Existence and size of top executive-specific effects on corporate performance and policy in Germany

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Abstract

Academic research on top executives in general is rare, and even more so for German top executives. This paper examines the existence and size of top executive-specific effects on company performance and policy. In addition, the effects of industry-, company-, and executive-level factors that potentially moderate the influence of top executives on their companies are analyzed. Based on a review of the theoretical and empirical literature, a set of hypotheses is derived and tested using a unique dataset including 110 large publicly listed German companies and 459 German top executives from 1983 to 2002. The results indicate that German top executives do matter for organizational outcomes and that their impact on their organization is comparatively large. Moreover, several industry- and company-level factors that influence the ability of top executives to shape their companies are detected. Finally, practical implications of the results are discussed.

Keywords:

Chief executive officer, chief financial officers, corporate governance, *Finanzvorstand*, Germany, management board, top executives, *Vorstandsvorsitzender*.

Introduction

For multiple reasons, German top executives have received much public attention in recent years. The rise and fall of the "new economy", recent turbulences of the world's stock markets, large corporate crises and scandals, and the ongoing debate on corporate governance and managerial compensation all contributed to this trend and heightened the public's attention. An indication of this trend is the treatment of top executives in the press. Traditionally, articles dealing with the particulars of top executives had their place in the business section of newspapers or in specialized publications. Today, such articles often can be found as cover stories on the front pages of newspapers or weekly magazines.

In stark contrast to the public interest and scrutiny, academic research on top executives, their origins and careers, and their impact on their organizations is decidedly scarce. In particular, there is a deficit of research in this area in Germany and its executives remain in the proverbial "black box". Two recent statements of German researchers with different perspectives illustrate this point:

"In contrast to the popular management literature, especially magazines and weekly publications, top executives of large companies have only seldom been the object of serious research. This holds for Germany in any case, less so for the USA. While there are more than one hundred empirical studies available on this subject, there are just five for Germany, of which two are from American authors. One can speculate about reasons – a specific German deficit obviously turns out."

(Hauschildt, preface of Salomo, 2000, own translation)

"The substantially increased attention that top managers enjoy today is certainly an odd contrast to the fact that there are no solid sociological studies about them in Germany which were published in recent times. The latest detailed sociological studies on German managers all originated in the 1960s. The statement Dahrendorf made three decades ago that the "economic upper class" is the "most unknown leadership group of the German society" is still valid today."

(Hartmann, 2001, introduction, own translation)

In the field of business administration and economics, three questions referring to top executives are of particular interest to researchers and practitioners:

(1) Do top executives have an impact on their companies? If they do, how much do they matter and under what circumstances do they affect corporate policy and performance?

(2) What are potential causes and interpretations of top executive-specific effects? Do top executives impose their individual style on their companies, or are they intentionally chosen by their companies because of their individual style?

(3) What overarching patterns in the decision-making of top executives exists? Which management styles are performance-enhancing and which are not?

It is obvious that the answers to these questions have substantial implications on areas such as managerial compensation, strategy, corporate governance/finance, and executive recruitment. The following three examples illustrate the relevance of each question. For example, the question when top executives have an impact on and make the difference for their companies is highly relevant to the volume and structure of executive pay. Moreover, when assessing a company and predicting its future strategy, knowing how the top executives affect company behavior is critical. Finally, knowing whether or not there are systematic differences in decision-making among top executives (e.g., internal vs. external growth strategies) enriches future research in strategy, marketing, and finance in that it suggests an often overlooked important dimension: top executive-specific heterogeneity.

This paper is the first in a series of papers (Normann & Schiereck, 2004a, b) that deal with the three questions raised above. While in the other two papers we explore the possible interpretations of top executive-specific effects and the management styles of German top executives, in this paper we lay the foundation and deal with the impact of German top executives on their companies. Using a unique dataset covering 110 German companies and 459 top executives from 1983 to 2002, we analyze the general impact of top executives on a broad range of company performance and policy variables, assess the magnitude of the top executive-specific effects on these variables, and examine the impact of industry-, firm-, and executive-specific characteristics on the impact of top executives on these variables.

This paper is divided into three sections. The first section describes and reviews theories and empirical evidence on the impact of top executives in the existing business and management literature. Various opposing theories and available evidence are assessed and hypotheses for the empirical section are derived. The empirical section, the second section, is divided into three parts. The first part deals with the general impact of different types of top executives on a broad range of performance, financial, operational and risk-related variables. The second part is founded on the first empirical results and illustrates their practical relevance by analyzing the magnitude of top executive-specific effects that are found in the first part of the empirical section. The third part refines the results of the first and second parts by examining the impact of various industry-, company-, and executive-related characteristics on the magnitude of top executive-specific effects. The third section summarizes the results and concludes with major implications of the findings on other research areas.

Top executives in the business and management literature: Theory and empirical evidence

The objective of this section is to provide an overview of existing theories on the impact of top executives and available empirical evidence as well as to derive testable hypotheses based on the synthesis of theory and evidence. It should be noted that this section does not provide a comprehensive overview of all details of the available theories and their empirical verification, but rather focuses on their contribution to the question at hand whether top executive have an impact on their organizations.

In general, there are opposing views in the business and economics literature about the importance of executives and the roles they play in organizations. Depending on their assumptions on the free will and autonomous behavior of individuals, the range of theories extends from completely deterministic to entirely voluntaristic models (Hitt & Tyler, 1991; Schrader, 1995). Deterministic models argue that top executives are constrained by the external environment or suggest that there is only one best solution, which in fact reduces strategic decisions to one of mechanics (Hannan & Freeman, 1977, 1984; Pfeffer & Salancik, 1978; Porter, 1980, 1985). In contrast, voluntaristic models emphasize that top executives, as the dominant coalition, make strategic decisions and, thus, have a considerable effect on their organizations (Child, 1972, 1997; Hambrick & Mason, 1984). Finally, integrative models, being an extension of deterministic and voluntaristic models, suggest that the magnitude of top executives' impact varies and depends on various environmental, organizational, and individual factors (Hambrick & Finkelstein, 1987; Wasserman, Nohria, & Anand, 2001).

DETERMINISTIC MODELS

Historically, deterministic models represent the starting point in the literature. In general, there are two groups of deterministic models, external control and rational normative models (Hitt et al., 1991; Schrader, 1995). External control models intend to explain existing structures and organizations, whereas rational normative models focus on making normative recommendations.

External control models

External control models argue that the external environment has a major impact on organizations and that decisions on structure and strategy are largely dependent on environmental factors. External control models are based on both organization theory and classical industrial organization theory (Hitt et al., 1991; Schrader, 1995).

In organization theory, most relevant approaches include contingency, resource dependence and population ecology models. Proponents of the contingency theory suggest that the external factors such as size, environment and its variability, and technology influence organizational behavior and structure and, thus, have a major impact on organizations (see Donaldson, 2001; Kieser, 1999, for an overview). Building on contingency models, resource dependence models argue that organizations are dependent on the environment's resources and have to adapt to the environment (Pfeffer et al., 1978). The task of the top executives is to ensure the adjustment of the organization to the environment. Aside from that, top executives primarily serve as a symbol of the organization and its actions. Population ecology models (see Kieser & Woywode, 1999 for an overview) contend that organizations are limited in their choices to adapt to their environment due to internal inertia (Hannan et al., 1984). Thus, "individual managers do not matter much in accounting for variability in organizational properties" (Hannan & Freeman, 1989) and the fit between organizational design and environmental demand decides on the survival and performance of the organization (Hannan et al., 1977).

The classical industrial economics theory (see, for example, Bain, 1956) is congruent with organization theory in that it argues that a firm cannot influence its industry nor its performance. According to this view, industry structure determines conduct, which yields performance. Specifically, the industry structure (e.g., power of sellers and buyers, cost structure, degree of product differentiation etc.) strongly influences competition and available strategies (e.g., pricing, investments, research and development, advertising etc.). Although modern theories of industrial economics (1) recognize interdependencies between market structure and company behavior and (2) stress the analysis of company behavior due to the advancement of game theory, they still view the company as the decision-making unit. However, they do not elaborate on who actually makes the decision inside the company and how this decision-making takes place.

Rational normative models

The main difference between external control and rational normative models is their intention: the objective of external control models is to describe and explain reality, whereas rational models intend to make normative recommendations with regard to the strategic decisions companies *should* make (Schrader, 1995). Early contributions to the strategic management literature promoted rational normative models (see, for example, Ansoff, 1965), and Porter (1980; 1985) became one of the chief proponents of this approach. In general, rational normative models are built on two assumptions (Schrader, 1995). First, successful and unsuccessful strategies can be distinguished. Second, the objective of research is to provide companies with instruments enabling them to make rational decisions.

Based on these assumptions, rational normative models argue that top executives follow an analytical and rational process (see, for example, Aaker, 1998) in which they analyze the internal and external environment and derive a list of external opportunities and threats as well as internal strength and weaknesses. The external analysis includes an examination of customers, competitors, markets and other environmental factors (e.g., technology, regulation, cultural and demographic trends). The internal analysis aims to provide an understanding of strategically important aspects (e.g., performance, organizational capabilities and constraints, financial resources). Finally, top executives assess available strategic alternatives and select the optimal solution. Although one might argue that this approach allows for choice, the rigorous problem solving approach limits the scope to a very narrow set of a few or only one alternative(s), which makes the rational normative model deterministic (Bourgeois, 1984).

VOLUNTARISTIC MODELS

Voluntaristic models were developed in response to the rise of deterministic models (Cannella, 2001) and stress the importance of top executives in strategic decisions. In principle, there are two groups of voluntaristic models, with differing assumptions about the rationality of the decision-maker (Hitt et al., 1991). The strategic choice model generally assumes a rational decision-making process, whereas the upper echelon theory takes the view of a behavioral decision-making model and emphasizes the various cognitive limitations of individuals.

Strategic choice models

The strategic choice model suggests that top executives do not assume the external and internal environment in which they operate as given, but make strategic choices. According to the original strategic choice model (Child, 1972), the top executives follow a three-step process in order to make their decisions. Specifically, they evaluate their competitive environment and their organization's position considering, among others, the expectations of stakeholders ("resource providers"), change in environmental conditions, and prior beliefs and principles ("ideology"). Based on this evaluation, the top executives choose the goals for the organization and, finally, the strategic action (e.g., size, technology, structure) that increase the organization's efficiency. In doing so, organizations adapt to elements that are fixed and shape the remaining elements to their advantage (Hitt et al., 1991). In principle, if managers act in a rational manner, strategic choice models and deterministic models concur. The main difference is that top executives decide on the goals in the strategic choice model, whereas, in deterministic models, the goals are imposed on the organization by external factors (Schrader, 1995). Thus, the strategic choice perspective recognizes limitations arising from external factors, but maintains that top executives do have decision-making freedom. However, although the strategic choice model emphasizes the importance of the personality of the decision-makers ("Their prior ideology is assumed to color this evaluation in some degree"), it does not further analyze this aspect, and the decision-making process of the executives remains a black-box.

Since its inception, the original strategic choice model has been developed further (Child, 1997). For example, the notion of constraint has been extended to internal limitations of choice (e.g., action determinism[1], intra-organizational political process, and informational deficiencies) that exist in addition to those imposed by the external environment. Moreover, a refined concept of the organizational environment as socially structured improves the understanding of the decision-making freedom of individuals and helps clarify (1) whether the environment is constraining or enabling and (2) the degree to which the environment is externalized.

Upper echelon theory

In contrast to the strategic choice model, values, cognitive abilities and perceptions of top executives are central to the upper echelon model (Hambrick et al.,

[1] Action determinism draws attention to managerial cognition that potentially can limit choice.

1984). Integrating findings of behavioral decision theory (e.g., ambiguous cues, conflicting goals and objectives, various aspiration levels), the model suggests that top executives are boundedly rational and use heuristics when making strategic choices. Specifically, top executives having idiosyncratic cognitive bases and values face an ongoing stream of environmental and organizational stimuli. To deal with this information overload, they limit, selectively filter and interpret the stimuli. The outcome of this cognitive process, that is the top executives' perception of the situation, is combined with their values to make a decision about a broad range of domains (e.g, operational, financial policy, organizational structure and procedures). Finally, the interaction of situation, top executives' characteristics, and strategic choices together determine company performance.

Although the upper echelon perspective recognizes the influence of external factors on strategic choice, it treats these factors as control variables. Thus, according to this view, the individual top executive does matter to company policy and performance or, to put it as succinctly as the authors of the upper echelon theory did in the title of their seminal paper, the organization can be seen as a reflection of its top executives.

Since values, cognitive abilities, and perception are difficult to measure in general and for top executives in particular, top executive characteristics can be used instead as observable proxies for the psychological constructs that shape the executives' perception of the situation and the influence their decisions. Moreover, these proxies are also efficient in that they facilitate the practical application of the theory in management selection and development as well as competitor analysis. Observable characteristics include age, socioeconomic background, education and career path.[2] However, some researchers being critical of this view argue that proxies can be very unreliable and call for an inquiry in the intervening processes (Lawrence, 1997; Priem, Lyon, & Dess, 1999).

Given that the original model was publicized twenty years ago, it is not surprising that many findings of recent research have been incorporated in the classical model and a more complex second generation model has been presented (Carpenter, Geletkanycz, & Sanders, 2004). Its additions include identification of organizational and environmental antecedents, new theoretical constructs proxied by observable characteristics, intervening variables, and differentiated outcomes in terms of strategy, performance, and the upper

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[2] As the focus of this paper is on the impact of top executives and not on the specific causes and interpretations of top executive-specific effects, the propositions for the observable characteristics are omitted here.

echelon itself. The next section will deal with the models that discuss various moderating factors on the impact of top executives.

INTEGRATIVE MODELS

The following models reconcile the opposing views of deterministic and voluntaristic models on how much impact executives have on organizational outcomes. They argue that the influence of top executives on their organization varies and depends on moderating factors. Consequently, in some situations top executives do matter, whereas in others they do not at all.

Managerial discretion theory

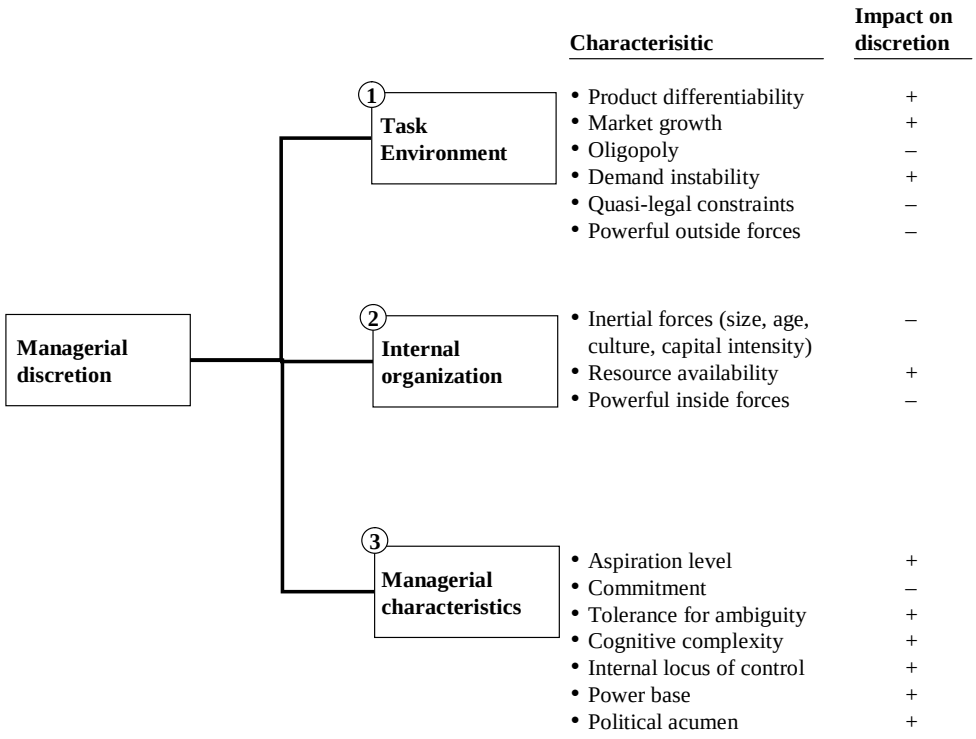
Hambrick and Finkelstein (1987) introduce the concept of managerial discretion. The basic premise of the theory is that managerial discretion can vary significantly from executive to executive. To avoid confusion, it should be noted that managerial discretion here differs from managerial discretion described in standard principal agent theory (Jensen & Meckling, 1976). Principal agent theory assumes that agents, the top executives, are self-interested and have high discretion. If the agents are not monitored, constrained or incentivized by other parties, they behave in self-interested ways contrary to the interest of their principals, the shareholders. In contrast, the concept of managerial discretion employed here does not make any assumptions regarding the type of choices executives make when they have discretion.

According to the managerial discretion theory, the latitude of action top executives enjoy depends on "(1) the degree to which the environment allows variety and change, (2) the degree to which the organization itself is amenable to an array of possible actions and empowers the chief executive to formulate and execute those actions, and (3) the degree to which the chief executive personally is able to envision or create multiple courses of action". Figure 1 below gives an overview of the specific determinants of managerial discretion, which are categorized as environmental, organizational, or individual factors.

Overall, the company's environment confers "discretion to the extent that (1) there is a relative absence of clear means-ends linkages, that is, where a wide range of options can meet stakeholders' nominal test of plausibility; and (2) there is an absence of direct and concentrated constraints" (Finkelstein & Hambrick, 1996). Therefore, industries that produce differentiable products, grow fast, and/or face high demand instability offer high

levels of discretion to top executives, since means-ends linkages and constraints are missing in these environments. On the other hand, industries with oligopoly-like structures, quasi-legal constraints, and powerful outside forces (e.g., suppliers, buyers) limit discretionary options for top executives.

Figure 1: Factors influencing top executives' discretion



Source: Based on Hambrick and Finkelstein (1987).

In addition to the task environment, the characteristics of the organization itself can have an influence on the discretion of top executives. The most important factors are inertial forces, resource availability, and powerful inside forces. It is argued that size, age, strong culture and high capital intensity create inertia in organizations that limit executive latitude. Conversely, uncommitted resources such as cash reserves, unused debt capacity, managerial talent, and/or legitimacy are expected to increase the discretion of top executives. As with powerful outside forces, powerful inside forces such as major shareholders and/or an independent board can also restrict the discretion of the top executives.

Finally, the top executives themselves can affect their level of discretion. Given an identical task environment and internal organization, top executives are not uniformly influential. Hambrick and Finkelstein argue that effective managers can create, find and

pursue opportunities that others cannot or do not. Individual attributes positively influencing top executive discretion are aspiration level, tolerance of ambiguity, cognitive processing ability, internal locus of control, higher power base, and political acumen. Specifically, executives with higher aspiration levels engage in broader search behavior, while higher tolerance of ambiguity and greater cognitive complexity allows a larger discretionary set of alternatives to top executives. Executives with an internal locus of control are more likely to convert their perceived control into execution of alternatives. Unsurprisingly, executives possessing a strong political power base and high degree of political acumen are more likely able to exercise discretion. In contrast, commitment is assumed to be the only factor to lower executive discretion, since it restricts search behavior and consideration of alternative options.

Contingent opportunities theory

Similar to the managerial discretion theory, the contingent opportunities theory argues that the effect of top executives varies by context. It suggest that the impact a top executive has depends on environmental and organizational factors (Wasserman et al., 2001).

However, in stark contrast to the managerial discretion theory, it argues that an external environment providing only a few opportunities to organizations increases the top executives' impact on organizational outcomes, since "it is critical that companies make the most of each opportunity" in these environments. On the other hand, if an environment offers plenty of opportunities, a missed opportunity does not matter much, since other opportunities are easily available. Thus, in those industries, the actions of an executive are assumed to have a small impact on the organization. Specifically, the contingent opportunities theory lists exchange constraints, industry concentration, and industry growth rates as important environmental factors. Based on the theory of structural holes (Burt, 1992), the theory argues that opportunities are scarce and the impact of top executives is high in high exchange-constraint industries with high concentration levels. A high (low) exchange-constraint indicates that an industry buys (sells) a significant part of its input factors (output) from (to) another industry and, thus, is dependent on the upstream (downstream) industry. The level of concentration in the upstream or downstream industry increases the power over the buying or selling industry and subsequently reduces the amount of discretion of the buying or selling industry. The industry growth rate is another indicator of the scarcity of opportunities. If industry growth is low or negative, it is important to capitalize on every single opportunity. If

industry growth is high, opportunities are plenty and one can miss an opportunity without severe consequences.

Similar to the managerial discretion theory, the organizational factor that the contingent opportunities theory considers, resource availability, has a positive effect on the ability of top executives to shape their organization. In particular, top executives of organizations with high debt and low slack levels are assumed to have low impact on their organizations. High level of debt reduces the free cash flow available to the company and increases monitoring efforts by outside parties, which essentially lowers the ability of executives to make discretionary decisions and capture opportunities. Irrespective of whether high slack levels impact positively or negatively on company performance, it will increase the top executives' impact on organizations by increasing the variance in performance.

EMPIRICAL EVIDENCE

The objective of this section is to review empirical evidence on the theoretical models laid out above. It proceeds as follows: first, it reviews and discusses empirical tests on the general impact of top executives on performance and policy. Secondly, results of empirical investigation of integrative models are described and evaluated.

General impact of top executives on performance and policy

A number of empirical studies focused on the impact of top executives (Ahn, Bhattacharya, Jung, & Nam, 2004; Bertrand & Schoar, 2003; Lieberson & O'Connor, 1972; Thomas, 1988; Wasserman et al., 2001; Weiner, 1978; Weiner & Mahoney, 1981). The standard approach to determine the impact of top executives on company performance and policy is to decompose the variance of these variables into year-, industry-, company- and top executive-specific effects (see Bowman & Helfat, 2001, for an overview of methods). The studies first estimate year-specific effects, then industry-specific fixed effects, and company-specific effects. Finally, the effect of top executives is assessed, which reflects the differences between top executives in average performance per top executive during his or her term in office after year-, industry-, and company-specific effects are accounted for. Table 1 presents an overview of studies using the variance decomposition approach and their results.

Table 1: Studies examining the general impact of year, industry, company, and top executives

Study	Sample	Dependent variable	Year effect[b]	Industry effect[b]	Company effect[b]	Top executive effect[b]
Lieberson & O'Connor (1972)	167 US-companies from 13 industries between 1946-1965	Return on sales[a]	1.8	28.5	22.6	14.5
Weiner (1978)	193 US-manufacturing companies between 1956-1974	Return on sales[a]	2.4	20.5	45.8	8.7
Weiner & Mahoney (1981)		Return on assets[a]		N/A[c]		43.9
		Stock price				47.0
Thomas (1988)	12 UK-retail companies between 1965-1984	Return on sales[a]	5.6	N/A	83.2	5.7
Wasserman et al. (2001)	531 US-companies from 42 industries between 1979-1997	Return on assets	2.6	6.3	25.5	14.7
		Market-to-book ratio	5.2	15.5	32.8	13.5

[a] These studies also analyzed absolute measures such as sales and profits. The results of these analyses are omitted, since they are primarily indicators of company size and not performance (Finkelstein et al., 1996).
[b] Measured as incremental increase of percentage of total variance explained.
[c] Instead of sequentially entering year, industry, and company dummy variables, various explanatory variables such as annual GNP, industry sales and concentration, firm size, capital/labor ratio, debt/equity ratio, and percentage of retained earnings were entered together in the regression.

An examination of the results reveals several interesting insights. First, all studies show that top executives have an impact on their organization, which seems to confirm voluntaristic theories. The percentage of variance explained by top executive ranges between 6% and 47% and, on average, approximately equals that of industry-specific effects. However, company-specific effects always explain more variation than top executive-specific effects, which is more in line with deterministic models. Year-specific effects do not appear to play an important role.

When assessing the results of the studies, one should mention methodological and analytical issues that may bias the results. The most important issues include the entry order of the variables, the absence of time-varying company-specific control variables, and the sample selection. In general, the results are sensitive to the order in which the groups of independent variables are entered (see, for example, Weiner, 1978). Since the top executive variables are the last variables to enter the regression, the size of top executive-specific effects is biased downward due to the fact that variance shared by top executives and other factors is attributed to other factors. The omission of time-varying company-specific control variables biases company-specific effects downwards, since company dummy variables represent a rather raw control for company differences. Lastly,

some studies above include only companies that have complete data for the entire sample period and some studies exclude diversified companies. This introduces a selection bias and biases top executive-specific effects downward, because it restricts the sample to companies and top executives who choose incremental strategies only, since mergers and acquisitions, divestures and failures are the primary means for executives to influence their companies (Finkelstein et al., 1996).

Secondly, as the description of the analyzed samples indicate, existing research has focused almost exclusively on US-American companies and their top executives. Depending on the study, top executives were defined as chief executive officers, presidents, or chairpersons of the board. Interestingly, no effort was made to distinguish the impact of different types of top executives.

Finally, the selection of dependent variables is restricted to company performance. No study examines the impact of top executives on company strategy or policy (e.g., financial policy, operational policy, etc.). This is surprising given that both strategic choice models and upper echelon theory argue that top executives primarily influence their company and its performance through idiosyncratic strategic choices.

A recent empirical study focusing exclusively on top executive specific effects addresses some of these issues and analyzes the impact of different types of executives on a broad range of policy variables (Bertrand et al., 2003). Using a sample of approximately US-American 600 companies and over 500 top executives from 1969 to 1999, the authors estimate how much variation in company performance and policy variables (i.e., investment policy, financial policy and organizational strategy) can be attributed to fixed effects of three different types of executives (chief executive officers, chief financial officers, and other executives[3]) after controlling for year and company fixed effects and time-varying company characteristics and accounting for serial correlation. Since the sample is restricted to companies whose top executives can be observed in at least one other company, the authors are able to separate top executive fixed effects from other firm-specific characteristics that might be correlated with the top executive fixed effects. The results are consistent with previous results and indicate that, in general, top executives have an impact on corporate policy and that the influence differs with the type of policy variable and top executive. Specifically, top executives seem to have the largest impact on the SGA cost ratio (increase of adjusted r-square of 37 percentage points),

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[3] The third category includes subdivision CEOs or presidents, executive vice-presidents, chief operating officers and vice-presidents.

acquisitions or diversification decisions (both 11 percentage points), interest coverage (10 percentage points), and dividend policy (7 percentage points). Moreover, CEOs and other top executives have a larger impact on organizational strategy than CFOs have, while CFOs matter more for financial policy. Compared to the results of the variance decomposition studies above, the increase in adjusted r-square for performance measures such as return on assets is rather small with 5 percentage points. This could be partly attributed to the more conservative sample selection approach (i.e., restriction to top executives being observed in at least two companies, time-varying company-specific controls, accounting for serial correlation) and partly to the fact that this study also includes less powerful top executives than CEOs (roughly 44% of the 519 top executives were CEOs in the last position they were observed, the others were CFOs (12%) or other top executives (44%)).

Another interesting result comes from a replication of the above described study in a different cultural setting (Ahn et al., 2004). Using a similarly restricted data set with top executives who changed their company at least once, the authors explore the impact of Japanese chief executive officers (*shachos*) and other top executives on performance, investment and financial policy of Japanese manufacturing companies. When restricting their analysis to CEOs, they can reject the null hypotheses of no top executive-specific effects only for one out of eleven performance and policy variables, namely cash holdings. Extending the sample to other top executives, they find significant effects only for three variables (advertising, leverage, and interest coverage). After examining whether the year of CEO departure constitutes a turning point for the company and finding no effects as well, the authors conclude that Japanese CEOs "do not matter in the Japanese corporation […]". This result, being contrary to those of the other reviewed studies from the USA or UK, is particularly interesting, since it is consistent with well-known cultural differences between Japan and Western Societies like the USA and UK. Japan is the common example for a collectivistic culture, while the USA and the UK, in which the aforementioned empirical tests took place, are common examples of individualistic cultures. Although the evidence is far from conclusive, it appears that an environment that values and rewards group achievements rather than individual achievements negatively affects the discretion of top executives.

Impact of industry-, firm-, and executive-level characteristics on top executive-specific effects

This first sections deals with empirical evidence for the managerial discretion theory and then with empirical evidence for the contingent opportunities view. In general, a first indication that the impact of top executives varies with the context can be derived from two of the aforementioned variance decomposition studies (Lieberson et al., 1972; Wasserman et al., 2001). Both studies analyze year-, company-, and top executive-specific effects separately for each industry and show that substantial differences in terms of top executive-specific effects among the industries exist. For example, in one study, top executives explained from 4.6 (paper mills) to 41.0 (hotels and motels) percent of the variance of the return on assets and from 2.4 (meat products) to 22.8 (measuring and controlling devices) percent of the variance of the market-to-book-ratio (Wasserman et al., 2001).

The managerial discretion theory has been tested empirically at two levels, the environmental/organizational level and the individual level. Studies examining discretion at the environmental and organizational level focus primarily on identifying environments as low or high discretion using qualitative assessments (Hambrick, Geletkanycz, & Frederickson, 1993), industry and company data such as advertising and R&D intensities (Haleblian & Finkelstein, 1993), or panels of academics and industry experts (Hambrick & Abrahamson, 1995). After identifying an environment as either high or low discretion, they analyze the effects of discretion on the relationship between top executives and organizational outcomes. In general, the findings indicate that top executive orientations are reflected in organizational outcomes as hypothesized by the upper echelon theory in high discretion environments, but not in low discretion environments (Finkelstein et al., 1996). For example, studies show that the positive relationship between top executive tenure and strategic persistence and conformity to industry standards is stronger in high discretion than in low discretion environments (Finkelstein & Hambrick, 1990). Likewise, the association between top management team size and CEO dominance, and company performance is found to be significant only in high discretion and not in low discretion environments (Haleblian et al., 1993). A final example is the negative relationship between CEO openness to change and strategic persistence, which is similarly only significant in high discretion environments (Datta, Rajagopalan, & Zhang, 2003). However, it is important to note that by identifying environments as either high or low discretion, these studies do not examine the effects of the individual environmental and organizational factors on top executives' discretion that are presented by the original

managerial discretion theory. Thus, they provide only indirect and indicative evidence and, moreover, do not analyze the proposed individual factors of the theory that affect the discretion of top executives.

A second category of studies examining the managerial discretion theory focuses on individual characteristics as determinants of discretion. To accomplish their objective, these studies use research methods such as surveys (Key, 1997, 2002) or management simulations (Carpenter & Golden, 1997). The results reveal that perception of and belief regarding individual discretion are positively correlated with internal locus of control (Carpenter et al., 1997; Key, 1997). Individuals who think that they have more power over external events perceive and believe that they have more discretion than others. In contrast to the managerial discretion and the upper echelon theory, organizational characteristics and individual demographics appear not to be related to perceived discretion (Key, 1997, 2002). However, these results should not be overemphasized, since they (1) refer to perceived discretion and not actual discretionary behavior, (2) are derived from questions of ethical and not business situations, and (3) are obtained through questionnaire instruments that have only received limited testing (Key, 2002). Turning to the effect of individual discretion, one study analyzes the effect of executive discretion and values on company behavior also using a questionnaire approach. It finds a positive relationship between managerial discretion and values and corporate philanthropy after controlling for size and resources (Buchholtz, Amason, & Rutherford, 1999).

The contingent opportunities view has been empirically examined in one study (Wasserman et al., 2001). In contrast to the managerial discretion theory, the contingent opportunities view sees environments with scarce opportunities as a determinant of high executive impact. Using the aggregated effect of CEOs on the market-to-book ratio for each industry as the dependent variable, the authors analyze the impact of (1) four measures of opportunity scarcity (industry-level concentration ratios, exchange-constraint measures, interaction of concentration ratios and exchange-constraints measures, and sales growth rates) and (2) two measures of resource availability (industry debt level and SGA cost ratio). They find that all coefficients have the expected sign and are highly significant at the 5% level or lower. In an additional analysis, they check the influence of average size, performance variance, and CEO tenure on the CEO effect on the market-to-book ratio and are unable to detect any statistically significant effect. Thus, they conclude that CEOs have the highest impact on their company when they have plenty of resources and environmental opportunities are scarce.

SYNTHESES AND HYPOTHESES

The preceding sections have dealt with the question whether top executives have an impact on their organization from a theoretical and empirical perspective. In the light of the theoretical models and the results of empirical examinations, this section briefly summarizes the main results and proposes hypotheses for the following empirical analysis. As the focus of this research is on the more general question whether or not top executives have an impact, the format of the hypotheses reflects the research question and differs from the conventional format that presents if-then or cause-and-effect relationships between specific variables.

There are two opposing theoretical views on the importance of top executives for organizational outcomes. External control and rational normative models deny any substantial influence, while strategic choice and upper echelon models emphasize the important role executives play in shaping company strategy, structure, and performance. Empirical work almost exclusively focuses on US-American top executives and on a narrow set of performance variables. It shows that, as predicted by the voluntaristic models, top executive-specific effects do exist and are, on average, comparable with industry-specific effects in terms of size. This leads to hypothesis 1.

Hypothesis 1: *Top executives have an impact on their company and are able to influence both performance and policy.*

Specifically, adding top executive fixed effects to panel models of company behavior that account for year, industry, and company-specific characteristics results in significant increases of adjusted r-square.

However, as table 1 shows, company-specific effects appear to be larger than top-executive specific effects, whereas year-specific effects seem to be rather small. Thus, hypothesis 2 is as follows.

Hypothesis 2: *The impact of top executives will be higher than year-specific effects and lower than company-specific effects.*

Specifically, adding company characteristics (year fixed effects) to the panel models of company behavior leads to larger (smaller) increases of adjusted r-square than adding top executive fixed effects.

One of the most recent empirical studies finds that top executives do not only influence company performance, but also a broad range of policy variables such as investment, financial and operational policy. The degree of influence depends on the type

of policy variable and the type of top executive (e.g., chief executive officers, chief financial officers). Hypotheses 3 and 4 relate to these questions.

Hypothesis 3: *The impact of top executives varies by performance and policy variable.*

Specifically, the amount of adjusted r-square resulting from the addition of top executive fixed effects varies by performance and policy variable.

Hypothesis 4: *The impact of top executives varies by type of executive.*

Specifically, the additional amount of adjusted r-square resulting from the addition of board chairmen differs from the additional amount of adjusted r-square resulting from the addition of chief financial officers. Moreover, the additional adjusted r-square due to board chairmen is larger than the additional adjusted r-square due to chief financial officers for performance and operational policy variables, but lower for financial policy variables.

In addition to deterministic and voluntaristic models, this section has also reviewed integrative models and their related empirical evidence. These models argue that the impact of top executives on organizational outcomes varies by context. The managerial discretion theory presents a set of environmental, organizational, and executive characteristics that either promote or demote the discretion of top executives and, thus, the impact of top executives. It holds that the influence of top executive is determined (1) by the degree to which the environment allows changes, (2) by the openness of the organization to change and available resources, and (3) by the ability of the top executive to create and execute alternatives. The contingent opportunities view concurs with the managerial discretion theory on the importance of readily available internal resources to top executive impact, but claims that only environments in which opportunities are scarce promote the ability of top executives to influence organizational outcomes. General evidence on the importance of contextual factors comes from studies that show substantial differences of top executive-specific effects among different industries.

Hypothesis 5: *The impact of top executives varies by context.*

Specifically, the additional amount of adjusted r-square due to the addition of top executives to panel models of company behavior varies by industry and time period.

Empirical examinations of the managerial discretion theory primarily focused on identifying low and high discretion environments and on analyzing the effects of discretion on the relationship between top executives and their companies. Results of

various studies show that top executives influence their companies to a greater extent in high discretion than in low discretion environments. However, these results provide only an indirect and indicative confirmation of the theory. Therefore, hypothesis 6 proposes.

Hypothesis 6: *Environmental, organizational, and individual factors increase or decrease the influence of top executives on their company as hypothesized by the managerial discretion theory (see figure 1).*

The contingent opportunities view has been examined only once so far. An industry-level analysis confirms the predictions of the theory, which states that scarce environments and the availability of internal resources increase the influence of top executives. Since both managerial discretion and contingent opportunities theory agree on the influence of internal resources, hypothesis 7 focuses on the differences between the theories.

Hypothesis 7: *In contrast to the managerial discretion theory and according to the contingent opportunities view, environments characterized by limited opportunities increase the effects of top executives.*

Specifically, market growth is negatively associated with top executives' influence.

German top executives and their impact on corporate performance and policy: An empirical examination

This section empirically examines the hypotheses derived from the synthesis of deterministic, voluntaristic, and integrative models. First, the general impact of German top executives on a broad range of performance and policy variables is analyzed using a unique dataset. Second, the magnitude of top executive effects is further examined by analyzing their distribution. Third, the impact of various industry-, company-, and executive-related characteristics on the magnitude of top executive-specific effects is tested.

GENERAL IMPACT OF TOP EXECUTIVES ON PERFORMANCE AND POLICY

Sample construction and empirical methodology

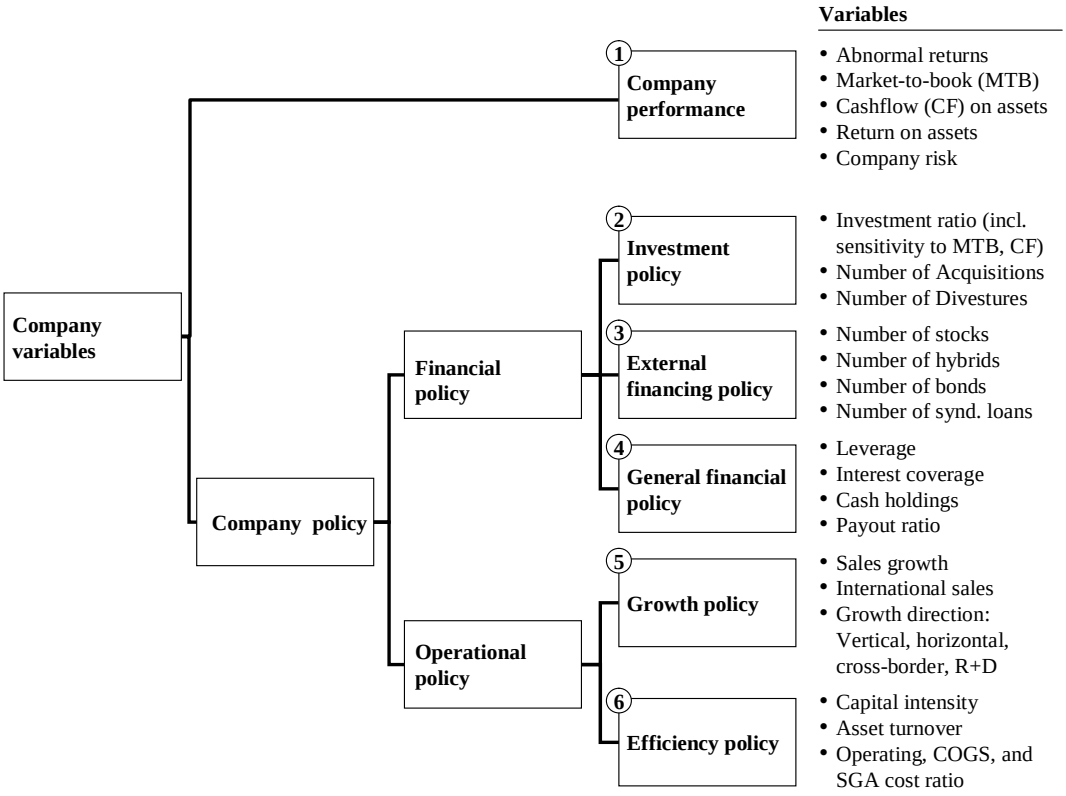
Since publicly listed companies are subject to higher disclosure standards than non-listed companies and represent a disproportional amount of economic activity, it is reasonable to focus on these companies and their executives first. A sample of all German companies that were listed on the bluechip index (*DAX*) or the midcap index (*MDAX*) of the German stock exchange between 1983 and 2002 is constructed. It should be mentioned that both indices were established after the beginning of the sample period, namely in 1987 (*DAX*) and 1994 (*MDAX*). To overcome this issue, the composition of the indices at the introduction of the indices is used to build the sample in the years before the introduction. Since some companies left the indices during the sample period, company data for all years between 1983 and 2002 are collected to avoid a potential survivorship bias. Companies that went public after the introduction of the indices and joined the one of the indices after their IPO are also included in the sample beginning with the year of their IPO.

As is common in studies involving financial ratios, financial companies (i.e., banks, insurance companies, and financial service companies) are excluded due to the

non-comparability of the ratios. Moreover, companies that were headquartered outside Germany or for which no data were available in Worldscope are also eliminated.

Next, top executives of the remaining companies are identified. Based on an assessment of the situation of German top executives in corporate practice, it is sensible to define the chairman of the management board as the most powerful top executive of German publicly limited companies (Normann & Schiereck, 2004c). Consequently, individual management board chairmen are identified using *Saling's Aktienführer/Hoppenstedt Aktienführer*. Companies that had no or only one management board chairman in the sample period are also excluded. In addition to the management board chairmen (MBC), the chief financial officers (CFOs) of the companies are identified using a variety of sources including annual reports and direct contact of the companies for which no public information is available. The resulting sample contains 110 companies, 459 top executives (i.e., 325 MBC and 134 CFOs) and 1659 observations (not all variables are available for each company and year).

Figure 2: Overview of performance and policy variables



For this sample of companies, data from Worldscope and Thompson Financial as well as information from the *Saling's Aktienführer/Hoppenstedt Aktienführer* are used to construct a broad range of performance, policy, governance and control variables. To avoid the narrow definition of performance of previous studies, five performance

variables ranging from purely market-based to purely accounting-based and including an indicator of company risk are defined. As displayed in figure 2, company policy variables are divided into financial and operational policy variables. The financial policy variables comprehensively cover investment, external financing, and general financial policy variables. Operational policy variables include variables indicating growth and efficiency strategies.

The definition and construction of the specific variables are reported in the appendix. Table 2 presents descriptive statistics for the company variables and a range of governance and other variables that are used to control for environmental and organizational differences.

Table 2: Descriptive statistics

Variable[a]	**Obs.**	**Mean**	**Std. Dev.**	**Median**	**Range**[b]
1. Company performance					
Abnormal return	1,601	0.00	0.03	0.00	0.03
Market-to-book ratio	1,631	1.43	0.71	1.23	0.41
Cash flow on assets	1,591	0.11	0.07	0.11	0.08
Return on assets	1,624	0.09	0.08	0.07	0.07
Company risk	1,601	0.09	0.04	0.08	0.04
2. Investment policy					
Investment ratio	1,573	0.36	0.39	0.28	0.19
Number of acquisitions	1,659	2.51	5.24	1.00	3.00
Number of divestures	1,659	1.41	3.19	0.00	1.00
3. External financing policy					
Number of stocks	1,659	0.20	0.68	0.00	0.00
Number of hybrids	1,659	0.05	0.28	0.00	0.00
Number of bonds	1,659	0.85	9.37	0.00	0.00
Number of syndicated loans	1,659	0.25	1.11	0.00	0.00
4. General financial policy					
Equity ratio	1,651	0.28	0.13	0.27	0.16
Interest coverage	1,614	13.83	53.20	3.89	5.61
Cash holdings	1,645	0.19	0.14	0.16	0.19
Payout ratio	1,605	0.50	0.63	0.43	0.37
5. Growth policy					
Sales growth	1,626	0.07	0.21	0.04	0.15
International sales	1,352	0.48	0.23	0.51	0.32
Vertical integration	1,637	201.96	138.89	166.44	90.23
Diversifying acquisitions	1,659	1.05	2.59	0.00	1.00
Focusing divestures	1,659	0.66	1.62	0.00	1.00
Cross-border acquisitions	1,659	1.39	3.00	0.00	2.00
Cross-border divestures	1,659	0.66	1.67	0.00	1.00
R+D ratio	604	0.04	0.04	0.03	0.05
6. Efficiency policy					
Asset turnover	1,626	1.54	0.80	1.37	0.65
Capital intensity	1,603	51.30	68.84	33.17	34.43
Operating cost ratio	1,577	0.98	0.06	0.98	0.07
COGS cost ratio	1,449	0.73	0.15	0.75	0.17
SGA cost ratio	607	0.21	0.13	0.18	0.17

Governance variables					
Shareholder concentration (Herfin)	1,659	0.32	0.32	0.24	0.38
Controlling shareholder	1,659	0.45	0.50	0.00	1.00
Leverage	1,651	3.77	5.85	2.75	2.29
Industry rent	1,658	-0.01	0.03	-0.01	0.04
Neutral takeovers (completed)	1,659	35.76	50.56	26.00	25.00
Takeovers (completed)	1,659	887.07	616.60	942.00	1.293.00
Control variables					
Company age	1,659	100.60	48.55	105.00	56.00
Total assets (log)	1,651	14.42	1.57	14.27	2.13
Market capitalization (log)	1,631	13.75	1.53	13.48	2.13
Market-to-book ratio (lagged)	1,586	1.44	0.72	1.23	0.41
Cash flow over PPE	1,585	0.52	3.06	0.37	0.27
Cash flow over PPE (lagged)	1,546	0.44	0.40	0.37	0.26

[a] As customary in the study of accounting ratios, all ratios are winsorized at the 0.5% and 99.5% level.
[b] Defined as interquartile range between 75th and 25th percentile.

The empirical methodology resembling that of McGahan & Porter (1997; 2002) employs a top-down approach and differentiates between year-, industry-, company-, and top executive-specific effects. In doing so, it measures first the impact of year effects, then industry effects, then company effects, and finally top executive effects. Year effects reflect macroeconomic conditions such as the stage of the business cycle and the financial markets as well as unique events in the sample period (e.g., German reunification in 1990, 9/11 terror attacks in 2001). The sample contains data from 1983 to 2002 and, therefore, year effects across 20 years are tested. Industry effects reflect the competitive landscape of industries (e.g., use of technology, barriers to entry and exit) being common to all companies in an industry. Industry effects arise when performance and policies of an industry consistently differ from the average of all industries. To measure industry effects, all companies in the sample are assigned to one of 10 industries derived from the *Frankfurter Allgemeine Zeitung* indices (*F.A.Z.* indices)[4] and dummy variables are created for each of the 10 industries. Company effects reflect the particularities of companies (e.g., size, market position, ownership) and are measured by two types of variables, 110 company dummy variables and a set of time-varying company level variables. The time-varying company level variables are governance variables that, on theoretical grounds, directly influence company performance and policy and specific control variables for each dependent variable (e.g., size, company age, profitability for any efficiency policy variable). The specific time-varying company level variables for each dependent variable are listed in the notes of tables 3 through 8. Top executive effects reflect the influence of top executives on company performance and policy and arise

[4] This industry classification is used, because it balances the tradeoff between number of industries and number of companies in an industry. In general, the vast majority of companies stays within one industry during the sample period. However, there are some companies that switch industries (e.g., Mannesmann, Klöckner-Werke).

when a company's performance and policies under a particular top executive differs from the average across all of the company's top executives. To assess the top executive effect, dummy variables for all 325 management board chairmen and 134 chief financial officers included in the sample are created.

In general, the empirical approach can be most easily explained by using a dependent variable such as the equity ratio as an example. Consider analyzing the impact of management board chairmen on the equity ratio. First, one derives a benchmark specification, which is the adjusted r-square of the model after controlling for any average differences across years, industries, companies, company-year specific shocks (e.g., an earnings shock) and intertemporal shocks that may affect the company's equity ratio. Then, one adds all management board chairmen variables to the model and calculates the additional adjusted r-square that is due to the group of management board chairmen.

Specifically, for each performance and policy variable, the following regression is estimated and further explained by using the equity ratio as an example:

$$(1) \qquad y_{it} = \alpha + \gamma_t + \lambda_k + \mu_i + \beta X_{it} + \upsilon_{MBC} + \upsilon_{CFO} + \varepsilon_{it}$$

where y_{it} is the equity ratio of company i in the year t, α is the average equity ratio over the entire period for all companies, and γ_t are year fixed effects that indicate the difference between α and the average equity ratio of all companies in the year t. The next two terms λ_k and μ_i are industry and company fixed effects and represent the incremental equity ratio associated with industry k and company i, respectively. The term X_{it} is a vector of time-varying company level corporate governance and control variables. The specific control variables for the equity ratio are company age, return on assets, total assets, number of equity issues, and number of non-equity issues. Finally, υ_{MBC} and υ_{CFO} are the fixed effects for the group of top executives who are management board chairmen and chief financial officers, respectively, and ε_{it} is the error term. The above described effects are successively entered in the model in the following order: null (α), year (γ_t), industry (λ_k) company ($\mu_i + \beta X_{it}$), management board chairmen (υ_{MBC}), all chief financial officers (υ_{CFO}), and all top executives ($\upsilon_{MBC+CFO}$). To assess the importance of each effect, the incremental adjusted r-square generated by adding the effect and the F-statistic from the test of joint significance are calculated.

To deal with the possibility of a shock in year t-1 influencing the equity ratio in year t, the model allows for autocorrelation in the error term. More specifically, it assumes that there is first-order autocorrelation AR(1) within panels, that the coefficient of the AR(1) process is estimated by a regression using one-period lags of the error term,

and that the coefficient of the AR(1) process is common to all panels. Finally, to avoid the loss of observations during the correction for autocorrelation, the Prais-Winsten transformation is applied (see Gujarati, 2003, for details). As a result, this approach captures intertemporal shocks influencing the equity ratio regardless of the source of the shock (e.g., macroeconomic fluctuations, industry and company specific shocks).

It should be cautioned that the resulting changes in the adjusted r-squares should be viewed as an indication, since the underlying r-squares are not directly comparable.[5] However, studies analyzing the variance of accounting profitability show that "the estimates of the corrected model are substantially similar to those in the uncorrected model" (McGahan et al., 2002).

Equation (1) illustrates why companies with only one management board chairman in the entire sample period were excluded. In this case, the executive effect cannot be separated from the fixed firm effect, since both are perfectly collinear. For that reason, at least two different top executives for each company need to be observed in the sampling period. Although this approach is less strict than that of Bertrand & Schoar (2003) who require their top executives to be present in at least two different company, it is reasonable in this context. First, the number of German top executives in publicly listed companies in the sample period who meet this requirement is relatively low. Second, the top executive-specific effects are the last effects to enter the regression, which biases their influence downwards. Third, the influence of unobservable, yet relevant time-varying factors is minimized by including relevant governance and control variables. More specifically, the model controls for the following governance mechanisms that are supposed to limit agency costs: ownership structure (Jensen et al., 1976; Shleifer & Vishny, 1986), capital structure (Jensen, 1986), product market competition (Allen & Gale, 2000), and the takeover market (Jensen & Ruback, 1983). There are two governance mechanisms that are not controlled for: board structure (Warther, 1998) and managerial remuneration (Jensen & Murphy, 1990). Since size and composition of the supervisory board is tightly regulated by various German laws (see Normann et al., 2004c, for an overview), it is reasonable to assume that board structure is exogenous in Germany. Data on managerial compensation at the individual level are not available for the sample period. The set of control variables that is specifically adapted to each dependent variable includes variables such as company age, size in terms of total assets

[5] The correction for autocorrelation approach generates r-squares that are based on different sum of squares, because the coefficients of the AR(1) process that are used to correct the observations differ in each model.

and market capitalization, profitability, operating cash flow, and the market-to-book ratio as an indicator for future growth opportunities.

Results

This section presents and discusses adjusted r-squares and F-tests of joint significance of the different effects from the estimation of equation (1) separately for each set of variables. More specifically, the adjusted r-square, the change in adjusted r-square due to the additional effect, the F-statistic, and p-value are shown for each effect. The results of this study are also compared to the results of previous research.

Table 3 reports the results for the performance variables. The overall results confirm hypothesis 1 in that both MBC and CFO increase the adjusted r-square of the estimated panel models. The respective F-values are large and allow rejection of the null hypothesis that all top executive-specific effects are zero for all performance variables and types of executives. Consistent with hypothesis 2, the influence of company-specific characteristics is higher than the influence of top-executives. The increase of adjusted r-square due to company characteristics ranges from 14% to 45% and is larger than the increase due to top executives for each performance variable, even when combining both types of executives. As predicted by hypothesis 2, the influence of year fixed-effects is relatively small. Year effects only seem to be somewhat important for stock market-based performance measures and company risk (standard deviation of monthly returns), as indicated by the comparatively large increases in adjusted r-square. When comparing the influence of top executives across performance variables, an interesting pattern coherent with hypothesis 3 emerges. The increase in adjusted r-square due to management board chairmen ranges from 22% for return on assets and 18% for cash flow returns to 9% for the market-to-book ratio and 7% for abnormal returns. Thus, it seems as if the influence of top executives on performance depends on the underlying performance metric with purely market-based variables the most difficult and purely accounting-based variables the easiest to influence. When comparing the influence of different types of executives, it appears that MBC influence performance to a larger extend than CFOs, which confirms hypothesis 4. Compared with the results of two recent studies on US-American top executives, German top executives seem to have a higher influence on return on assets and a lower influence on the market-to-book ratio, which is coherent with and may reflect differences in the amount of managerial discretion that German and US accounting rules and practices permit.

Table 3: Executive effects on company performance

Variable/statistic	**Null**	**Year**	**Indu-stry**	**Com-pany**	**MBC[f]**	**CFOs[f]**	**MBC+ CFOs[f]**
Abnormal return[a]							
Adj. r-square	0.00	0.06	0.08	0.22	0.29	0.23	0.32
Adj. r-square inc.		0.06	0.01	0.14	0.07	0.01	0.10
F-Value		6.74	3.57	3.57	1.68	1.30	1.75
p-value		0.00	0.00	0.00	0.00	0.04	0.00
Market-to-book ratio[b]							
Adj. r-square	0.22	0.28	0.33	0.78	0.87	0.81	0.88
Adj. r-square inc.		0.06	0.06	0.45	0.09	0.03	0.10
F-Value		7.92	16.40	30.42	5.52	3.87	5.23
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Cash flow on assets[c]							
Adj. r-square	0.09	0.10	0.13	0.36	0.55	0.42	0.57
Adj. r-square inc.		0.01	0.03	0.23	0.18	0.06	0.21
F-Value		1.82	7.39	6.23	3.77	2.51	3.54
p-value		0.02	0.00	0.00	0.00	0.00	0.00
Return on assets[d]							
Adj. r-square	0.06	0.07	0.09	0.35	0.57	0.42	0.59
Adj. r-square inc.		0.01	0.02	0.25	0.22	0.07	0.24
F-Value		2.28	5.01	6.68	4.56	2.92	4.12
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Company risk[e]							
Adj. r-square	0.02	0.14	0.18	0.42	0.59	0.46	0.62
Adj. r-square inc.		0.12	0.04	0.24	0.17	0.05	0.20
F-Value		13.19	9.07	6.66	3.73	2.39	3.79
p-value		0.00	0.00	0.00	0.00	0.00	0.00

[a] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, market-to-book ratio, and market capitalization.
[b] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, total assets, and market capitalization.
[c] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, and total assets.
[d] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, and total assets.
[e] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, total assets, return on assets, and equity ratio.
[f] Benchmark specification is the regression that includes year-, industry-, and company-specific effects.

Table 4 focuses on investment policy. Before discussing the results, the variables investment to market-to-book and cash flow sensitivity are explained. These variables express the sensitivity of the investment ratio to the company's market-to-book-ratio and cash flow. The top executive effects for these variables that are presented in table 4 differ slightly in their definition in that they are not fixed effects, but fixed effects interacted with the market-to-book ratio and cash flow, respectively. The results of the investment policy regressions confirm hypothesis 1 to 4 only for the investment ratio, the number of acquisitions, and the number of divestures. After controlling for cash flow and investment opportunities, all top executives, MBC and CFOs, have a large influence on these variables, as indicated by the substantial increases in adjusted r-square that even exceeds that of company characteristics for acquisitions and divestures. The investment

sensitivities, however, show a different picture. Only MBC seem to have some influence on the investment to market-to-book sensitivity, but the F-tests cannot reject the null hypothesis that top executive effects are zero for the other investment sensitivity variables.

Table 4: Executive effects on investment policy

Variable/statistic	**Null**	**Year**	**Indu-stry**	**Compa ny**	**MBC[b]**	**CFOs[b]**	**MBC+ CFOs[b]**
Investment ratio[a]							
Adj. r-square	0.03	0.04	0.06	0.41	0.53	0.47	0.54
Adj. r-square inc.		0.01	0.03	0.34	0.12	0.07	0.13
F-Value		1.95	5.63	8.81	2.80	3.03	2.51
p-value		0.01	0.00	0.00	0.00	0.00	0.00
Inv. to MTB sensitivity[a]							
Adj. r-square	Same as investment ratio.				0.64	0.46	0.36
Adj. r-square inc.					0.11	-0.02	-0.18
F-Value					2.41	0.62	0.16
p-value					0.00	1.00	1.00
Inv. to CF sensitivity[a]							
Adj. r-square	Same as investment ratio.				0.54	0.45	0.39
Adj. r-square inc.					0.01	-0.03	-0.15
F-Value					1.06	0.41	0.27
p-value					0.28	1.00	1.00
Number of acquisitions[a]							
Adj. r-square	-	0.05	0.13	0.43	0.74	0.66	0.78
Adj. r-square inc.		0.05	0.08	0.30	0.31	0.23	0.35
F-Value		5.83	17.89	8.18	9.30	11.77	9.29
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Number of divestures[a]							
Adj. r-square	-	0.03	0.09	0.38	0.73	0.71	0.80
Adj. r-square inc.		0.03	0.06	0.29	0.35	0.32	0.42
F-Value		3.68	12.63	7.51	9.62	18.62	12.29
p-value		0.00	0.00	0.00	0.00	0.00	0.00

[a] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, market-to-book ratio, lagged cash flow over PPE, and total assets.
[b] Benchmark specification is the regression that includes year-, industry-, and company-specific effects.

Table 5 presents the results for the external financing policy. Consistent with the previous results, top executives also matter for external financing decisions. Adding top executives to the model improves the fit of the models substantially, even after controlling for company-level factors such as profitability, investment ratio, equity ratio, number of acquisitions, and cash flow. Top executives' influence is particularly strong in the areas of hybrid and syndicated loan financing. In these areas, top executive-specific effects are even larger than company-specific effects. Coherent with hypothesis 4, the influence of CFOs exceeds the influence of MBC except for bond financing. Nevertheless, the influence of MBC on most external financing decisions is still relatively high, which could be attributed to their career path. An analysis of the career path of a subsample of these MBC shows that a career background in finance, accounting, or auditing is more

common among German MBC than the traditional image suggests (Normann et al., 2004c).

Table 5: Executive effects on financing policy

Variable/statistic	**Null**	**Year**	**Indu-stry**	**Com-pany**	**MBC[b]**	**CFOs[b]**	**MBC+ CFOs[b]**
Number of stocks[a]							
Adj. r-square	0.00	0.01	0.04	0.23	0.26	0.30	0.32
Adj. r-square inc.		0.01	0.03	0.18	0.03	0.07	0.10
F-Value		1.78	7.49	4.22	1.27	2.67	1.75
p-value		0.02	0.00	0.00	0.01	0.00	0.00
Number of hybrids[a]							
Adj. r-square	-	0.01	0.01	0.07	0.17	0.21	0.21
Adj. r-square inc.		0.01	0.01	0.06	0.10	0.13	0.14
F-Value		1.80	2.03	1.90	1.79	3.64	1.91
p-value		0.02	0.03	0.00	0.00	0.00	0.00
Number of bonds[a]							
Adj. r-square	-	0.00	0.01	0.21	0.37	0.35	0.37
Adj. r-square inc.		0.00	0.01	0.20	0.15	0.14	0.15
F-Value		1.17	3.34	4.46	2.65	4.34	2.27
p-value		0.27	0.00	0.00	0.00	0.00	0.00
Number of syndicated loans[a]							
Adj. r-square	-	0.03	0.04	0.11	0.43	0.48	0.55
Adj. r-square inc.		0.03	0.01	0.08	0.32	0.37	0.44
F-Value		3.53	2.49	2.18	4.85	12.03	6.22
p-value		0.00	0.01	0.00	0.00	0.00	0.00

[a] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, return on assets, total assets, investment ratio, equity ratio, number of acquisitions, and cash flow over PPE.
[b] Benchmark specification is the regression that includes year-, industry-, and company-specific effects.

The exposure to financial decision-making during their career could also explain the strong impact of German MBC on general financial policy. As shown in table 6, the adjusted r-squares increase substantially when MBC fixed effects are included. For example, the inclusion of MBC fixed effects in the equity ratio model that controls for various company-level factors (e.g., profitability, equity and non-equity issues) increases the adjusted r-square by 19 percentage points. The MBC fixed effects for interest coverage and cash holdings are even larger with 35 and 24 percentage points, respectively. MBC also play a decisive role in setting the payout policy. In fact, they are the only factor that explains the variation in the payout ratio to a substantial degree. Interestingly, the F-test does not allow the rejection of the null hypothesis that all year effects are zero. This finding could be explained by the fact that a default payout ratio is stipulated by German accounting law and practices. A comparison of the influence of MBC and CFOs shows limited support for hypothesis 4. CFOs matter less for all general financing policies than MBC.

Table 6: Executive effects on general financing policy

Variable/statistic	**Null**	**Year**	**Industry**	**Company**	**MBC[c]**	**CFOs[c]**	**MBC+ CFOs[c]**
Equity ratio[a]							
Adj. r-square	0.24	0.24	0.25	0.64	0.83	0.69	0.85
Adj. r-square inc.		0.00	0.02	0.38	0.19	0.05	0.21
F-Value		1.47	4.71	16.06	8.41	3.66	8.07
p-value		0.09	0.00	0.00	0.00	0.00	0.00
Interest coverage[b]							
Adj. r-square	0.00	0.01	0.02	0.41	0.76	0.53	0.77
Adj. r-square inc.		0.01	0.02	0.39	0.35	0.12	0.35
F-Value		1.53	3.91	10.51	10.81	4.95	8.90
p-value		0.07	0.00	0.00	0.00	0.00	0.00
Cash holdings[b]							
Adj. r-square	0.07	0.09	0.10	0.41	0.65	0.52	0.68
Adj. r-square inc.		0.02	0.01	0.31	0.24	0.11	0.27
F-Value		2.64	3.75	8.53	5.70	4.63	5.53
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Payout ratio[b]							
Adj. r-square	0.01	0.01	0.02	0.09	0.23	0.11	0.25
Adj. r-square inc.		0.00	0.01	0.07	0.15	0.02	0.16
F-Value		1.29	1.94	2.10	2.27	1.32	2.11
p-value		0.18	0.04	0.00	0.00	0.02	0.00

[a] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, return on assets, total assets, number of equity issues, and number of non-equity issues.
[b] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, return on assets, and total assets.
[c] Benchmark specification is the regression that includes year-, industry-, and company-specific effects.

Turning to operational policy, the executive effects on growth policy are displayed in table 7. In general, the results confirm hypotheses 1 to 4. Top executives are able to influence company growth and executive-specific effects are larger than year-specific effects, but smaller than company-specific effects. The effect of top executives also differs among top executive types with MBC being more influential than CFOs. There are, however, some noteworthy exceptions with regard to acquisition and divesture decisions that can be viewed as indicators of company boundaries. For instance, top executives have a large impact on (1) diversifying acquisitions and focusing divestures that indicate whether a company diversifies into new industries or focuses on its core business by withdrawing from peripheral activities and (2) cross-border acquisitions and divestures that indicate whether a company expands or withdraws internationally. Adding top executive effects to these models leads to larger increases of adjusted r-square than adding company-specific effects. It should be noted that all company models account for size, cash flow, and investment opportunities. To distinguish executive effects on acquisitions and divestures in general from executive effects on diversifying/focusing and cross-border acquisitions and divestures, the models also control whether any acquisition

or divesture took place in the respective year. Finally, CFOs have a disproportionally large influence on these decisions that exceeds the influence of MBC in two out of four variables.

Table 7: Executive effects on growth policy

Variable/statistic	**Null**	**Year**	**Industry**	**Company**	**MBC[e]**	**CFOs[e]**	**MBC+ CFOs[e]**
Sales growth[a]							
Adj. r-square	0.00	0.05	0.06	0.20	0.27	0.22	0.28
Adj. r-square inc.		0.05	0.01	0.14	0.07	0.02	0.08
F-Value		5.08	2.87	3.48	1.70	1.47	1.60
p-value		0.00	0.00	0.00	0.00	0.00	0.00
International sales[b]							
Adj. r-square	0.10	0.12	0.19	0.54	0.74	0.61	0.76
Adj. r-square inc.		0.02	0.07	0.35	0.20	0.08	0.22
F-Value		2.93	13.59	10.02	5.81	4.05	5.56
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Vertical integration[c]							
Adj. r-square	0.08	0.09	0.15	0.60	0.81	0.66	0.81
Adj. r-square inc.		0.01	0.05	0.46	0.20	0.06	0.21
F-Value		2.14	11.98	17.45	8.17	3.78	7.01
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Diversifying acquisitions[d]							
Adj. r-square	-	0.03	0.08	0.35	0.59	0.58	0.66
Adj. r-square inc.		0.03	0.05	0.27	0.24	0.23	0.31
F-Value		3.96	10.84	6.53	4.96	9.90	5.91
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Focusing divestures[d]							
Adj. r-square	-	0.03	0.07	0.35	0.62	0.63	0.71
Adj. r-square inc.		0.03	0.04	0.28	0.27	0.28	0.36
F-Value		3.56	9.18	6.74	5.91	13.16	7.52
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Cross-border acquisitions[d]							
Adj. r-square	-	0.03	0.09	0.43	0.68	0.67	0.74
Adj. r-square inc.		0.03	0.07	0.34	0.25	0.23	0.31
F-Value		3.37	14.69	9.05	6.42	12.09	7.36
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Cross-border divestures[d]							
Adj. r-square	-	0.02	0.06	0.36	0.67	0.69	0.77
Adj. r-square inc.		0.02	0.04	0.30	0.31	0.33	0.41
F-Value		3.12	8.86	7.29	7.22	18.29	10.25
p-value		0.00	0.00	0.00	0.00	0.00	0.00
R+D ratio[c]							
Adj. r-square	0.08	0.09	0.36	0.85	0.93	0.90	0.95
Adj. r-square inc.		0.01	0.27	0.50	0.08	0.05	0.10
F-Value		1.28	28.16	27.69	9.93	6.14	11.30
p-value		0.19	0.00	0.00	0.00	0.00	0.00

[a] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, return on assets, total assets, number of acquisitions, and number of divestures.

[b] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, return on assets, total assets, number of cross-border acquisitions, and number of cross-border divestures.

[c] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, return on assets, and total assets.

[d] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, total assets, lagged market-to-book ratio, lagged cash flow, a dummy variable indicating whether any acquisition or divesture took place in the same year.
[e] Benchmark specification is the regression that includes year-, industry-, and company-specific effects.

Finally, table 8 exhibits executive effects on efficiency policy. In this area, the general picture is mixed. Capital intensity is the only variable where a strong executive influence can be found. The other variables show only moderate top executive-specific effects (e.g., COGS and SGA ratios). One variable, the operating cost ratio, does not seem to be influenced by company- or top executive-specific effects at all. Adding company-specific effects and top executive-specific effects to the regression decreases the adjusted r-square. It is also interesting to compare the effects of US-American and German top executives on cost ratios at this point. In a similar study, adding US-American CEOs, CFOs, and other executives improves the fit of the SGA ratio regression by 37 percentage points (Bertrand et al., 2003). In the German context and for the same variable, adding top executives increases the adjusted r-square by only 11 percentage points. Explanations for the lacking or low influence of German top executives on cost ratios could be (1) comparatively rigid labor laws and strong labor codetermination, and (2) the production-oriented management approach that focus on building long-term relations with business partners. Both factors prevent fast adjustments of internal capacities to market fluctuations by making them either difficult or undesirable.

Table 8: Executive effects on efficiency policy

Variable/statistic	**Null**	**Year**	**Indus-try**	**Com-pany**	**MBC[b]**	**CFOs[b]**	**MBC+ CFOs[b]**
Asset turnover[a]							
Adj. r-square	0.21	0.22	0.31	0.74	0.87	0.78	0.87
Adj. r-square inc.		0.01	0.09	0.42	0.13	0.04	0.14
F-Value		2.58	24.43	24.09	7.54	3.84	6.80
p-value		0.00	0.00	0.00	0.00	0.00	0.00
Capital intensity[a]							
Adj. r-square	0.01	0.01	0.15	0.51	0.85	0.62	0.87
Adj. r-square inc.		0.00	0.13	0.37	0.34	0.11	0.35
F-Value		1.37	28.64	11.75	16.67	5.66	14.97
p-value		0.13	0.00	0.00	0.00	0.00	0.00
Operating cost ratio[a]							
Adj. r-square	0.87	0.88	0.88	0.86	0.76	0.83	0.77
Adj. r-square inc.		0.01	0.00	-0.02	-0.10	-0.03	-0.09
F-Value		5.66	2.81	-0.80	-1.75	-1.74	-1.01
p-value		0.00	0.00	n/a	n/a	n/a	n/a
COGS ratio[a]							
Adj. r-square	0.61	0.62	0.65	0.76	0.84	0.79	0.86
Adj. r-square inc.		0.01	0.03	0.11	0.08	0.03	0.10
F-Value		3.12	14.92	6.66	4.00	2.90	4.92
p-value		0.00	0.00	0.00	0.00	0.00	0.00
SGA ratio[a]							
Adj. r-square	0.22	0.21	0.38	0.82	0.91	0.88	0.93
Adj. r-square inc.		-0.01	0.17	0.44	0.09	0.06	0.11

F-Value	0.67	18.34	17.65	6.70	6.18	8.38
p-value	0.85	0.00	0.00	0.00	0.00	0.00

[a] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, return on assets, and total assets.
[b] Benchmark specification is the regression that includes year-, industry-, and company-specific effects.

MAGNITUDE OF TOP EXECUTIVE-SPECIFIC EFFECTS

The previous section confirms that top executives exert non-negligible influence over a broad range of company performance and policy variables. This result is established by showing that top executive effects explain a significant fraction of variation of performance and policy variables. Company-specific effects, however, explain a larger fraction of variation for most of the variables. Thus, the results are not completely unambiguous and, to some degree, open to interpretation. In fact, depending on the author, the results of the first study of executive effects are seen as support for the view that top executives matter (Lieberson et al., 1972) or do not matter (Pfeffer et al., 1978). This section provides an additional measure of the influence of top executives and assesses the magnitude of top executive-specific effects by analyzing their distribution. This additional measure is also better suited for practitioners to gauge the influence of top executives on company performance and policy.

Table 9 shows the distribution of the fixed effects of both MBC and CFOs that are retrieved from the final regression of each variable. Since the fixed effects are measured with error, all statistics are derived weighting each observation with the inverse of the standard error. Overall, the results support the view that top executive-specific effects are quite large. The fixed effects for return on assets can illustrate this point. Row 5 of table 8 shows that the difference between a top executive in the 25th percentile and a top executive in the 75th percentile is 7 percentage points. Given that the average return on assets in the sample is 9 percent (table 2), the impact of top executives on their companies is substantial. Compared to the median top executive, a top executive in the bottom quartile reduces the return on assets by 4 percentage points, while a top executive in the top quartile increases the return on assets by 3 percentage points. When applied to the median observation in the sample with assets of about 1.5 billion EUR, the difference between a top executive in the top quartile and a top executive in the bottom quartile amounts to roughly 100 million EUR in EBIT per annum. The ranges of other performance and policy variables also indicate substantial variation in the size of executive fixed effects. Policy variables with substantial differences between top executives as indicated by range are the investment ratio, all acquisition and divesture variables, number of bonds issued, and all general financial and growth variables. Only

efficiency-related variables exhibit small differences between top executives in different quartiles, which is consistent with the small influence of top executives on these variables. A comparison with a similar US-American study (Bertrand et al., 2003) reveals interesting results. While almost identical for performance related variables (i.e., return on assets, cash flow on assets), the size distributions (i.e., median, standard deviation, 25th and 75th percentile) for policy related variables that are employed to achieve performance differ significantly for US-American and German top executives. Two examples illustrate this point. For acquisitions, the range between top quartile and bottom quartile top executives is 2.66 in Germany, whereas the same range is only 0.95 in the US. On the contrary, the range for the interest coverage is 12.43 in Germany and 107.7 in the US. This result is consistent with the view that top executives of both countries have similar "performance impact", but employ different strategies to achieve company performance. Finally, means and medians of most top executive fixed effects are zero or very close to zero. This indicates that the top executives in the sample do not seem to belong to a particular type of executive and that sample selection bias does not seem to be severe in this analysis.

Table 9: Distribution of top executive fixed effects

Variable[a]	**Obs.**[b]	**Mean**	**Std. Dev.**	**Median**	**25th perc.**	**75th perc.**	**Range**[c]
Performance policy							
Abnormal return	280	0.00	0.03	0.00	-0.02	0.01	0.03
Market-to-book ratio	290	0.02	0.37	-0.01	-0.11	0.13	0.24
Cash flow on assets	286	0.00	0.06	0.00	-0.03	0.03	0.06
Return on assets	289	0.01	0.08	0.01	-0.03	0.04	0.07
Company risk	279	0.00	0.03	0.00	-0.01	0.02	0.03
Investment policy							
Investment ratio	268	-0.01	0.25	0.01	-0.08	0.09	0.17
Investment sensitivity to MTB	366	0.00	0.02	0.00	0.00	0.00	0.00
Investment sensitivity to CF	366	0.00	0.08	0.00	-0.04	0.01	0.05
Number of acquisitions	271	-0.06	3.57	-0.03	-1.37	1.29	2.66
Number of divestures	269	-0.05	2.74	0.02	-0.75	0.90	1.65
External financing policy							
Number of stocks	277	-0.04	0.53	-0.02	-0.17	0.11	0.27
Number of hybrids	278	-0.01	0.26	0.00	-0.07	0.06	0.13
Number of bonds	282	1.51	9.60	1.19	-1.24	3.38	4.62
Number of loans	280	0.00	1.26	0.01	-0.22	0.37	0.58
General financial policy							
Equity ratio	291	0.01	0.13	0.00	-0.04	0.06	0.10
Interest coverage	282	0.45	45.96	0.07	-6.37	6.06	12.43
Cash holdings	286	0.01	0.11	0.00	-0.05	0.06	0.11
Payout ratio	286	0.03	0.61	-0.01	-0.20	0.25	0.45
Growth policy							
Sales growth	286	0.00	0.17	0.00	-0.09	0.07	0.16
International sales	255	0.01	0.16	0.01	-0.07	0.08	0.15
Vertical integration	289	5.03	93.92	5.58	-19.17	27.73	46.89

Diversifying acquisitions	270	0.08	1.80	-0.14	-0.58	0.54	1.12
Focusing divestures	270	-0.11	1.52	-0.01	-0.42	0.43	0.85
Cross-border acquisitions	272	0.26	2.22	0.21	-0.66	1.09	1.75
Cross-border divestures	268	0.04	1.58	0.06	-0.28	0.39	0.67
R+D	109	0.00	0.02	0.00	-0.01	0.01	0.02
Efficiency policy							
Asset turnover	287	0.07	0.41	0.05	-0.12	0.21	0.33
Capital intensity	279	1.81	37.75	0.40	-11.03	10.90	21.93
Operating cost ratio	274	0.00	0.03	0.00	-0.02	0.02	0.03
COGS cost ratio	258	-0.01	0.10	-0.01	-0.04	0.03	0.08
SGA cost ratio	121	0.00	0.08	0.00	-0.03	0.03	0.06

[a] The fixed effects presented in this table are retrieved from the regressions reported in tables 3 to 8 row "MBC+CFOs". Each observation of each fixed effect is weighted by the inverse of its standard error.
[b] Number of top executives for whom fixed-effects could be estimated.
[c] Range is defined as difference between 75th and 25th percentile.

IMPACT OF INDUSTRY-, FIRM-, AND EXECUTIVE-LEVEL CHARACTERISTICS ON TOP EXECUTIVE-SPECIFIC EFFECTS

This section deals with the impact of contextual factors on top executive specific effects. First, the influence of top executive is analyzed across time periods and industries. Secondly, the specific hypotheses of the managerial discretion and contingent opportunities view are tested.

Sample construction and empirical methodology

To test the hypothesis on the general influence of contextual factors, the empirical procedure of the previous section is repeated for two types of subsamples. In the first analysis, the sample is split into two time periods, from 1983 to 1992 and 1993 to 2002. The split into these two time periods seems to be reasonable, because substantial changes in the German governance and management system occurred in the beginning of the 1990s (Normann et al., 2004c) that potentially influenced the ability of top executives to shape their companies. In the second analysis, the sample is split into ten industries. This particular split presents a compromise, since a more granular split of the sample would result in only very few companies and observations per industry.

The managerial discretion and contingent opportunities view are tested using the estimated top executive fixed effects from the regressions reported in tables 3 to 8 that include all top executives, MBC and CFOs. These fixed effects represent an estimate of the positive or negative impact of a specific top executive. Since the magnitude and not the direction of the fixed effects is of interest, the absolute values of the estimates are analyzed. For brevity, the analysis concentrates on performance variables only. Specifically, the following regression is estimated and can be explained by using the return on assets as an example:

$$(2) \qquad FE(y)_j = \alpha + \beta X_j + \varepsilon_j$$

where $FE(y)_j$ is the absolute value of the estimated fixed effect of top executive j on the return on assets and α and ε_j are the constant and error term, respectively. X_j is a vector of industry-, company- and executive-level variables that are proposed by the two theories. Specifically, the industry- and company-level variables are individually calculated for each top executive for the time period, in which the executive was in office during the sample period. For example, the managerial discretion theory postulates that company age as an inertial force has a negative impact on managerial discretion. In this analysis, company age is operationalized as the average age of the executive's company during the executive's time in office within the sample period. For two of the proposed variables, only a significantly lower number of observations are available. To use all available information as efficiently as possible, a base model including variables for which all observations are available is estimated first and then subsequently extended to the other two variables. The impact of executive characteristics on top executive specific effects are analyzed using a subsample that includes MBC only. The industry-level and company-level variables of the base model are included in these regressions, but not reported for brevity.

Estimating model (2) presents two potential econometric difficulties that need to be addressed. First, the dependent variable is based on an estimated coefficient and, thus, measured with error. However, having a mismeasured variable on the left-hand side of the model is a less serious problem than having a mismeasured independent variable. In fact, the ordinary least squares estimator remains "unbiased under a wide range of assumptions" in this case (Hausman, 2001). The only drawback of a mismeasured dependent variable is a reduced precision of the estimated coefficients and, consequently, lower t-statistics and reduced r-squares. The second difficulty, simultaneity, is more serious. Simultaneity occurs when one or more independent variables are simultaneously determined with the dependent variable (Wooldridge, 2002). For instance, if the dependent variable is the influence of top executives on performance such as return on assets and the independent variable is a company-level variable such as size measured by assets, then the size of the company could be potentially determined by the influence of the top executive on the return on assets. Technically, the independent variable in question is correlated with the error term and, therefore, endogenous, which violates one of the basic assumptions of the ordinary least squares estimator, namely the exogeneity of all independent variables. As a result, the ordinary least squares estimator is biased and inconsistent. In this analysis, the following company-level variables are treated as

potentially endogenous: size, capital intensity, debt level, cash holdings, and SGA cost ratio. Industry-level variables and company-level variables such as company age and shareholder concentration are regarded as exogenous.

A potential solution to simultaneity is the application of the instrumental variables estimator. If appropriate instruments for the endogenous variables can be found, the technique provides consistent estimates. However, this advantage needs to be balanced against a potential loss of efficiency of the instrumental variables approach. Therefore, the Durbin-Wu-Hausman test of endogeneity is employed. If the test rejects the null hypothesis of exogenous regressors at the 10% level, the instrumental variables approach is selected. Otherwise, the standard ordinary least squares estimator is used. The main difficulty of the instrumental variable approach is to obtain instruments that are both highly correlated with the endogenous variables and uncorrelated with the error process. The first requirement, relevance of instruments, can be tested by examining the results of the first-stage regressions. However, the present case is particularly challenging, since multiple regressors are assumed to be endogenous. In this case, traditional rules of thumbs for single endogenous regressors such as F statistics above 10 for the instruments in the first-stage regression (Staiger & Stock, 1997) do not apply. Therefore, Shea's partial r-square that accounts for intercorrelations among instruments is calculated (Shea, 1997). As a rule of thumb, if partial r-squares (Bound, Jaeger, & Baker, 1995) are large and the Shea's r-square is small, the instruments lack relevance to explain all endogenous regressors (Baum, Schaffer, & Stillman, 2003). The second requirement, the overidentification of instruments, is tested using the heteroskedasticity-robust Hansen-J statistic. The instruments used in this analysis to mitigate the effects of simultaneity are derived from Lewbel (1997) and Durbin (1954). Both methods use functions of the model data to generate instruments that can be employed in the instrumental variables approach. Although the former method is more advanced and preferable for theoretical reasons, numerous sets of instruments failed to pass the above described tests for acceptable instruments. Therefore, instruments recommended by the latter method are also included in the set of instruments used in the analysis. The final set of instruments includes cross-products of an exogenous variable (demand instability) with the assumed endogenous variables as well as size-based rank orders of the endogenous variables. This set of variables performs reasonably well for all models. The median F-value of the first stage regressions is 48, the median values of the partial and Shea's r-square are 0.66 and 0.54, respectively. The null hypothesis of the test of overidentifying restrictions cannot be

rejected in 15 out of 16 models at the 10% level. In one model, the p-value of the Hansen J statistic is 0.096, which is only slightly below the traditional 10% level.

Results

This section begins with the results of the analyses that examine the influence of top executives across time periods and industries. Both analyses confirm hypothesis 5 in that the impact of top executives varies by time period and industry. Table 10 shows the executive effects on company performance for the time periods, 1983 to 1992 and 1993 to 2002. The results are clear for all variables except cash flow on assets. For all other variables, the influence of top executives on company performance is larger in the later than in the earlier time period. The increases of the adjusted r-square that can be attributed to top executive effects are partially very large and range from 0.04 to 0.13 (abnormal return), 0.01 to 0.10 (market-to-book), and 0.11 to 0.24 (return on assets). Only the variable cash flow on assets shows the same increase in adjusted r-square for both periods. The overall result is consistent with the view that the transition of the traditional German corporate governance system of large, publicly listed companies relying on large inside investors and financial institutions to a system that depends on capital markets and small outside investors has decreased the effectiveness of governance and increased managerial discretion (Schmidt, 2004). It is also consistent with the view that the increased pressure exerted by the capital markets in combination with a new generation of top executives who are more receptive to the idea of shareholder value resulted in an increased performance orientation and, thus, influence of top executives.

Table 10: Executive effects on company performance, 1983-1992 and 1993-2002

Variable/	**1983-1992**		**1993-2002**	
Statistic	***Company***	***MBC+CFOs[e]***	***Company***	***MBC+CFOs[e]***
Abnormal return[a]				
Adj. r-square	0.19	0.23	0.27	0.40
Adj. r-square inc.		0.04		0.13
F-Value		1.34		2.03
p-value		0.03		0.00
Market-to-book[b]				
Adj. r-square	0.84	0.84	0.81	0.91
Adj. r-square inc.		0.01		0.10
F-Value		1.29		6.39
p-value		0.05		0.00
Cash flow on assets[c]				
Adj. r-square	0.55	0.70	0.45	0.60
Adj. r-square inc.		0.15		0.15
F-Value		4.06		2.73
p-value		0.00		0.00
Return on assets[d]				

Adj. r-square	0.55	0.66	0.43	0.66
Adj. r-square inc.		0.11		0.24
F-Value		2.99		4.27
p-value		0.00		0.00

[a] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, market-to-book ratio, and market capitalization.
[b] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, total assets, and market capitalization.
[c] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, and total assets.
[d] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, and total assets.
[e] Benchmark specification is the regression that includes year-, industry-, and company-specific effects.

The analysis of executive effects on an industry level is also in line with hypothesis 5 and previous studies. Table 11 shows that the adjusted r-square increase due to the inclusion of top executives varies among industries. In some industries, top executives have a rather large influence on company performance, while in other industries the F-test cannot reject the null hypothesis that all top executive specific effects are zero. Averaging the rank of the industries over all performance variables, top executives in the electronics, construction, and retail/transport industries seem to have particularly high influence on performance, whereas top executives in the machinery and chemical/pharmaceutical industries do not appear to have a strong influence on performance. However, these results should be interpreted with caution. First, the averaging covers potential reversals in ranking for some variables. For example, the construction industry, cited as an industry with more influential top executives, ranks eighth in terms of market-to-book and the machinery industry, cited as an industry with less influential top executives, ranks third. Second, the industry split is rather crude and potentially combines industries that differ in the discretion they offer to top executives (e.g., chemicals and pharmaceuticals). Third, some of the analyzed industries have only few companies and observations (e.g., software and media), which may result in a large fraction of variation being attributed to the company-specific effects. Due to these reasons, the industry-level results are not used for testing of the managerial discretion theory and contingent opportunities view.

Table 11: Executive effects on company performance, various industries

Variable/	**Abnormal return[a]**		**Market-to-book[b]**		**Cash flow on assets[c]**		**Return on assets[d]**	
Statistic	***Com-pany***	***MBC+ CFOs[e]***	***Com-pany***	***MBC+ CFOs[e]***	***Com-pany***	***MBC+ CFOs[e]***	***Com-pany***	***MBC+ CFOs[e]***
Electronics								
Adj. r-square	0.28	0.51	0.78	0.95	0.48	0.77	0.28	0.71
Adj. r-square inc.		0.23		0.16		0.29		0.44
F-Value		2.55		10.65		5.06		5.81
p-value		0.01		0.00		0.00		0.00
Construction								
Adj. r-square	0.51	0.69	0.77	0.87	0.53	0.81	0.37	0.78

Adj. r-square inc.		0.17		0.10		0.28		0.42
F-Value		3.30		4.20		6.93		8.87
p-value		0.00		0.00		0.00		0.00
Chemicals/Pharma								
Adj. r-square	0.14	0.24	0.82	0.86	0.33	0.43	0.35	0.63
Adj. r-square inc.		0.10		0.04		0.10		0.28
F-Value		1.64		2.47		1.91		4.77
p-value		0.03		0.00		0.01		0.00
Utilities/Telco								
Adj. r-square	0.28	0.49	0.87	0.93	0.60	0.63	0.60	0.80
Adj. r-square inc.		0.21		0.07		0.03		0.20
F-Value		2.24		3.96		1.33		4.24
p-value		0.03		0.00		0.24		0.00
Automotive								
Adj. r-square	0.35	0.38	0.81	0.88	0.46	0.60	0.45	0.71
Adj. r-square inc.		0.03		0.07		0.14		0.26
F-Value		1.21		3.21		2.35		4.37
p-value		0.26		0.00		0.00		0.00
Machinery								
Adj. r-square	0.31	0.32	0.74	0.88	0.33	0.46	0.34	0.48
Adj. r-square inc.		0.00		0.14		0.13		0.15
F-Value		1.01		8.32		2.42		2.71
p-value		0.46		0.00		0.00		0.00
Basic Resources								
Adj. r-square	0.17	0.23	0.74	0.90	0.15	0.43	0.27	0.46
Adj. r-square inc.		0.06		0.17		0.28		0.19
F-Value		1.37		9.01		3.10		2.58
p-value		0.15		0.00		0.00		0.00
Retail/Transport								
Adj. r-square	0.19	0.38	0.91	0.96	0.18	0.55	0.26	0.66
Adj. r-square inc.		0.19		0.05		0.37		0.40
F-Value		2.57		8.17		5.29		7.03
p-value		0.00		0.00		0.00		0.00
Consumer Goods								
Adj. r-square	0.19	0.47	0.81	0.86	0.27	0.43	0.42	0.56
Adj. r-square inc.		0.28		0.05		0.16		0.14
F-Value		3.58		2.58		2.37		2.57
p-value		0.00		0.00		0.00		0.00
Software/Media								
Adj. r-square	0.56	0.87	0.90	0.98	0.97	0.98	0.95	0.99
Adj. r-square inc.		0.32		0.08		0.01		0.03
F-Value		9.04		16.07		3.71		7.43
p-value		0.10		0.01		0.12		0.04

[a] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, market-to-book ratio, and market capitalization.
[b] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, total assets, and market capitalization.
[c] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, and total assets.
[d] Time-varying company-specific control variables include shareholder concentration, controlling shareholder, leverage, industry rent, neutral completed takeovers, all completed takeovers, company age, and total assets.
[e] Benchmark specification is the regression that includes year-, industry-, and company-specific effects.

The test of the managerial discretion theory and contingent opportunities view is based on the absolute values of the top executive fixed-effects and performed in two steps. First, the impact of industry-level and company-level factors on fixed effects of all

executives is analyzed. Secondly, the impact of executive characteristics on fixed effects of MBC is examined. Table 12 shows the results of the industry- and company-level factors. Overall, the results partly support the managerial discretion theory, but not the contingent opportunity view. For example, in line with the managerial discretion theory and contrary to the prediction of the contingent opportunities view, industry growth is positively associated with influence of top executives on performance. However, one should note that only the coefficients for cash flow on assets and return on assets are significant at traditional levels. The impact of demand instability does not follow the predictions of the managerial discretion theory, while the level of product differentiation does (an exception that is not significant at traditional levels to both results: abnormal returns).

As predicted by the managerial discretion theory, inertial forces such as size and company age are strongly negatively related to managerial decision-making freedom. All coefficients are highly significant. Again, the executive fixed effects on abnormal returns are the only exception to this finding. A possible explanation for this could be the fact that, in general, larger and older companies enjoy more attention from investors, analysts, and the public. The increased publicity and attention could increase the capability of top executives who represent the company vis-à-vis the public to influence stock prices. The results for another inertial force, capital intensity, is less clear. It turns out to be only negatively related to fixed effects on abnormal returns and cash flow on assets. Surprisingly, there is only limited support for the hypothesis shared by both managerial discretion and contingent opportunities view that internal resources increase the influence of top executives. The coefficients for debt level, cash holdings, and SGA cost ratio have the expected sign in only 50% of all cases and, moreover, if they do have the expected sign, they are insignificant in 5 out of 6 instances. In addition to inertial forces and internal resources, the managerial discretion theory considers the negative impact of potentially powerful internal forces such as (supervisory) board and shareholders. Since the size and composition of the German supervisory board is largely determined by various laws, the assumption is that board size and composition are exogenous and should be excluded from the analysis. However, the influence of shareholders is examined and the association between shareholder concentration and top executives' influence is negative in 3 out of 4 cases. However, only the coefficient in the market-to-book regression is significant at traditional levels.

Table 12: Impact of industry- and company-level factors on top executive fixed effects

Variables	**Exp. sign**	**Mgmt. FE abnormal return**	**Mgmt. FE market-to-book ratio**	**Mgmt. FE cash flow on assets**	**Mgmt. FE return on assets**
		Coef./Std.err.	***Coef./ Std.err.***	***Coef./Std.err.***	***Coef./Std.err.***
Mean industry growth	+/-	0.0024	0.7047	0.1249*	0.21626*
		{0.0271}	{0.8217}	{0.0733}	{0.11127}
Mean demand instability	+	0.0241	-1.1013	-0.0565	-0.17517**
		{0.0241}	{0.7158}	{0.0597}	{0.08776}
Mean product differentiation[a]	+	-0.0488	3.611**	0.1254	0.39907**
		{0.0667}	{1.7031}	{0.1401}	{0.18413}
Mean size (ln assets)	-	0.0011	-0.0749***	-0.0043**	-0.01545***
		{0.0014}	{0.0249}	{0.0020}	{0.00444}
Mean company age	-	0.0000	-0.0022***	-0.0003***	-0.00042***
		{0.0000}	{0.0008}	{0.0001}	{0.00011}
Mean capital intensity	-	-0.0001**	0.0005	-0.0000	0.00021
		{0.0000}	{0.0005}	{0.0001}	{0.00016}
Mean debt level	-	0.0000	-0.0027	0.0003	-0.00439***
		{0.0001}	{0.0040}	{0.0009}	{0.00135}
Mean cash holdings	+	-0.0031	0.1387	-0.0051	0.00661
		{0.0026}	{0.1008}	{0.0060}	{0.01363}
Mean SGA cost ratio[b]	+	-0.0017	0.041	0.0088	-0.06683
		{0.0159}	{0.2915}	{0.0272}	{0.06419}
Mean shareholder concentration	-	-0.0009	-0.1929*	0.0077	-0.01215
		{0.0046}	{0.1086}	{0.0122}	{0.01827}
Constant		0.0091	1.7405***	0.1391***	0.35187***
		{0.0204}	{0.5005}	{0.0399}	{0.07518}
Constant[a]		-0.0004	1.6277***	0.1372***	0.37746***
		{0.0202}	{0.5140}	{0.0435}	{0.08335}
Constant[b]		-0.0242	2.387**	0.1534*	0.52401***
		{0.0356}	{0.9568}	{0.0785}	{0.14453}
Number of observations		287	298	300	300
R-square		0.02	0.13	0.10	0.14
Hansen J statistic (p-value)					0.52
Number of observations[a]		269	281	281	280
R-square[a]		0.03	0.16	0.10	0.15
Hansen J statistic (p-value)[a]					0.30
Number of observations[b]		157	170	167	170
R-square[b]		0.06	0.15	0.12	0.16
Hansen J statistic (p-value)[b]					0.50

[a] Values in row derived from inclusion of product differentiation in regression of base model
[b] Values in row derived from inclusion of SGA cost ratio in regression of base model.
[c] All standard errors are robust to heteroskedasticity. *, **, *** indicates significance at the 0.10, 0.05, and 0.01 levels, respectively.

The final analysis deals with the impact of individual characteristics on the ability of German MBC to influence company performance. Executive characteristics serve as proxies for the individual attributes that are proposed to influence the discretion of MBC. For instance, the proxy for the aspiration level of the top executive is the number of years it took the top executive to reach the MBC position counting from the year the top executive took his first job. The dummy variables lifetime employment and outsider measure the level of commitment of the MBC. The assumption is that executives who

stayed with the same company for their entire career are more strongly committed to their organization than outsiders who joined the company for their current position. The cognitive processing ability is gauged by the level of education. It is assumed that MBC holding a Ph.D. degree possess higher cognitive processing skills. Finally, characteristics of the career path serve as proxies for the tolerance of ambiguity. It is assumed that top executives who spent most of their career in output related functions such as research/development and marketing/sales have high tolerance of ambiguity, since they "deal with more exogenous, uncontrollable factors than do managers in other, more internally oriented functional areas, such as operations or accounting" (Finkelstein et al., 1996). Moreover, it is assumed that top executives who were exposed to various functions during their career also develop a broader perspective of situations and a higher tolerance of ambiguity.

Overall, the results presented in table 13 seem to provide only very limited support for the managerial discretion theory. With two exceptions, the coefficients are insignificant and many coefficients do not have the expected sign in the majority of the cases. The only notable exception is lifetime employment, which is negatively, albeit not significantly, associated with top executive fixed-effects for all performance variables. However, one should note that these results do not necessarily mean that the predictions of the managerial discretion theory for the impact of executive attributes on discretion are unconfirmed. As always with the use of executive characteristics, it (well) could be that the proxies are to too crude or otherwise biased to represent the underlying psychological constructs. More research needs to be done to assess this theory more thoroughly.

Table 13: Impact of executive characteristics on top executive fixed effects

Variables	**Exp. sign**	**Mgmt. FE abnormal return**	**Mgmt. FE market-to-book ratio**	**Mgmt. FE cash flow on assets**	**Mgmt. FE return on assets**
		Coef/Std.err.	***Coef/Std.err.***	***Coef/Std.err.***	***Coef/Std.err.***
Time to top (total)	-	0.0003	0.003	-0.0003	0.00058
		{0.0005}	{0.0037}	{0.0008}	{0.00068}
Lifetime employment	-	-0.0032	-0.005	-0.0089	-0.00526
		{0.0075}	{0.0559}	{0.0081}	{0.00895}
Level of education: Ph.D.	+	-0.0049	0.0549	-0.0031	-0.0005
		{0.0055}	{0.0634}	{0.0070}	{0.00964}
Output career orientation	+	-0.0072	-0.1635*	0.0134	0.02745
		{0.0097}	{0.0959}	{0.0237}	{0.02402}
Career heterogeneity	+	0.0078	-0.1136	0.0041	-0.04191*
		{0.0139}	{0.1059}	{0.0230}	{0.02335}
Outsider	+	0.0085	-0.0765	-0.008	-0.00769
		{0.0079}	{0.0720}	{0.0090}	{0.01128}
Constant		0.0038	0.7752	0.1411*	0.31495***
		{0.0421}	{0.6860}	{0.0734}	{0.09785}

Number of observations	129	129	127	130
R-square	0.09	0.09	0.15	0.18
Hansen J statistic (p-value)				0.10

[a] All standard errors are robust to heteroskedasticity. *, **, *** indicates significance at the 0.10, 0.05, and 0.01 levels, respectively.

Summary and conclusions

Based on theoretical models and existing empirical research, seven hypotheses are proposed and tested using a unique dataset including 110 large publicly listed German companies and 459 German top executives from 1983 to 2002. In general, all hypotheses can be confirmed. As with US-American top executives, German top executives influence company performance and policy as indicated by significant increases in adjusted r-square and large F-tests that allow the rejection of the null hypothesis that all top executive specific effects are zero. However, the influence of top executives is smaller than the influence of company specific effects. In general, German management board chairmen exert a larger influence on organizational outcomes than German chief financial officers with the exception of external financing policy. Interestingly, executive impact on performance seems to depend on the underlying performance metric with purely market-based measures the most difficult to influence and purely accounting-based measures the easiest to influence. Noteworthy exceptions to the general finding that German top executives matter are investment sensitivities for which almost no influence can be detected. Surprisingly, German management board chairmen seem to have a strong influence on financial decisions which could be attributed to the fact a significant number of them worked in finance-related functions during their career. Contrary to their US-American counterparts, German top executives have only a limited impact on efficiency-related policies, which may be attributed to rigid labor laws and/or different management approaches and business cultures. In addition to assessing executive influence by comparing increases in adjusted r-square, the magnitude of top executive-specific effects is examined. The results support the notion that top executives do matter for organizational outcomes, since the variation in the size of the executive fixed effects is large compared to the respective averages of the performance and policy variables. For example, the return on assets differential between a top executive in the top quartile and a top executive in the bottom quartile is 7 percentage points, while the average return on assets is 9%. For the median company, this performance differential sums up to a difference of roughly 100 million EUR in annual EBIT. However, one should be cautious to mechanically extrapolate this finding as the tests of the integrative models show. First, they establish the general importance of contextual factors by analyzing the influence of top executives for separate time periods and industries. It can be shown that the influence

of top executives on company performance has increased in recent years and that the influence of top executives on performance differs depending on the industry in which their companies operate. Second, it can be shown that industry growth and level of product differentiation increase the ability of top executives to influence organizational performance. This supports the managerial discretion theory and contradicts the contingent opportunities view. As predicted by the managerial discretion theory, inertial forces such as size, company age and to a lesser degree capital intensity severely limit the ability of top executives to influence their organizations. Surprisingly and contrary to the hypotheses of the managerial discretion theory and contingent opportunities view, indicators of resource availability do not seem to exert any significant influence on the ability of top executive to shape their organizations. Finally, the analysis of the impact of executive characteristics on top executive fixed-effects failed to establish robust and significant results, which could be due to the use of proxies for psychological constructs.

To summarize, the empirical results of this paper lead to the conclusion that German top executives do matter considerably for a variety of organizational outcomes and that their ability to shape their organizations is moderated by various industry- and company-level factors. These results have several important practical implications. First, the impact that top executives have on their organizations and the performance differential between good and bad performers justifies substantial investments in recruiting, management and retention of top talent as well as significant search efforts when filling vacant top positions. Second, the same reasons should spur the legislator to establish general conditions for effective governance mechanisms and management oversight. Finally, the (supervisory) boards should consider the industry- and company-level factors that moderate the influence of top executives on performance and design compensation packages for top executives accordingly.

DEFINITION OF VARIABLES

- Abnormal return is the constant α from the regression that is estimated for each year and company: $(rm-rf) = \alpha + \beta(rs-rf) + \varepsilon_t$, where rm is the monthly total return of the CDAX, rf is the one-month money market rate, rs is the monthly total return of the ordinary shares, and ε is the error term.
- Acquisitions is the total number of acquisitions during the current year.
- Asset turnover is the ratio of total sales over lagged total assets.
- Bonds is the total number of straight bonds issued during the current year.
- Capital intensity is the ratio of property, plant, and equipment over number of employees adjusted for inflation.
- Cash flow on assets is the ratio of operating cash flow over lagged total assets.
- Cash flow over PPE is the ratio of operating cash flow over lagged property, plant, and equipment.
- Cash holdings is the ratio of cash over property, plant and equipment.
- COGS cost ratio is the ratio of cost of goods sold over total sales.
- Company age is the difference between the current year and the year the company was founded.
- Company risk is the standard deviation of monthly total returns of ordinary shares.
- Controlling shareholder is a dummy variable that equals one, if the company has a shareholder who owns 50% or more of the ordinary shares.
- Cross-border acquisitions is the number of acquisitions outside Germany during the current year.
- Cross-border divestures is the number of divestures outside Germany during the current year.
- Demand instability is the sales weighted standard deviation of the annual sales growth adjusted for inflation of all companies within an industry.
- Diversifying acquisitions is the number of acquisitions during the current year in macro industries different from the macro industry the ultimate parent operates in.
- Divestures is the total number of divestures during the current year.
- Equity ratio is the ratio of book value of common equity over total assets.
- Focusing divestures is the number of divestures during the current year in macro industries different from the macro industry the ultimate seller operates in.
- Hybrids is the total number of hybrid financial instruments issued during the current year.

- Industry growth is the sales weighted annual sales growth adjusted for inflation of all companies within an industry.
- Industry rent is defined as earnings before interest, taxes, depreciation, and amortization minus cost of capital over total sales. Cost of capital is defined as weighted average cost of capital times lagged total assets. Weighted average cost of capital is defined as weight of equity times required return on equity plus weight of debt times the annual return on corporate bonds in Germany. The weight of equity is defined as lagged market value of common equity over lagged market value of common equity plus the total book value of debt. The weight of debt is defined as total book value of debt over lagged market value of common equity plus the total book value of debt. The required return on equity is defined as the annual rate of a ten year government bond plus the market premium times the beta of the ordinary stock. The market premium is assumed to be 4%, the beta of the ordinary stock is the coefficient β from the regression that is estimated for each year and company: $rm = \alpha + \beta rs + \varepsilon_t$, where rm is the monthly total return of the CDAX, rs is the monthly total return of the ordinary stock, and ε is the error term.
- Interest coverage is the ratio of earning before interest and taxes (EBIT) over interest expenses.
- International sales is the ratio of sales outside Germany over total sales.
- Investment ratio is the ratio of capital expenditures over lagged property, plant and equipment.
- Leverage is the ratio of total debt over common equity.
- Market capitalization (log) is the natural logarithm of the market value of common equity.
- Market-to-book ratio is the ratio of total assets plus market value of common equity minus book value of common equity over total assets.
- Neutral takeovers (completed) is the number of completed unfriendly takeovers in Germany during the current year.
- Operating cost ratio is the ratio of operating expenditure over total sales.
- Payout ratio is the ratio of cash dividends over lagged net income.
- Product differentiation is the sales weighted R+D ratio of all companies within an industry.
- R+D ratio is the ratio of research and development expenses over total sales.
- Return on assets is the ratio of earnings before interest and taxes (EBIT) over lagged total assets.
- Sales growth is the annual sales growth adjusted for inflation.
- SGA cost ratio is the ratio of selling, general, and administrative expenses over total sales.

- Shareholder concentration is the Herfindahl index herf = Σp_j^2, where p_j is the size of an individual block.
- Stocks is the total number of stocks issued during the current year.
- Syndicated loans is the total number of syndicated loans announced during the current year.
- Takeovers (completed) is the number of completed takeovers in Germany during the current year.
- Total assets (log) is the natural logarithm of total assets.
- Vertical integration is the ratio of total sales over lagged number of employees adjusted for inflation.

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