable – firm ROA – and the independent variables, moderators and control variables used in the models.

Table 2: Results table

VARIABLES	(1) reg1 ROA_new	(2) reg2 ROA_new	(3) reg3 ROA_new	(4) reg4 ROA_new	(5) reg5 ROA_new	(6) reg6 ROA_new	(7) reg7 ROA_new	(8) reg8 ROA_new	(9) reg9 ROA_new	(10) reg10 ROA_new	(11) reg11 ROA_new	(12) reg12 ROA_new
CFO_left		0.00766 (0.0804)			0.00697 (0.0856)			0.00694 (0.0940)			0.0115 (0.0856)	
ROA_old	0.180** (0.0744)	0.178** (0.0741)	0.182** (0.0740)	0.178** (0.0746)	0.177** (0.0743)	0.179** (0.0742)	0.179** (0.0745)	0.178** (0.0742)	0.178** (0.0742)	0.180** (0.0746)	0.178** (0.0744)	0.181** (0.0742)
ceo_age	-0.244 (0.186)	-0.243 (0.186)	-0.254 (0.186)	-0.244 (0.186)	-0.244 (0.186)	-0.249 (0.186)	-0.244 (0.186)	-0.243 (0.186)	-0.263 (0.186)	-0.239 (0.186)	-0.242 (0.186)	-0.267 (0.186)
cfo_age	0.0600 (0.424)	0.0609 (0.424)	0.0608 (0.423)	0.0638 (0.425)	0.0644 (0.424)	0.0448 (0.424)	0.0708 (0.425)	0.0605 (0.425)	0.0686 (0.424)	0.0656 (0.424)	0.0630 (0.424)	0.0615 (0.423)
coo_age	0.103 (0.468)	0.105 (0.468)	0.0621 (0.468)	0.110 (0.469)	0.111 (0.469)	0.161 (0.472)	0.109 (0.468)	0.105 (0.469)	0.0485 (0.468)	0.105 (0.468)	0.102 (0.469)	0.0952 (0.468)
size	0.0170 (0.0157)	0.0176 (0.0154)	0.0173 (0.0154)	0.0160 (0.0161)	0.0166 (0.0158)	0.0173 (0.0157)	0.0178 (0.0158)	0.0175 (0.0156)	0.0183 (0.0155)	0.0168 (0.0157)	0.0173 (0.0155)	0.0169 (0.0154)
num_execleft	0.00567 (0.0274)			0.00601 (0.0306)			0.000438 (0.0332)			0.0170 (0.0301)		
COO_left			0.126* (0.0724)			0.184** (0.0816)			0.0489 (0.104)			0.198** (0.0838)
hightech				-0.0193 (0.131)	-0.0226 (0.0855)	0.0176 (0.0767)						
exechightech				-0.00135 (0.0603)								
CFOhightech					0.00252 (0.131)							
COOhightech						-0.264 (0.172)						
num_execdirleft							-0.0524 (0.131)	0.000508 (0.0552)	-0.0298 (0.0489)			
execexecdir							0.0220 (0.0538)					
CFOexecdir								0.00110 (0.0900)				
COOexecdir									0.115 (0.109)			
insider										0.118 (0.129)	0.0196 (0.0733)	0.0578 (0.0646)
execinsider										-0.0578 (0.0634)		
CFOinsider											-0.0181 (0.125)	
COOinsider												-0.276* (0.162)
Constant	0.140 (0.190)	0.148 (0.185)	0.134 (0.185)	0.141 (0.192)	0.150 (0.186)	0.124 (0.185)	0.152 (0.192)	0.147 (0.187)	0.153 (0.187)	0.121 (0.191)	0.144 (0.186)	0.130 (0.185)
Observations	1,283	1,283	1,283	1,283	1,283	1,283	1,283	1,283	1,283	1,283	1,283	1,283
R-squared	0.128	0.128	0.130	0.128	0.128	0.132	0.128	0.128	0.131	0.129	0.128	0.132

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Regressions 1-3 report the main results concerning the analyzed relationship between top executive turnover and firm post-turnover performance, including the number of departing executives, the change of CFO, and the change of COO respectively. Regressions 4-12 report the results with the addition of the three interaction terms (moderators) – high-tech (vs. non-high-tech) industry, the number of executives also active as board members that left the company and the fact whether the newly appointed CEO was insider or outsider respectively. These variables are expected to moderate the relationship between the number of executives that left the company and the firm performance, the change of CFO and the firm performance, and the change of COO and the firm performance. In order to test this assumption, the interactions between individual moderators and independent variables are generated. By this means, the three moderators are added separately into each of the three regressions testing the effect of the particular turnover situation. More detailed description of the generation of the respective interactions can be found in Appendix 3: Regressions.

When interpreting the results from the Table 2, the value corresponding to the respective variable in each row represents the estimated coefficient while the number underneath this value, depicted in parentheses, demonstrates the standard deviations (standard errors). As the results show, the variable *ROA_old* that stands for firm performance before and during the turnover period is, as expected, significantly positively correlated with firm performance in all carried out regressions, on the 5% significance level ($p < 0.05$). The coefficient for *ROA_old* is positive across all models, ranging from 0.177 to 0.182. In addition, the variable *COO_left*, representing the departure of the COO from the company, shows significant positive relationship with organizational performance in three out of four regressions containing this variable; on the 10% significance level ($p < 0.1$) in reg3 and on the 5% significance level ($p < 0.05$) in reg6 and reg12 respectively. The variable *COO_left* does not display significant impact on firm ROA in reg9, where the interaction between the departure of the COO and the number of departing managers serving as directors (*COOexecdir*) is included. This can be explained by the fact that both variables are highly correlated (the value of the correlation coefficient between *COO_left* and *COOexecdir* is 0.7017), suggesting that the interaction might be superfluous in this case. Overall, the coefficients for *COO_left* are strictly positive, ranging from 0.0489 to 0.198.

The last significant coefficient is the coefficient for *COOinsider* – the interaction term between COO change and the insider CEO successor, which is negative and significant on 10% level of significance ($p < 0.1$) in reg12. Moreover, when looking at the multiple squared correlation coefficients (R-squared) in the results table, it can be also pointed out that that all twelve regression models explain about 13% of variance in post-turnover firm performance.

4.4 ROS results

In order to compare the obtained results concerning the consequences of top executive turnover on firm performance measured as return on assets with the results including another financial performance measure, the above-described statistical analysis was repeated with an alternative dependent variable – return on sales (ROS). The main findings relating to the relationship between managerial turnover and firm performance measured as ROS, computed as income before extraordinary items divided by total revenue as reported by Compustat, are summarized below. Descriptive table (correlations and descriptive statistics table) and results table are provided in Appendix 4: ROS results.

Overall, the results obtained from the statistical analysis after changing the dependent variable from *ROA_new* to *ROS_new*, referring to firm financial performance after the top management turnover period, are significantly different than expected. As the results show, the variable *ROS_old* that represents firm prior performance is significantly positively correlated with its subsequent performance in all carried out regressions. Comparable results can be seen in the case of *ROA_old*, suggesting that firm prior performance largely determines its following performance. However, the remaining regression outputs are conflicting with the ROA results discussed above. The variable *CFO_left* that stands for the departure of the CFO from the company shows significant negative relationship with organizational performance in three out of four regressions containing this variable. Similarly, the variable *num_execleft*, representing the departure of the three highest-paid managers from the company, shows significant negative relationship with organizational performance in three

out of four regressions containing this variable. The other significant coefficients are the coefficients for three interaction terms, namely: *CFOexecdir* – the positive interaction term between CFO change and the number of departing managers that were also active as directors; *execinsider* – the negative interaction term between the number of departing top three highest-paid executives and the CEO origin; and *CFOinsider* - the interaction term between CFO change and the CEO origin, which is also negative. In addition, the variable *insider*, representing the fact whether the CEO comes from inside or outside the respective company, shows significant negative relationship with organizational performance in one out of three regressions containing this variable.

From a general perspective, the obtained results seem relatively confusing and their interpretation is rather problematic. The key findings of the carried out analysis can be summed up as follows. The departure of the top management team members as well as the change of company's CFO are, according to present results, significantly negatively correlated with firm post-turnover performance measured as return on sales. These findings are in accordance with evidence in the most recent relevant scientific literature, suggesting that the departure of top executives from the company has negative consequences on its subsequent financial performance (e.g. Messersmith et al., 2013). However, this conclusion has to be drawn cautiously, seeing that this model has several issues. When looking at the multiple squared correlation coefficients (R-squared) in the results table, it has to be pointed out that that all twelve regression models explain only about 2,6% of variance in post-turnover firm performance. These values are very low, suggesting that some important predictors may be omitted in the model. Another issue concerns the p-value of the F-test ($\text{Prob} > F$) in the carried out regressions (not included in the present study). The value of $\text{Prob} > F$ is higher than 0.05 in almost all models. As already explained above, in the case that the p-value is lower than 0.05, it can be concluded that the presented model is an appropriate one and that the obtained results are satisfying. In terms of the evaluation of the suggested model, these results indicate that the applied set of predictors is not relevant for the model, meaning that the chosen variables do not correlate with firm post-turnover performance, calculated as ROS.

From another point of view, substantial differences between results obtained in the case when the dependent variable is represented by post-turnover firm ROA and the case when the firm performance is calculated as ROS can be explained by limited suitability of the second mentioned measure for the purpose of this research.

Organizational performance is a very complex phenomenon and researchers aiming to analyze the effects of various internal and external factors on firm profitability can choose from various ways of measurement. Seeing that this study is based on data available in two financial databases – Execucomp and Compustat, firm performance could be calculated either as income before extraordinary items divided by total assets (ROA) or as income before extraordinary items divided by total revenue (ROS) in a given fiscal year as reported by Compustat. Differences between both measures as well as their suitability for the ultimate purpose of this study are briefly discussed below. From a broader perspective, these two methods of financial performance measurement are widely applied in research concerned with organizational strategy. It has to be pointed out that neither ROA nor ROS takes into account non-financial performance measures. Moreover, both measures have their benefits and drawbacks and their appropriateness is largely contingent on the context of the particular study (Bierly & Chakrabarti, 1996). Return on assets is an accounting-based measure of firm profitability, demonstrating medium and longer-run consequences of happenings, actions and changes in the company (Hilger et al., 2013). Return on sales is an adequate measure of firm performance especially when assessing organizational profitability within the framework of merges and acquisitions (Krishnan et al., 2007). The underlying reasons for this approach are the decisive changes in assets and equity, resulting from the fusion and takeover processes. Therefore, while the results obtained from the analysis relying on the return on equity measure or on the return on assets measure might be biased, the return on sales measure is not associated with this issue. The final choice of ROA as the more appropriate variable representing organizational performance was based on its understandability and wide acceptance as accounting measure of firm performance in the existing research (Zajac, 1990). In addition, this decision was also reinforced by the fact that the use of return on assets as a performance measure is widely supported by a majority of the relevant studies conducted in this

research area. As a result, when taking into consideration the present research settings, it seems accurate and reasonable to rely on ROA, rather than ROS, as the measure of firm performance.

5 Discussion

5.1 Summary

Referring to the evidence in the current scientific literature and building on the existing research in the related field, the present study examines the relationship between turnover in upper level management positions resulting from a transition in the CEO's position and the subsequent business performance. More precisely, the performance consequences of widespread replacement at the top ranks induced by a new CEO appointment are investigated, analyzed and evaluated and the relevant research findings are presented. Thereby, the reshuffle of the non-CEO senior executive personnel is subdivided into three distinct events – top management team turnover, CFO turnover and COO turnover – that are studied and assessed individually. In addition, moderating effects of high-tech industry, number of departing executives that are also active as directors and the incoming CEO origin are examined, while controlling for firm prior performance, age of departing managers at the time when they exited the respective company, industry type, firm size and the year of the new CEO appointment.

One of the key findings of the statistical analysis is the fact that only the COO departure is associated with the increase in the firm subsequent performance. Neither the widespread replacement of the TMT executives nor the change of the CFO can be declared as a significant predictor of the firm's post-turnover profitability. The resulting conclusion can be thus formulated as follows.

According to the present results, there is no linear relationship between the dependent variable (firm ROA) and the two independent variables (executive departure and CFO change). The results indicate a significant, positive correlation between higher rates of COO turnover preceded by a change of company's CEO and the subsequent organizational profitability. In addition, as expected, firm prior performance is also positively associated with organizational post-turnover performance. On the

contrary, the six remaining control variables included in the analysis – age of the managers (CEOs, COOs and CFOs) leaving the company, firm size, industry type and the year of the new CEO appointment – do not meet statistical significance. Moreover, the interactions between the COO departure (as well as the departure of the CFO and the TMT members) and the three moderators – industry type, the number of departing executives with a seat on the board of directors and the incoming CEO origin – do not prove to be of a statistical significance. This implies that the new COO appointment as such is associated with contribution of adequate expertise and/or ability to induce appropriate changes in TMT processes, enabling the company to boost its current performance (Virany et al., 1992), regardless of other circumstances, such as industry type.

5.2 Contributions and implications

Overall, the results of the statistical data analysis suggest that post-CEO-succession turnover of the non-CEO top personnel does not fundamentally determine long-term corporate performance. Contrary to the formulated hypotheses concerning the expected outcomes, the obtained results indicate that neither the magnitude of turnover among TMT members nor the departure of the firm's CFO exert a significant influence on the subsequent organizational performance. In terms of the three main events expected to determine firm ROA, the only variable that seems to essentially affect corporate post-turnover profitability is the departure of the firm's COO from the respective company. With respect to the control variables included in the analysis, the only variable that is significantly related to firm current performance is firm prior performance. This finding is not very surprising regarding the fact that organizations are usually characterized by a pattern of relatively sustained performance, especially when the observed period covers a time span of a few years. Generally, organizational performance does not increase or decrease significantly from one financial year to another, seeing that the projects and activities generating corporate income are defined by longer duration. It was therefore expected to observe a similar outcome regarding organizational performance, as dramatic fluctuations in firm profit are not very common and can be seen especially in the times of unexpected changes in the market environment, such as economic crisis. However, several interesting implications can be derived

from the fact that the change of company's COO has significant, positive associations with corporate performance after the reshuffle in upper level management positions induced by a new CEO appointment. The present research provides evidence that the subsequent appearance of the event of CEO succession followed by a change of the COO has positive consequences on firm profitability measured as ROA. Thus, the results obtained suggest that after the CEO succession, the company should also aim to change its current COO, with the view of boosting its present and future business performance. When trying to reverse the negative business trend and endeavoring to reshape firm strategy, the company should not only replace its CEO but also the COO, as this might be a basic prerequisite for achieving the desired turnaround. Concerning the freshly elected CEOs, they should consider replacing company's current COO after their appointment.

With reference to the results obtained from the statistical analysis, possible explanations of the principle finding concerning the positive performance consequences of COO departure following CEO succession are provided below.

From a general perspective, company's chief operating officer is often defined as a co-leader and a direct successor of the departing CEO (Zhang, 2006), perceived as the most appropriate person to be in charge of strategic decision-making processes after the current CEO leaves the company. However, if the board decides to appoint a new CEO from outside the company, which is usually the case, the COO might choose to exit the company as well. The underlying reasons might be unfulfillment of his/her career expectations, or the fear of forced departure initiated by the newly elected CEO. Alternatively, COO departure might be involuntary, closely related to the change of CEO, seeing that both executives work as a team and cooperate closely. Therefore, in order to bring about a change in the company, it might seem insufficient to change only one of the two leading personalities, as they usually share the same vision about company's future.

At this point, I would also like to make clear that the following theoretical explanations and understandings of the obtained results are nothing else than hypothetical, cannot be analyzed and proven in these research settings and require more intensive research.

Firstly, the observed increase in firm performance can be explained by outside CEO succession followed by the appointment of a new COO of his/her choice. Indeed, there is evidence in existing research (Finkelstein & Hambrick, 1996; Friedman & Singh, 1989) to show that the probability to elect a new CEO from outside the company rises especially in the times of weak organizational performance. In turn, the outside CEO is expected to bring in “his/her” top executives who would take the place of the current officers. Concerning this matter, Zhang (2006) points out that when trying to assess the relationship between CEO and COO, it is essential to take into consideration previous research findings showing that in the most cases CEO has the decisive word in the COO appointment process. Moreover, Hayes et al. (2006) provide evidence that it is highly probable that freshly appointed CEOs bring in top managers from outside the company. Even though the results of the study conducted by the authors show that these executives usually do not have the same background as the CEO in terms of their previous employing company, I suggest that they may share a common demographic and/or academic and employment background. This implies that the incoming CEO chooses his/her closest coworker(s) based on subjective preferences, so that they can divide the tasks, cooperate, work effectively as a team and thus help to boost performance. Considering the high level of interconnection between individual tasks of the CEO and the COO, the relationship between both leaders can have considerable influence on the firm. Under these assumptions, the departure of the former COO resulting from a company’s CEO succession and the choice of the new COO influenced by the incoming CEO may be one of the explanations for the increase in organizational performance.

Alternatively, the results of the statistical analysis could be interpreted as follows. Seeing that CEO and COO cooperate closely, it seems evident that it might not be enough to replace company’s CEO when trying to implement changes in the company. Rather, collective replacement of CEO and COO can be the right step in efforts to boost organizational performance. As explained by Hambrick & Cannella (2004), company’s CEO usually deals with external and strategic issues while a COO’s main focus is set on internal operating issues. From a broader perspective, COO is not responsible for a specific organizational entity, individual division or a particular department. Instead, he/she is more or less in charge of managing, coordinating and supervising all company projects and day-to-day

activities. Therefore, one could assume that if the company is facing difficult times, it lies in the responsibility of both CEO and COO to initiate and implement all necessary and appropriate measures to reverse the trend. Indeed, the evidence from research carried out by Fee & Handlock (2004) indicates that qualities and abilities of top executives are assessed by means of measuring performance, implying that managers exiting the company are often seen to be responsible for poor performance. Thereby, the responsibility for weak performance of a department or a division is directly attributed to the manager who is in charge of the respective organizational entity. In the case of COOs (and CFOs), the study results suggest that these top executives are criticized for total weak organizational performance. In terms of the results obtained in the present study, the increase in organizational performance resulting from a change of COO that was preceded by a company's CEO succession could be explained by the particular importance of the role of the COO in the company's key decision-making processes. As such, replacing COO can help to promote organizational growth. The fact that COO change resulting from a new CEO appointment is positively correlated with firm subsequent performance might indicate that the new COO brings with him a wealth of knowledge, experience and expertise that is essential for successful company development. On the contrary, the change of company's CFO and/or its TMT members may not be sufficient to boost performance, as supported by the present results.

Another possible reason why COO departure from the company resulting from a CEO change might have beneficial consequences for the firm is the right timing of these succession events, in the sense that the company succeeds in completing the change of senior executive personnel before the expected change in organizational environment or in the respective industry, rather than attempts to change the guard at the top in reaction to these changes. So, a key factor of organizational success may lie in its achievement of interconnecting reshuffle in leadership at the top with new strategic alignment.

The following paragraphs summarize some interesting figures that can be derived from the data analysis, contributing to the overall picture of the phenomenon described and examined in this study. In terms of the firms constituting the sample, 26.49% per cent of the newly appointed CEOs were insiders – managers serving in the respective company for more than two years while 73.51% per cent

of the CEOs were outsiders – managers coming from outside the company. These results clearly demonstrate that when looking for a new leader, the vast majority of the companies tends to appoint a new CEO from outside the company, rather than to promote a manager from the firm's upper management ranks. These findings contribute to the existing research by providing evidence that outsider succession is a widespread phenomenon that can be observed across large publicly traded companies in the U.S. This is particularly the case when the firm is facing difficult times and experiencing decline in profitability, aligned with the lack of suitable candidates in top management ranks (Finkelstein & Hambrick, 1996). Newly appointed CEOs coming from outside the firm are generally appreciated for their ability to provide new vision and direction for the company (e.g. Wiersema, 1995) and reorganize the company successfully (Shen & Cannella, 2002). As far as the departure of the corporate officers is concerned, the percentages of turnover vary between TMT members, CFOs and COOs respectively. The proportion of TMT turnover among the corporations in the sample ranged from a low of 0% in 14.66 per cent of the companies (meaning that none of the executives left the company) to a high of 100% in 31.37 per cent of all companies (meaning that the company changed all of its three highest-paid non-CEO managers within the two-year period) with a mean of 1.8 departing executives. The formulation of the departure of the CFO/COO is binary, implying that the company either changes its CFO/COO or not. In the case of the CFO, the turnover reaches as low as 0% (no CFO departure) for 67.33 per cent of the companies in the sample and as high as 100% (CFO departure) for 32.67 per cent of all companies, with a mean of 0.3. Similarly, in the case of COO, 84.12 per cent of the companies record no COO departure and 15.88 per cent of the companies indicate COO departure, with a mean of 0.2.

Considering these results, the evidence suggests that the companies that have recently gone through a change of a CEO are very likely to reshuffle the team of its three highest-paid corporate officers as well. More precisely, approximately 85% of the companies in the sample changed at least one of its non-CEO top managers and more than 30% of the companies replaced all of its top three executives. These results suggest that one of the first organizational changes introduced by the freshly elected CEO consists of swapping out the top management team. Alternatively, another possible explanation

for the collective departure of the members of the senior management team is their voluntary decision to leave the company. As already explained in the section concerned with the underlying literature and concepts, the reasons for a voluntary departure from a company are manifold and vary from one case to another. These findings are in line with more recent scientific evidence on post-succession managerial turnover suggesting that the CEO departure from the firm is usually associated with either forced or voluntary departure of other members of the TMT (e.g. Fee & Hadlock, 2004; Hayes et al., 2006; Friedman & Saul, 1991).

Contrary to the alterations in the top management team, the change of a company's CFO/COO resulting from a new CEO appointment is not that common. Only around 30% of all companies in the sample report a change in the CFO and less than 16% indicate a departure of the COO from the firm. The rather low turnover rates may indicate that both the CFOs and the COOs have relatively stable position that is not endangered by the arrival of a new Chief Executive Officer in the company. As the newly appointed CEO aims to boost organizational efficiency, he/she may attribute poor performance to the TMT members rather than to the COO/CFO and is thus more likely to replace (some of) the members of the top management team. Another possible cause of this phenomenon may be the fact that as a large number of the incoming CEOs are outsiders, they prefer to keep some of the most important managers, such as COOs or CFOs, in the company, serving as their "right hand". Since their knowledge about the company is considerably limited, they may need someone who knows the company, its culture and the internal processes much better than they do. Furthermore, assuming that the freshly appointed CEO strives for a certain level of stability in leadership, he/she is inclined to keep some of the most important executives in the company. Moreover, an alternative interpretation can be derived from the research conducted by Meier & Hicklin (2008). The authors suggest that it is essential that the CEO takes charge of managerial turnover and that he/she supervises the process consciously. They claim that changing of the guard at the top is an organizational process that requires governing and regulation in order to achieve equilibrium between extensive turnover rates that are disruptive for the company and too low levels of turnover causing organizational inertia. Thus, CEOs should strive to reach moderate levels of turnover, reinforcing innovation and company development.

This implies that changing just some of the most important managers (e.g. TMT members) and retaining other key executives (e.g. COOs and CFOs) may have beneficial consequences for the company. Assuming that corporate leaders share the same view on the balance to be achieved between too high and too low turnover rates, it could be one of the possible explanations for the phenomenon observed in this study.

5.3 Limitations

It is essential to look at the results of the present analysis with regard to its limitations and to draw the resulting implications cautiously. One of the most important limitations concerns the measurement of firm return on assets, representing organizational performance. Despite the fact that the assessment of firm performance based on the three-year average ROA is very common in the scientific research, it determines organizational efficiency only in the three years after the two-year TMT turnover period and does not take into consideration firm performance in the following years. It is likely that the changes in leadership at the top lead to different performance consequences in the subsequent years, as the tenure of newly appointed managers increases. This fact has been also pointed out by Shen & Cannella (2002).

As far as the definitions and measurement of the variables are concerned, one possible limitation regarding the changes of managers directly below the CEO in the corporate hierarchy is that the fact that the name of a particular manager does not appear in the list of the firm's three highest-paid upper-level managers does not necessarily imply that the manager really departed the firm. In fact, the elimination from the list of the top three non-CEO corporate officers from one year to another can only indicate a decline in total compensation of the specific manager, rather than his/her departure from the company. However, Barron et al. (2011) examined this issue in more detail by means of thorough analysis of the complete set of company's executives that is available in the database, ranging from five up to eleven upper-echelon organization members. They conclude that the upper-level managers

that disappear from the firm's set of the three highest-paid non-CEO executives do indeed exit the specific company.

In addition, it is apparent that the applied measure of TMT turnover and COO/CFO departure from the company covers also the change of those executives that would have departed from the company irrespective of the CEO's departure. Examples include, among others, death of the manager, compulsory retirement, as well as turnover contingent on the structural changes in the organization (Kesner & Dalton, 1994). Nevertheless, I assume that such "ordinary" turnover events show a complete random distribution within the sample.

Another issue that is closely related to the above described limitation has been expressed by Kaplan (1993) and concerns the fact that the information on the age of the departing corporate officers is missing in the databases. Given that the age of organizational top managers is provided in the database, it would be possible to exclude the case of decease of a manger as well as the occasion of the forced retirement. As a result, a more clear and accurate distinction between the turnover induced by the new CEO appointment and the turnover that is caused by other factors would be possible. Even though the involved data collection would be more extensive and would go beyond the scope of this paper, it is important to point out that by this means the validity of the research could be improved.

The next possible limitation concerns the assumption that those managers who left the company at the age of 65 or higher are retired and those who exited the company at the age of 64 or lower are dismissed. Concerning the age of executives as the only determinant of this distinction might be incorrect in some cases. For example, Shen & Cannella (2011) report evidence of several CEOs who abdicate their position as company's CEOs before the age of 65 but continue to serve in other important position, such as chairman of the board. It is very unlikely that these CEOs were really dismissed, seeing that the company has no motivation to keep dismissed officers in such a high position. Moreover, there are some other reasons for managerial departure at any given age, such as health problems, unexpected decease or executive's voluntary decision to leave the company and

pursue his/her career elsewhere. Nevertheless, the approach used in this analysis finds support in prior literature evidence and is feasible in these research settings.

Following possible limitation that can be identified in the present analysis concerns the reason for managerial departure from the firm. Indeed, prior research suggests that companies are generally not willing to disclose the true reason of executive's departure from the company (Shen & Cannella, 2011). Therefore, the very relevant question whether the departing CFOs, COOs and the TMT members exited the company voluntarily, or whether they were rather forced to leave remains unanswered. From a broader perspective, two types of turnover can be characterized depending on the reason for managerial departure – voluntary turnover (caused by the departure induced by the respective managers) and involuntary turnover (caused by the departure induced by the company). Reduction-in-force turnover represents a specific category (Park & Shaw, 2013). Seeing that these distinct types of managerial departure can have various effects on the turnover-performance relationship examined in this study, it is necessary to bear in mind that this aspect is not taken into consideration due to limited availability of the needed data. Despite the fact that Execucomp generally distinguishes between four possible reasons for departure – retired, resigned, deceased and unknown – this information is missing for the majority of companies under study.

Referring to Denis & Denis (1995), in order to control for factors that determine revenues but are not connected with changing of the guard at the top, industry-adjusted changes in performance should be calculated. As explained by the authors, an industry-adjusted change in operating income can be characterized as the change in the ratio of operating income to total assets for the sample firm minus the same change for the median firm in the same industry, identified by a two-digit Standard Industrial Classification (SIC) code. Again, these calculations would go beyond the scope of the present study but it seems relevant to advise the reader of this matter.

5.4 Suggestions for further research

Regarding suggestions for further research, it seems inevitable to highlight the gap in the existing research concerning the relationship between post-succession managerial turnover and the subsequent firm performance. This gap could be filled by means of analyzing various aspects of the post-turnover organizational performance, concentrating on determinants, moderators and consequences of top executive turnover after a new CEO appointment. Focusing on different factors that may exert an influence on the turnover-performance relationship enables better understanding of the phenomenon as such. Therefore, some recommendations for further, more specific theoretical and empirical research are summarized below.

Taking into consideration the results of the current study, especially the nature of the relationship between COO departure and firm performance should be examined in more detail. Even though the present results suggest positive significant correlation between these two variables, more in-depth insides and knowledge about this interrelationship is needed, as it has been largely neglected in previous research. Hambrick & Cannella (2004) examine the internal and external aspects affecting the choice to nominate an executive who would fulfill the role of a COO in the company and then analyze the resulting implications and consequences of this decision on firm performance. However, to my knowledge, there is no study concerned with the effects of departure of company's COO on organizational efficiency.

In terms of the CEO successor type, the present study distinguishes between insider and outsider succession. However, a further distinction between follower and contender succession in the case of insider succession would be appropriate and advisable. Additional research could concentrate on performance implications resulting from alterations in the management ranks that are caused and determined by specific circumstances of the individual cases of the CEO succession, with the aim of answering questions such as: How does the CEO successor origin (when distinguishing between contender, follower and outsider successor) affect changes in the top management team composition and the following corporate performance? What are the consequences of the appointment of different

types of CEO successors on the COO and/or CFO replacement and the subsequent organizational efficiency?

In addition, it would be very interesting and appropriate to explore the possibility of a non-linear relationship between post-CEO-succession managerial turnover and subsequent organizational performance, seeing that there is some evidence in the literature that top executive turnover is beneficial for the company only to some extent and only under specific circumstances, and that both too low and too high levels of turnover might be detrimental to the company. The arising questions could be thus formulated as follows: What kind of relationship (e.g. linear, curvilinear, positive, negative) is there between top executive turnover and organizational performance? Which factors (e.g. tenure of the managers and/or of the departing CEO, external industry factors, and corporate strategy) moderate and determine this relationship? Under which conditions is the replacement of top executives advantageous vs. harmful for the company?

Summarizing the above, I believe that examination of turnover of corporate officers under various circumstances and the consequent discussion regarding the implications of their departure from the company on corporate profitability could be a rewarding field of further research. Despite the fact that this study has shed some light on the phenomenon of managerial departure induced by a new CEO appointment, a more comprehensive investigation of the underlying causes and resulting effects is crucial for better understanding of this occurrence and its impact on corporate future, focusing on suitable managerial actions that have to be undertaken to boost efficiency.

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7 Appendix

7.1 Appendix 1: Abstract (English)

Building on existing research concerned with the analysis of departure of the upper-echelon organization members from the company, the ultimate aim of the present study is to examine performance consequences of the top executive turnover resulting from a CEO succession. Thereby, the focus is set on the three distinct turnover events – change of COO, change of CFO and turnover among company's top three highest-paid executives. In addition, the moderating effects of high-tech industry, number of departing executives who were also active as directors and CEO origin on the relationship between turnover in the management ranks and firm subsequent performance are analyzed and evaluated. Using a sample of 1310 U.S. publicly traded companies experiencing a change of CEO during the period 2003 to 2011, this study extends the existing research by means of providing evidence that a change of COO following a new CEO appointment has beneficial consequences for the company in terms of increase in organizational performance, measured as return on assets (ROA). The contributions and managerial implications resulting from this principal finding are summarized and presented.

7.2 Appendix 2: Abstract (German)

Aufbauend auf den bestehenden Forschungsarbeiten zur Analyse des Ausscheidens der Mitglieder der oberen Führungsebene aus dem Unternehmen besteht das Ziel der vorliegenden Studie in der Untersuchung der Leistungskonsequenzen der Fluktuation unter den Führungskräften, die sich aus einer CEO-Nachfolge ergibt. Dabei liegt der Fokus auf den drei unterschiedlichen Möglichkeiten des Führungswechsels – COO-Wechsel, CFO-Wechsel und Fluktuation der drei höchstbezahlten Führungskräfte des Unternehmens. Darüber hinaus werden die Moderationseffekte der High-Tech-Industrie, der Anzahl der ausscheidenden Führungskräfte, die auch im Verwaltungsrat tätig waren, sowie der Herkunft des CEOs auf den Zusammenhang zwischen der Fluktuation unter den Mitgliedern der Führungsebene und der folgenden Unternehmensperformance analysiert und bewertet. Unter Verwendung einer Stichprobe von 1310 börsennotierten US-Unternehmen, die während der Jahre 2003 bis 2011 einen CEO-Wechsel erfahren haben, ergänzt die vorliegende Studie die bereits bestehende Forschung durch den Nachweis, dass das Wechsel des COOs nach der Ernennung eines neuen CEOs positive Auswirkungen auf das Unternehmen im Sinne der Leistungssteigerung, die als Return on Assets (ROA) gemessen wird, hat. Die Beiträge und Managementempfehlungen, die sich aus der Haupteckdaten ergeben, werden zusammengefasst und dargestellt.

7.3 Appendix 3: Regressions

reg1-reg3: Three main regressions explaining the effect of three different events – the magnitude of TMT turnover, CFO departure and COO departure – on organizational performance

The variables used in the following regressions can be described as follows:

ROA_new = firm performance calculated as ROA over 3 years after managerial turnover (DV)

num_execleft = the number of top executives that left the company (IV)

ROA_old = firm prior performance calculated as ROA over 3 years before and during turnover (CV)

ceo_age/ cfo_age/ coo_age = age of departing managers at the time when they left the company (CV)

ind1-ind9 = industry type based on the first two digits of the SIC code (CV)

size = company size calculated as the natural logarithm of the number of employees (CV)

dum* = dummy variable for the year of the CEO change (CV)

CFO_left = CFO departure from the company (IV)

COO_left = COO departure from the company (IV)

reg1: The effect of **the number of executives that left the company** on firm performance

```
. regress ROA_new num_execleft ROA_old ceo_age cfo_age coo_age ind1 ind2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	159.5932	23	6.9388348	F(23, 1259) =	8.04
Residual	1087.0993	1259	.86346251	Prob > F =	0.0000
				R-squared =	0.1280
				Adj R-squared =	0.1121
Total	1246.6925	1282	.972459049	Root MSE =	.92923

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
num_execleft	.005669	.0274005	0.21	0.836	-.0480867	.0594247
ROA_old	.1795513	.0743576	2.41	0.016	.0336728	.3254297
ceo_age	-.2437529	.1861238	-1.31	0.191	-.6089	.1213941
cfo_age	.0599843	.4238777	0.14	0.887	-.7716002	.8915689
coo_age	.1031566	.4677398	0.22	0.825	-.8144787	1.020792
ind1	-.0958539	.5605159	-0.17	0.864	-1.195502	1.003794
ind2	-.0690748	.2751823	-0.25	0.802	-.6089412	.4707916
ind3	-.0500972	.1681778	-0.30	0.766	-.3800367	.2798424
ind4	-.0306502	.1608226	-0.19	0.849	-.34616	.2848597
ind5	-.0846815	.200781	-0.42	0.673	-.4785836	.3092206
ind6	4.9781	.4167285	11.95	0.000	4.160542	5.795659
ind7	-.003052	.1811393	-0.02	0.987	-.3584201	.352316
ind8	-.0014403	.1716674	-0.01	0.993	-.338226	.3353453
ind9	-.0614559	.1748917	-0.35	0.725	-.4045672	.2816554
size	.0169993	.0157066	1.08	0.279	-.0138148	.0478134
dum1	.1153407	.1236284	0.93	0.351	-.1271996	.357881
dum2	-.1506794	.1224424	-1.23	0.219	-.3908929	.0895342
dum3	-.1638964	.1180144	-1.39	0.165	-.3954231	.0676302
dum4	-.1065692	.1236649	-0.86	0.389	-.3491812	.1360427
dum5	-.0536942	.1241778	-0.43	0.666	-.2973124	.1899241
dum6	-.0556841	.127025	-0.44	0.661	-.3048881	.19352
dum7	-.0246591	.1329884	-0.19	0.853	-.2855623	.2362442
dum8	0	(omitted)				
dum9	-.1005721	.1368328	-0.74	0.462	-.3690175	.1678733
_cons	.1398753	.1899053	0.74	0.462	-.2326903	.512441

reg2: The effect of the change of CFO on firm performance

```
. regress ROA_new CFO_left ROA_old ceo_age cfo_age coo_age ind1 ind2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	159.564072	23	6.93756834	F(23, 1259) =	8.03
Residual	1087.12843	1259	.863485646	Prob > F	= 0.0000
				R-squared	= 0.1280
				Adj R-squared	= 0.1121
Total	1246.6925	1282	.972459049	Root MSE	= .92924

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
CFO_left	.0076551	.0803817	0.10	0.924	-.1500417	.1653519
ROA_old	.1784721	.0741269	2.41	0.016	.0330462	.3238979
ceo_age	-.2434408	.1861379	-1.31	0.191	-.6086154	.1217338
cfo_age	.0609205	.4239919	0.14	0.886	-.7708881	.8927291
coo_age	.104691	.4679278	0.22	0.823	-.8133132	1.022695
ind1	-.0970581	.5604908	-0.17	0.863	-1.196657	1.002541
ind2	-.0680181	.2754618	-0.25	0.805	-.6084328	.4723967
ind3	-.0508983	.1683338	-0.30	0.762	-.381144	.2793474
ind4	-.030983	.1609945	-0.19	0.847	-.3468301	.2848641
ind5	-.0853403	.2010351	-0.42	0.671	-.4797409	.3090604
ind6	4.980214	.4166127	11.95	0.000	4.162882	5.797545
ind7	-.0034796	.1811512	-0.02	0.985	-.358871	.3519119
ind8	-.0016672	.1718501	-0.01	0.992	-.3388113	.3354769
ind9	-.0622806	.1752831	-0.36	0.722	-.4061598	.2815986
size	.0175583	.0154284	1.14	0.255	-.0127099	.0478265
dum1	.1213989	.1244015	0.98	0.329	-.1226583	.365456
dum2	-.1502033	.1243527	-1.21	0.227	-.3941647	.0937581
dum3	-.1631826	.1200737	-1.36	0.174	-.3987492	.0723839
dum4	-.1110769	.1254944	-0.89	0.376	-.3572781	.1351243
dum5	-.0570933	.1354871	-0.42	0.674	-.3228986	.208712
dum6	-.0573058	.1303756	-0.44	0.660	-.3130831	.1984715
dum7	-.0254732	.132961	-0.19	0.848	-.2863228	.2353763
dum8	0	(omitted)				
dum9	-.1021649	.1368443	-0.75	0.455	-.3706329	.1663032
_cons	.1475783	.1853086	0.80	0.426	-.2159693	.5111259

reg3: The effects of the change of COO on firm performance

```
. regress ROA_new COO_left ROA_old ceo_age cfo_age coo_age ind1 ind2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	162.151892	23	7.05008225	F(23, 1259) =	8.18
Residual	1084.54061	1259	.86143019	Prob > F =	0.0000
				R-squared =	0.1301
				Adj R-squared =	0.1142
Total	1246.6925	1282	.972459049	Root MSE =	.92813

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
COO_left	.1256526	.0723866	1.74	0.083	-.0163591 .2676643
ROA_old	.1822918	.0740282	2.46	0.014	.0370597 .327524
ceo_age	-.2542298	.1860039	-1.37	0.172	-.6191415 .110682
cfo_age	.0607698	.4233788	0.14	0.886	-.769836 .8913755
coo_age	.0620526	.4677951	0.13	0.894	-.8556912 .9797963
ind1	-.121547	.56	-0.22	0.828	-1.220183 .977089
ind2	-.0812478	.2749454	-0.30	0.768	-.6206494 .4581538
ind3	-.0541776	.1679944	-0.32	0.747	-.3837574 .2754021
ind4	-.0291488	.1606232	-0.18	0.856	-.3442675 .2859699
ind5	-.0895764	.2005614	-0.45	0.655	-.4830478 .303895
ind6	4.982332	.4161183	11.97	0.000	4.165971 5.798694
ind7	-.0099147	.1809632	-0.05	0.956	-.3649373 .3451079
ind8	-.0063447	.1714724	-0.04	0.970	-.3427478 .3300583
ind9	-.0656394	.174699	-0.38	0.707	-.4083726 .2770938
size	.0172748	.015395	1.12	0.262	-.0129279 .0474776
dum1	.0996304	.1225949	0.81	0.417	-.1408825 .3401432
dum2	-.1512584	.1220109	-1.24	0.215	-.3906255 .0881087
dum3	-.1558947	.1177787	-1.32	0.186	-.3869589 .0751695
dum4	-.1048912	.1230696	-0.85	0.394	-.3463353 .1365528
dum5	-.0599615	.1238046	-0.48	0.628	-.3028475 .1829245
dum6	-.0601722	.126779	-0.47	0.635	-.3088935 .1885491
dum7	-.0276673	.1328001	-0.21	0.835	-.2882012 .2328665
dum8	0	(omitted)			
dum9	-.1028115	.1365749	-0.75	0.452	-.3707509 .1651278
_cons	.1342362	.1846568	0.73	0.467	-.2280327 .4965051

reg4 – reg12: Nine regressions with the three interaction terms (moderators) – hightech, execdir, insider – that moderate the relationship between (1) the number of executives that left the company and firm performance; (2) the change of CFO and firm performance; and (3) the change of COO and firm performance. These are almost the same regressions as above, whereby the three moderators are added separately into each regression.

Thereby,

hightech = high-tech vs. non-high-tech industry

execdir = the number of executive officers serving as directors that left the company

insider = the fact whether the newly appointed CEO was insider or outsider

The interaction terms for the moderators – hightech; execdir; insider – are generated as follows:

gen execheightech = num_execleft * hightech

gen CFOheightech = CFO_left * hightech

gen COOheightech = COO_left * hightech

gen execexecdir = num_execleft * num_execdirleft

gen CFOexecdir = CFO_left * num_execdirleft

gen COOexecdir = COO_left * num_execdirleft

gen execinsider = num_execleft * insider

gen CFOinsider = CFO_left * insider

gen COOinsider = COO_left * insider

reg4: The effects of the first moderator (interaction term) – **hightech** – on firm performance

```
. regress ROA_new num_execleft hightech exechightech ROA_old ceo_age cfo_age coo_age ind1 i
> nd2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	159.672366	25	6.38689463	F(25, 1257) =	7.39
Residual	1087.02013	1257	.864773377	Prob > F	= 0.0000
				R-squared	= 0.1281
				Adj R-squared	= 0.1107
Total	1246.6925	1282	.972459049	Root MSE	= .92993

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
num_execleft	.0060142	.0306039	0.20	0.844	-.0540262	.0660546
hightech	-.0193291	.1311127	-0.15	0.883	-.2765529	.2378947
exechightech	-.0013508	.0603326	-0.02	0.982	-.1197145	.1170129
ROA_old	.17806	.0745827	2.39	0.017	.0317397	.3243803
ceo_age	-.2437408	.1863082	-1.31	0.191	-.60925	.1217684
cfo_age	.0637862	.4246136	0.15	0.881	-.7692431	.8968156
coo_age	.1095712	.4688076	0.23	0.815	-.8101603	1.029303
ind1	-.0949174	.5609571	-0.17	0.866	-1.195433	1.005598
ind2	-.0692343	.2753921	-0.25	0.802	-.6095131	.4710444
ind3	-.0512762	.1683777	-0.30	0.761	-.3816085	.279056
ind4	-.0228137	.1630376	-0.14	0.889	-.3426695	.297042
ind5	-.0855781	.2009615	-0.43	0.670	-.479835	.3086789
ind6	4.974236	.4172408	11.92	0.000	4.155671	5.792801
ind7	-.0015823	.1813507	-0.01	0.993	-.3573658	.3542012
ind8	.0091902	.175422	0.05	0.958	-.334962	.3533424
ind9	-.0593688	.1751604	-0.34	0.735	-.4030077	.2842701
size	.0160164	.0160626	1.00	0.319	-.0154961	.047529
dum1	.1145852	.1237887	0.93	0.355	-.12827	.3574404
dum2	-.1508632	.1225646	-1.23	0.219	-.391317	.0895906
dum3	-.163678	.1181757	-1.39	0.166	-.3955214	.0681654
dum4	-.1063735	.1238378	-0.86	0.391	-.349325	.136578
dum5	-.0525393	.1245317	-0.42	0.673	-.2968521	.1917736
dum6	-.0557327	.1273621	-0.44	0.662	-.3055984	.194133
dum7	-.0244175	.1331968	-0.18	0.855	-.2857301	.2368951
dum8	0	(omitted)				
dum9	-.1004569	.1371073	-0.73	0.464	-.3694412	.1685274
_cons	.1409724	.1924723	0.73	0.464	-.23663	.5185747

reg5: The effects of the first moderator (interaction term) – **hightech** – on firm performance

```
. regress ROA_new CFO_left hightech CFOhightech ROA_old ceo_age cfo_age coo_age ind1 ind2 i
> nd3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	159.642353	25	6.38569412	F(25, 1257) =	7.38
Residual	1087.05015	1257	.864797253	Prob > F =	0.0000
				R-squared =	0.1281
				Adj R-squared =	0.1107
Total	1246.6925	1282	.972459049	Root MSE =	.92994

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
CFO_left	.0069724	.0856163	0.08	0.935	-.1609941 .1749389
hightech	-.0225575	.0855086	-0.26	0.792	-.1903128 .1451977
CFOhightech	.0025229	.1306745	0.02	0.985	-.2538412 .258887
ROA_old	.176987	.074349	2.38	0.017	.0311251 .3228489
ceo_age	-.2436821	.1864681	-1.31	0.192	-.6095052 .122141
cfo_age	.0643688	.4244687	0.15	0.879	-.7683764 .8971139
coo_age	.1106049	.4687323	0.24	0.813	-.8089789 1.030189
ind1	-.096185	.5609244	-0.17	0.864	-1.196636 1.004266
ind2	-.0683618	.2757899	-0.25	0.804	-.6094211 .4726975
ind3	-.0520946	.1685173	-0.31	0.757	-.3827007 .2785115
ind4	-.0231143	.1632261	-0.14	0.887	-.3433399 .2971113
ind5	-.0861938	.2012286	-0.43	0.668	-.4809746 .3085871
ind6	4.976318	.4171537	11.93	0.000	4.157924 5.794713
ind7	-.0020492	.1813891	-0.01	0.991	-.3579079 .3538095
ind8	.0089552	.1756013	0.05	0.959	-.3355487 .3534591
ind9	-.0601926	.175554	-0.34	0.732	-.4046038 .2842185
size	.0165953	.0158089	1.05	0.294	-.0144195 .04761
dum1	.120567	.1245268	0.97	0.333	-.1237364 .3648703
dum2	-.1504802	.1244518	-1.21	0.227	-.3946363 .0936759
dum3	-.1630771	.1201717	-1.36	0.175	-.3988362 .072682
dum4	-.11091	.1256188	-0.88	0.377	-.3573556 .1355357
dum5	-.0561267	.1357619	-0.41	0.679	-.3224716 .2102182
dum6	-.0575182	.1304947	-0.44	0.659	-.3135298 .1984933
dum7	-.02539	.1330755	-0.19	0.849	-.2864644 .2356845
dum8	0	(omitted)			
dum9	-.1021843	.1369515	-0.75	0.456	-.370863 .1664943
_cons	.14958	.1857278	0.81	0.421	-.2147906 .5139506

reg6: The effects of the first moderator (interaction term) – **hightech** – on firm performance

```
. regress ROA_new COO_left hightech COOhightech ROA_old ceo_age cfo_age coo_age ind1 ind2 i
> nd3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	164.263722	25	6.57054888	F(25, 1257) =	7.63
Residual	1082.42878	1257	.861120747	Prob > F	= 0.0000
				R-squared	= 0.1318
				Adj R-squared	= 0.1145
Total	1246.6925	1282	.972459049	Root MSE	= .92797

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
COO_left	.1836718	.0816051	2.25	0.025	.0235746	.3437689
hightech	.0176199	.0767137	0.23	0.818	-.132881	.1681208
COOhightech	-.2644065	.1724146	-1.53	0.125	-.6026586	.0738457
ROA_old	.1786321	.0741864	2.41	0.016	.0330894	.3241748
ceo_age	-.2492078	.1860007	-1.34	0.181	-.6141139	.1156983
cfo_age	.0447686	.4236522	0.11	0.916	-.7863746	.8759119
coo_age	.1613636	.472044	0.34	0.733	-.7647174	1.087445
ind1	-.1317166	.5599521	-0.24	0.814	-1.23026	.9668272
ind2	-.0859487	.2749124	-0.31	0.755	-.6252864	.453389
ind3	-.0567046	.1680167	-0.34	0.736	-.3863287	.2729195
ind4	-.0227257	.1626881	-0.14	0.889	-.3418958	.2964445
ind5	-.0927849	.2005544	-0.46	0.644	-.4862432	.3006733
ind6	4.978364	.4162341	11.96	0.000	4.161774	5.794955
ind7	-.014305	.1810394	-0.08	0.937	-.3694776	.3408676
ind8	.0052248	.1750406	0.03	0.976	-.338179	.3486287
ind9	-.0650018	.1748052	-0.37	0.710	-.4079438	.2779402
size	.017256	.0157488	1.10	0.273	-.0136408	.0481527
dum1	.1012458	.122614	0.83	0.409	-.1393049	.3417965
dum2	-.1498489	.1219967	-1.23	0.220	-.3891885	.0894908
dum3	-.1519269	.1177849	-1.29	0.197	-.3830035	.0791496
dum4	-.1015858	.1230656	-0.83	0.409	-.3430225	.1398509
dum5	-.057359	.1238299	-0.46	0.643	-.3002951	.1855771
dum6	-.0592002	.1267608	-0.47	0.641	-.3078862	.1894858
dum7	-.0189609	.1328948	-0.14	0.887	-.2796809	.2417591
dum8	0	(omitted)				
dum9	-.1016959	.1365525	-0.74	0.457	-.3695919	.1662001
_cons	.1243423	.1848804	0.67	0.501	-.2383659	.4870505

reg7:The effects of the second moderator (interaction term) – **num_execdirleft** – on firm performance

```
. regress ROA_new num_excleft num_execdirleft execexedir ROA_old ceo_age cfo_age coo_age in
> d1 ind2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs = 1283		
Model	159.739988	25	6.38959954	F(25, 1257) = 7.39		
Residual	1086.95251	1257	.86471958	Prob > F = 0.0000		
				R-squared = 0.1281		
				Adj R-squared = 0.1108		
Total	1246.6925	1282	.972459049	Root MSE = .9299		

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
num_excleft	.0004377	.0331585	0.01	0.989	-.0646145	.0654899
num_execdirleft	-.0523517	.1305279	-0.40	0.688	-.3084282	.2037248
execexedir	.0219655	.0538454	0.41	0.683	-.0836712	.1276023
ROA_old	.1793997	.0745086	2.41	0.016	.0332248	.3255746
ceo_age	-.2440186	.186486	-1.31	0.191	-.6098768	.1218395
cfo_age	.0707745	.4254927	0.17	0.868	-.7639796	.9055286
coo_age	.1085543	.4683166	0.23	0.817	-.810214	1.027323
ind1	-.083317	.5619548	-0.15	0.882	-1.18579	1.019156
ind2	-.0666418	.2754762	-0.24	0.809	-.6070855	.4738019
ind3	-.0504904	.1683447	-0.30	0.764	-.3807579	.2797771
ind4	-.0297264	.1610065	-0.18	0.854	-.3455976	.2861447
ind5	-.0836406	.2009446	-0.42	0.677	-.4778643	.310583
ind6	4.981971	.4171514	11.94	0.000	4.163581	5.800361
ind7	-.0041225	.181292	-0.02	0.982	-.3597907	.3515457
ind8	.0015877	.1720815	0.01	0.993	-.3360109	.3391864
ind9	-.0610785	.1751086	-0.35	0.727	-.404616	.2824589
size	.0178354	.0158493	1.13	0.261	-.0132587	.0489294
dum1	.1046765	.1264296	0.83	0.408	-.1433598	.3527127
dum2	-.1552965	.1230449	-1.26	0.207	-.3966926	.0860995
dum3	-.1672266	.1184079	-1.41	0.158	-.3995256	.0650723
dum4	-.1121153	.1245124	-0.90	0.368	-.3563904	.1321598
dum5	-.057757	.1246618	-0.46	0.643	-.3023252	.1868111
dum6	-.0588964	.1274006	-0.46	0.644	-.3088376	.1910448
dum7	-.0252425	.1331413	-0.19	0.850	-.2864461	.2359611
dum8	0	(omitted)				
dum9	-.1015367	.1369955	-0.74	0.459	-.3703018	.1672283
_cons	.1524165	.1924958	0.79	0.429	-.2252321	.530065

reg8:The effects of the second moderator (interaction term) – **num_execdirleft** – on firm performance

```
. regress ROA_new CFO_left num_execdirleft CFOexecdir ROA_old ceo_age cfo_age coo_age ind1 in
> d2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs = 1283		
Model	159.564581	25	6.38258325	F(25, 1257) = 7.38		
Residual	1087.12792	1257	.864859124	Prob > F = 0.0000		
				R-squared = 0.1280		
				Adj R-squared = 0.1106		
Total	1246.6925	1282	.972459049	Root MSE = .92998		

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
CFO_left	.0069395	.0939506	0.07	0.941	-.1773777	.1912568
num_execdirleft	.0005079	.0551737	0.01	0.993	-.1077349	.1087506
CFOexecdir	.0010955	.090018	0.01	0.990	-.1755065	.1776976
ROA_old	.1784494	.0741935	2.41	0.016	.0328927	.3240061
ceo_age	-.2432783	.1864622	-1.30	0.192	-.6090897	.1225331
cfo_age	.0604811	.4249651	0.14	0.887	-.7732379	.8942002
coo_age	.1046223	.4685308	0.22	0.823	-.8145662	1.023811
ind1	-.097321	.5611732	-0.17	0.862	-1.19826	1.003618
ind2	-.0679414	.2757006	-0.25	0.805	-.6088255	.4729428
ind3	-.0507864	.1685321	-0.30	0.763	-.3814215	.2798487
ind4	-.0308814	.1611785	-0.19	0.848	-.34709	.2853271
ind5	-.0853032	.2012482	-0.42	0.672	-.4801226	.3095162
ind6	4.980205	.4172496	11.94	0.000	4.161622	5.798787
ind7	-.0034033	.181398	-0.02	0.985	-.3592794	.3524729
ind8	-.0015226	.1720916	-0.01	0.993	-.3391411	.3360958
ind9	-.062109	.175573	-0.35	0.724	-.4065574	.2823393
size	.0175463	.015609	1.12	0.261	-.0130763	.0481688
dum1	.121283	.1248839	0.97	0.332	-.1237208	.3662868
dum2	-.1501807	.124583	-1.21	0.228	-.3945942	.0942328
dum3	-.1632049	.1201757	-1.36	0.175	-.398972	.0725623
dum4	-.1109194	.1260984	-0.88	0.379	-.3583058	.1364671
dum5	-.0571231	.1356762	-0.42	0.674	-.3232999	.2090537
dum6	-.0574267	.1306486	-0.44	0.660	-.3137401	.1988867
dum7	-.025511	.1330778	-0.19	0.848	-.2865901	.2355682
dum8	0	(omitted)				
dum9	-.1021104	.1372002	-0.74	0.457	-.371277	.1670561
_cons	.1472458	.18737	0.79	0.432	-.2203466	.5148382

reg9:The effects of the second moderator (interaction term) – **num_execdirleft** – on firm performance

```
. regress ROA_new COO_left num_execdirleft COOexecdir ROA_old ceo_age cfo_age coo_age ind1 in
> d2 ind3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs = 1283		
Model	163.125711	25	6.52502846	F(25, 1257) = 7.57		
Residual	1083.56679	1257	.862026085	Prob > F = 0.0000		
				R-squared = 0.1308		
				Adj R-squared = 0.1136		
Total	1246.6925	1282	.972459049	Root MSE = .92845		

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
COO_left	.0488592	.1039878	0.47	0.639	-.1551497	.252868
num_execdirleft	-.0298393	.0488944	-0.61	0.542	-.1257629	.0660843
COOexecdir	.1147376	.1091604	1.05	0.293	-.099419	.3288943
ROA_old	.1784792	.0741593	2.41	0.016	.0329896	.3239688
ceo_age	-.2634279	.186429	-1.41	0.158	-.6291743	.1023185
cfo_age	.0686413	.4241325	0.16	0.871	-.7634443	.900727
coo_age	.0484601	.4682019	0.10	0.918	-.8700832	.9670035
ind1	-.1230008	.560378	-0.22	0.826	-1.22238	.9763784
ind2	-.0785507	.2750868	-0.29	0.775	-.6182307	.4611292
ind3	-.0598193	.168168	-0.36	0.722	-.3897401	.2701015
ind4	-.0309953	.1607057	-0.19	0.847	-.3462762	.2842856
ind5	-.081035	.2007917	-0.40	0.687	-.4749588	.3128888
ind6	4.983418	.4163478	11.97	0.000	4.166605	5.800231
ind7	-.0070298	.1810477	-0.04	0.969	-.3622187	.3481591
ind8	-.0027844	.1716377	-0.02	0.987	-.3395124	.3339436
ind9	-.0651727	.1748249	-0.37	0.709	-.4081535	.277808
size	.0183111	.0154997	1.18	0.238	-.012097	.0487192
dum1	.0950893	.1228646	0.77	0.439	-.1459529	.3361316
dum2	-.1537821	.1221811	-1.26	0.208	-.3934836	.0859193
dum3	-.160053	.1178847	-1.36	0.175	-.3913254	.0712195
dum4	-.1134463	.123576	-0.92	0.359	-.3558842	.1289915
dum5	-.0633233	.1239245	-0.51	0.609	-.3064448	.1797983
dum6	-.0660627	.1270398	-0.52	0.603	-.315296	.1831707
dum7	-.0265387	.1328593	-0.20	0.842	-.2871891	.2341117
dum8	0	(omitted)				
dum9	-.1028571	.1367379	-0.75	0.452	-.3711168	.1654026
_cons	.1525777	.1867452	0.82	0.414	-.213789	.5189443

reg10: The effects of the third moderator (interaction term) – **insider** – on firm performance

```
. regress ROA_new num_exceleft insider execinsider ROA_old ceo_age cfo_age coo_age ind1 ind2
> ind3 ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	160.357563	25	6.41430251	F(25, 1257) =	7.42
Residual	1086.33494	1257	.864228272	Prob > F =	0.0000
				R-squared =	0.1286
				Adj R-squared =	0.1113
Total	1246.6925	1282	.972459049	Root MSE =	.92964

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
num_exceleft	.0170354	.0300741	0.57	0.571	-.0419656 .0760363
insider	.1179991	.1289258	0.92	0.360	-.1349345 .3709326
execinsider	-.0578201	.0634135	-0.91	0.362	-.182228 .0665879
ROA_old	.1797322	.0745723	2.41	0.016	.0334323 .3260322
ceo_age	-.2385046	.1863546	-1.28	0.201	-.6041049 .1270958
cfo_age	.0656348	.4242	0.15	0.877	-.7665834 .8978529
coo_age	.1053361	.4679533	0.23	0.822	-.8127196 1.023392
ind1	-.1166776	.5612032	-0.21	0.835	-1.217676 .9843206
ind2	-.0836894	.2757484	-0.30	0.762	-.6246673 .4572885
ind3	-.0586535	.1685016	-0.35	0.728	-.3892288 .2719218
ind4	-.0394322	.1611726	-0.24	0.807	-.3556291 .2767646
ind5	-.099549	.2014936	-0.49	0.621	-.4948499 .2957519
ind6	4.96814	.4171771	11.91	0.000	4.149699 5.78658
ind7	-.0098298	.1813628	-0.05	0.957	-.3656371 .3459774
ind8	-.0107776	.1720972	-0.06	0.950	-.348407 .3268519
ind9	-.0696255	.1751966	-0.40	0.691	-.4133355 .2740844
size	.0168334	.0157498	1.07	0.285	-.0140654 .0477322
dum1	.1244749	.1241796	1.00	0.316	-.1191473 .368097
dum2	-.1482148	.1225944	-1.21	0.227	-.388727 .0922975
dum3	-.1577789	.1182686	-1.33	0.182	-.3898046 .0742468
dum4	-.1022868	.1238204	-0.83	0.409	-.3452042 .1406307
dum5	-.0527279	.124288	-0.42	0.671	-.2965627 .1911069
dum6	-.0548431	.1271247	-0.43	0.666	-.304243 .1945567
dum7	-.0214728	.1331299	-0.16	0.872	-.282654 .2397085
dum8	0	(omitted)			
dum9	-.0988714	.1369184	-0.72	0.470	-.3674851 .1697423
_cons	.1209803	.1911385	0.63	0.527	-.2540054 .495966

reg11: The effects of the third moderator (interaction term) – **insider** – on firm performance

```
. regress ROA_new CFO_left insider CFOinsider ROA_old ceo_age cfo_age coo_age ind1 ind2 ind3
> ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	159.626013	25	6.38504051	F(25, 1257) =	7.38
Residual	1087.06649	1257	.864810253	Prob > F =	0.0000
				R-squared =	0.1280
				Adj R-squared =	0.1107
Total	1246.6925	1282	.972459049	Root MSE =	.92995

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
CFO_left	.0115191	.0855849	0.13	0.893	-.1563859	.1794242
insider	.0195796	.0732657	0.27	0.789	-.1241569	.1633161
CFOinsider	-.0180837	.1253547	-0.14	0.885	-.2640112	.2278438
ROA_old	.1777123	.0744134	2.39	0.017	.0317242	.3237005
ceo_age	-.2417788	.186391	-1.30	0.195	-.6074506	.1238929
cfo_age	.0629559	.4244333	0.15	0.882	-.7697199	.8956317
coo_age	.1020913	.4686166	0.22	0.828	-.8172656	1.021448
ind1	-.0942033	.5615496	-0.17	0.867	-1.195881	1.007474
ind2	-.0699772	.275771	-0.25	0.800	-.6109994	.4710449
ind3	-.0513246	.1684713	-0.30	0.761	-.3818405	.2791912
ind4	-.0320506	.1611683	-0.20	0.842	-.3482391	.2841379
ind5	-.0857544	.2012902	-0.43	0.670	-.4806562	.3091474
ind6	4.983559	.4171543	11.95	0.000	4.165164	5.801955
ind7	-.0045207	.1813565	-0.02	0.980	-.3603155	.3512742
ind8	-.0035534	.1721353	-0.02	0.984	-.3412576	.3341508
ind9	-.0620288	.1754248	-0.35	0.724	-.4061865	.282129
size	.0173384	.015473	1.12	0.263	-.0130174	.0476941
dum1	.120855	.1245358	0.97	0.332	-.1234659	.3651759
dum2	-.1511766	.1245118	-1.21	0.225	-.3954504	.0930972
dum3	-.1632047	.1201845	-1.36	0.175	-.398989	.0725795
dum4	-.1095964	.126087	-0.87	0.385	-.3569606	.1377678
dum5	-.0562485	.135905	-0.41	0.679	-.3228742	.2103772
dum6	-.0569322	.130635	-0.44	0.663	-.3132189	.1993546
dum7	-.0244623	.1331243	-0.18	0.854	-.2856326	.236708
dum8	0	(omitted)				
dum9	-.101884	.1369784	-0.74	0.457	-.3706154	.1668474
_cons	.1437014	.1860758	0.77	0.440	-.221352	.5087548

reg12: The effects of the third moderator (interaction term) – **insider** – on firm performance

```
. regress ROA_new COO_left insider COOinsider ROA_old ceo_age cfo_age coo_age ind1 ind2 ind3
> ind4 ind5 ind6 ind7 ind8 ind9 size dum*
note: dum8 omitted because of collinearity
```

Source	SS	df	MS	Number of obs =	1283
Model	164.694719	25	6.58778876	F(25, 1257) =	7.65
Residual	1081.99778	1257	.860777869	Prob > F =	0.0000
				R-squared =	0.1321
				Adj R-squared =	0.1148
Total	1246.6925	1282	.972459049	Root MSE =	.92778

ROA_new	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
COO_left	.1978575	.0838398	2.36	0.018	.0333761	.3623389
insider	.0577877	.0645766	0.89	0.371	-.0689021	.1844774
COOinsider	-.2759176	.1621845	-1.70	0.089	-.5940997	.0422645
ROA_old	.1809957	.0741727	2.44	0.015	.0354797	.3265117
ceo_age	-.2673015	.1862289	-1.44	0.151	-.6326552	.0980522
cfo_age	.0615337	.4233381	0.15	0.884	-.7689934	.8920609
coo_age	.095185	.4680249	0.20	0.839	-.8230112	1.013381
ind1	-.0657139	.5608013	-0.12	0.907	-1.165924	1.034496
ind2	-.0918146	.2749519	-0.33	0.738	-.6312298	.4476005
ind3	-.063743	.1680235	-0.38	0.704	-.3933803	.2658944
ind4	-.0375094	.1606666	-0.23	0.815	-.3527136	.2776947
ind5	-.0966115	.2005735	-0.48	0.630	-.4901073	.2968843
ind6	4.979447	.4160399	11.97	0.000	4.163238	5.795656
ind7	-.0167978	.1809428	-0.09	0.926	-.371781	.3381854
ind8	-.0185936	.1716643	-0.11	0.914	-.3553737	.3181864
ind9	-.0718438	.1746705	-0.41	0.681	-.4145216	.2708341
size	.0169412	.0154229	1.10	0.272	-.0133163	.0471987
dum1	.0938619	.1226139	0.77	0.444	-.1466886	.3344124
dum2	-.1531022	.1220157	-1.25	0.210	-.3924791	.0862747
dum3	-.1592862	.1177515	-1.35	0.176	-.3902973	.0717249
dum4	-.1060084	.1230281	-0.86	0.389	-.3473715	.1353548
dum5	-.0626549	.1238018	-0.51	0.613	-.3055358	.1802261
dum6	-.0627392	.126767	-0.49	0.621	-.3114375	.1859591
dum7	-.022742	.1328276	-0.17	0.864	-.2833303	.2378462
dum8	0	(omitted)				
dum9	-.1050927	.1365506	-0.77	0.442	-.3729849	.1627994
_cons	.1296738	.1848616	0.70	0.483	-.2329975	.4923452

7.4 Appendix 4: ROS results

Descriptive table (correlations and descriptive statistics table)

VARIABLES	mean	std.dev.	1	2	3	4	5	6	7	8	9	10	11	12
1. ROS_new	-0.3140497	9.770017	1.0000											
2. num_execleft	1.794163	1.042095	-0.0182	1.0000										
3. CFO_left	0.328725	0.4699303	-0.0255	0.2239	1.0000									
4. COO_left	0.1582181	0.3650856	0.0201	0.2142	0.0477	1.0000								
5. hightech	0.2296467	0.4207672	0.0038	-0.0056	0.0339	-0.0084	1.0000							
6. num_execdirleft	0.5353303	0.6161264	0.0219	0.4250	0.0638	0.1262	-0.0716	1.0000						
7. insider	0.2665131	0.4423054	-0.0441	0.0034	0.0210	-0.0085	0.0796	0.0254	1.0000					
8. size	1.503042	1.818654	0.0544	0.1749	0.0349	0.0167	-0.1761	0.1236	0.0801	1.0000				
9. ROS_old	-0.0519764	2.162737	0.0856	0.0292	0.0250	0.0161	-0.1349	0.0212	0.0568	0.1401	1.0000			
10. ceo_age	0.0207373	0.1425584	0.0065	0.0276	0.0042	0.0434	0.0003	-0.0278	-0.0377	0.0070	-0.0124	1.0000		
11. cfo_age	0.0046083	0.0677539	0.0035	-0.0001	0.0090	0.0070	0.0254	0.0469	-0.0381	-0.0492	-0.0352	0.0797	1.0000	
12. coo_age	0.0030722	0.0553635	0.0024	0.0107	0.0199	0.0523	0.0360	0.0191	-0.0025	0.0262	-0.0114	-0.0081	-0.0035	1.0000

Results table

VARIABLES	(1) reg1 ROS_new	(2) reg2 ROS_new	(3) reg3 ROS_new	(4) reg4 ROS_new	(5) reg5 ROS_new	(6) reg6 ROS_new	(7) reg7 ROS_new	(8) reg8 ROS_new	(9) reg9 ROS_new	(10) reg10 ROS_new	(11) reg11 ROS_new	(12) reg12 ROS_new
CFO_left		-1.533* (0.853)			-1.764* (0.909)			-2.451** (0.995)			-0.753 (0.904)	
ROS_old	0.391*** (0.129)	0.392*** (0.129)	0.387*** (0.129)	0.385*** (0.129)	0.388*** (0.130)	0.390*** (0.129)	0.393*** (0.129)	0.391*** (0.129)	0.387*** (0.129)	0.399*** (0.128)	0.399*** (0.128)	0.401*** (0.129)
ceo_age	0.267 (1.983)	0.212 (1.983)	0.219 (1.986)	0.209 (1.984)	0.147 (1.986)	0.231 (1.988)	0.363 (1.985)	0.235 (1.983)	0.245 (1.992)	0.240 (1.978)	0.126 (1.977)	0.145 (1.988)
cfo_age	0.983 (4.484)	0.781 (4.484)	0.934 (4.488)	0.746 (4.489)	0.758 (4.488)	0.868 (4.495)	1.038 (4.497)	0.766 (4.488)	0.889 (4.498)	0.813 (4.471)	0.485 (4.471)	0.702 (4.485)
coo_age	0.904 (4.946)	0.611 (4.947)	0.718 (4.958)	0.628 (4.955)	0.530 (4.955)	0.884 (5.009)	0.974 (4.949)	0.784 (4.947)	0.731 (4.964)	0.925 (4.930)	0.110 (4.935)	0.569 (4.957)
size	0.234 (0.168)	0.197 (0.165)	0.184 (0.166)	0.238 (0.172)	0.212 (0.170)	0.193 (0.170)	0.251 (0.170)	0.223 (0.167)	0.180 (0.167)	0.265 (0.168)	0.224 (0.165)	0.208 (0.166)
num_execleft	-0.481* (0.290)			-0.667** (0.325)			-0.763** (0.351)			-0.183 (0.318)		
COO_left			0.377 (0.771)			0.505 (0.871)			0.491 (1.103)			0.0726 (0.894)
hightech				-1.316 (1.396)	-0.212 (0.910)	0.237 (0.819)						
exechightech				0.814 (0.640)								
CFOhightech					1.029 (1.386)							
COOhightech						-0.588 (1.834)						
num_execdirleft							-0.971 (1.392)	-0.477 (0.585)	0.107 (0.520)			
execexecdir							0.632 (0.573)					
CFOexecdir								1.679* (0.953)				
COOexecdir									-0.186 (1.158)			
insider										1.541 (1.363)	-0.179 (0.773)	-1.470** (0.685)
execinsider										-1.588** (0.670)		
CFOinsider											-3.231** (1.321)	
COOinsider												1.078 (1.723)
Constant	1.440 (2.005)	0.964 (1.958)	0.640 (1.956)	1.838 (2.031)	1.015 (1.962)	0.602 (1.960)	1.705 (2.031)	1.123 (1.977)	0.580 (1.978)	1.251 (2.011)	0.898 (1.958)	0.887 (1.957)
Observations	1,275	1,275	1,275	1,275	1,275	1,275	1,275	1,275	1,275	1,275	1,275	1,275
R-squared	0.025	0.025	0.023	0.026	0.026	0.023	0.027	0.028	0.023	0.033	0.033	0.027

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1