



Managerial optimism and the cost of capital The SEM-approach with a focus on the German capital market

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Abstract

The present study contributes the first analysis of the influence of managerial optimism on companies' financing policy and cost of capital. Since overconfidence biases investment and financing decisions, it may directly and indirectly influence a company's risks and value. In contrast to prior research, which has almost exclusively been focused on the analysis of leverage, the present paper also takes risk measures into account to decompose the cost of capital and to identify direct and indirect effects of managerial optimism by using structural equation modeling (SEM). Based on a large sample of companies listed in Germany, this study found strong evidence that optimistic managers caused a higher equity risk and a higher risk of insolvency. However, this effect was not caused by the choice of leverage, and, thus, it must have been caused by investment-policy decisions. However, an optimistic management achieves a significant reduction in the overall cost of capital.

Keywords: behavioral finance, managerial optimism, overconfidence, financing policy, cost of capital.

Streszczenie

Optymizm menedżerski a koszt kapitału

Zastosowanie podejścia SEM w odniesieniu do niemieckiego rynku kapitałowego

Prezentowane w artykule badanie dotyczy pierwszej analizy wpływu optymizmu menedżerskiego na politykę finansową przedsiębiorstw i koszt kapitału. Zbyt duża pewność oddziałuje na decyzje inwestycyjne i finansowe, może mieć zatem wpływ pośredni lub bezpośredni na ryzyko i wartość przedsiębiorstwa. W przeciwieństwie do wcześniejszych badań empirycznych, które koncentrowały się na analizie dźwigni, w niniejszym artykule uwzględniono również miary ryzyka w celu dekompozycji kosztu kapitału oraz określenia bezpośrednich i pośrednich skutków optymizmu menedżerskiego za pomocą modelowania równań strukturalnych (*structural equation modeling* – SEM). Opierając się na dużej próbie spółek giełdowych notowanych w Niemczech, w badaniu empirycznym udowodniono, że optymistycznie nastawieni menedżerowie powodowali większe ryzyko kapitałowe oraz większe ryzyko niewypłacalności. Jednak efekt ten nie był spowodowany wyborem dźwigni, a zatem musiał być konsekwencją decyzji podejmowanych w obszarze polityki inwestycyjnej. Niemniej optymistyczne zarządzanie przyczynia się z kolei do znacznej redukcji całkowitego kosztu kapitału.

Słowa kluczowe: finanse behawioralne, optymizm menedżerski, nadmierna pewność, polityka finansowania, koszt kapitału.

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Introduction

Numerous empirical studies have shown that human beings do not act rationally in economic contexts (Kahneman et al., 1991). One among several factors causing irrational behaviour is optimistic misperceptions (Weinstein, 1980). Psychological textbooks define optimism essentially as overconfidence or, alternatively, as an overestimation of the probability that desirable events will occur (Hoffrage, 2012). According to Taylor and Brown (1988, p. 197), the mantra that summarizes the belief held by optimistic people is: „The future will be great, especially for me”. The question arises as to what extent optimism among managers (management optimism or managerial optimism) determines major strategic decisions such as financing policy. Neither neo-classical approaches nor New Institutional Economics (NIE) – both theories assume rational decision-making – can explain capital structure as a partial result of management optimism’s irrational influence. However, rationalist approaches offer necessary reference points to research on irrational behaviour, including management optimism, because irrationality can only be described, and quantified, as a deviation from a normative rationality.

The influence of management optimism on corporate decision-making has been studied mainly for the US and some European and Asian countries. The works of Glaser et al. (2008) and Kasch (2008) investigated the area of management optimism with a focus on Germany. Fairchild (2005) and Hackbarth (2008) have shown, based on theoretical models, that management optimism leads to a higher leverage ratio, while empirical studies have come to divergent and contradictory results concerning optimism’s effect on leverage ratio (Barros, Silveira, 2007; Brettel et al., 2008). If the results of Fairchild (2005) and Hackbarth (2008) are correct, management optimism affects financing decisions of companies, so their capital structures deviate from the normative optimum. The consequences would include an effect on the cost of capital for these companies. So far, an analysis of the influence of management optimism on financing policies and on companies’ cost of capital is still outstanding. The current paper contributes to closing this research gap. Its particular focus is on the research hypotheses that managerial optimism affects the leverage and thus affects directly and indirectly the equity premium, Altman’s Z-Score, and the cost of capital. To test these hypotheses, these measures’ effects will be decomposed by means of structural equation Modeling (SEM). The empirical analysis is based on a sample of 192 German companies that were listed in the broad CDAX-index in September 2014 and whose historical data goes back to 2002. Corporate practice may benefit from the results presented here since managerial hubris often leads to bad decisions, which could be avoided by so-called debiasing techniques.

The paper is organized as follows: section 1 provides an overview of theoretical frameworks for, and the current state of research on, the effect of management optimism on financing policy. Based on this literature review, research hypotheses will be formed. Section 2 describes the research methodology and the sample used. Section 3 presents the results and their critical appraisal. At the end summarizes the results.

1. Theoretical background, current state of research, and hypotheses

Since neoclassical and neo-institutional theory are based on the strongly rationalistic *homo economicus* assumption, they are not able to explain any psychological deviation from this supposition. Contrariwise, psychological deviations from rationalism – like management optimism – cannot be analysed within a purely behavioural framework, as neoclassical and neo-institutional theory are still the reference for the analysis. Accordingly, we will deduct our hypothesis from both neoclassical and neo-institutional theory, as well as behaviourism.

1.1. Neoclassical and neo-institutional framework

Fisher (1930) postulated that funding decisions should not depend on investment decisions. Assuming the validity of this theorem, funding policy, in particular decisions on capital structure, should be made regardless of previous or future investment decisions. Modigliani and Miller (1958) have postulated in their well-known essay that a company's entity value and its cost of capital are independent of the chosen capital structure. This analysis still forms the foundation and vantage point of modern finance theory. The highly restrictive and therefore unrealistic assumptions of their arbitrage approach gave rise to criticism (Stiglitz, 1969; Jensen, Meckling, 1976). Therefore, in a subsequent essay, Modigliani and Miller (1963) extended their theory to include the effect of a corporate tax. According to this model, the deductibility of the interest from the tax base leads to a lower cost of debt after tax and thus to a preferred usage of debt financing. Accordingly, a rising debt ratio should be the consequence. However, this approach has also been criticized because total enterprise value increases proportionally with the level of debt, and an optimum arises when fully leveraged (Solomon, 1963). In particular, the criticism is directed to the neglect of insolvency costs and insolvency risks resulting from the higher debt ratio (Baxter, 1967; Solomon, 1963).

Kraus and Litzenberger (1973) have provided a more realistic theory of the optimal capital structure. In their trade-off theory, both tax-shields and bankruptcy costs are considered to be determinants of an optimal capital structure. An optimal capital structure is given as soon as the present values of tax benefits and bankruptcy costs are balanced. Therefore, an entity selects a debt level at which the company's value is maximized. Although Kraus and Litzenberger responded to the criticism directed at Modigliani and Miller by considering insolvency costs in their model, opponents of their approach doubt the relevance of insolvency costs as qualified offset of the tax advantage. Instead, they consider the effect of insolvency costs on capital structure as insignificant (Haugen, Senbet, 1978).

A pioneering approach to explain market imperfection comes from Jensen and Meckling (1976) and is based on the study of the relationship between investor and

borrower. This relationship has been analysed in the literature mainly within the conceptual framework of principal-agent theory. Jensen and Meckling describe the impact of agency costs (monitoring costs, bonding costs and residual losses) resulting from information asymmetry between principal and agent on the capital structure of the firm. In companies with total self-financing by the owner, no agency costs will occur. This changes with an increasing level of external financing for both external debt as well as external equity financing. However, increasing external financing allows managers a better diversification of their own investments so that the result is a trade-off between agency costs and diversification benefits.

Jensen (1986) analysed the agency costs of free cash flow in relation to the company's dividend policy. A conflict between managers and shareholders arises from the divergence of goals that are pursued using free cash flow. The managers have an interest to keep the additional funds within the company to keep them under their control. A raise in equity funding – as an alternative to retaining profits – would lead to further agency costs. Shareholders, however, expect a distribution of released funds to prevent the management from investing in inefficient projects. A solution to this problem is the borrowing of funds, because the agreed upon payment of interest to external investors creates a binding substitute for uncertain dividend payments. This measure leads to a reduction of agency costs as the interest payment reduces the free cash flow. However, Jensen also points to the agency costs of high debt levels and recommends that insolvency costs should be considered.

Leland and Pyle (1977) analysed information asymmetries between lenders and borrowers and expanded the existing approaches by including aspects of signalling theory. The authors assume that the owner of a company has insider information and is aware of the true quality of an investment. However, insiders may choose not to inform lenders about actual investment quality if disadvantages can result from this disclosure. In this case, opportunism, in the sense of moral hazard, prevents the disclosure of this information. Nevertheless, the asymmetric information about the quality of the investment increases the risk for the lenders. Consequently, loan conditions become less favourable for lenders. If managers have a personal financial stake in the investment, then this could be seen as a positive signal about the quality of the project. Ross (1977) has also drawn on signalling theory in analysing the signals provided by the financing structure of a company. The author discusses how to shape a management compensation system in order to achieve a truthful signalling function. Contrary to the already mentioned traditional paradigms, Ross states that a rising debt ratio may count as a valid signal that managers, based on their insider information, classify the company as stable. The compensation scheme, which may also include financial penalties for managers, prevents weak companies from sending false signals.

The pecking-order theory by Myers and Majluf (1984) is based on thoughts first articulated by Donaldson (1961) and on principal-agent and signalling theory. The authors postulate that the management has an information advantage over potential outside investors due to its insider position. Therefore, the management can assess the

value and potential of the company more accurately than outside investors. At the same time, investors understand the management's financing decision as a signal, interpret it rationally, and draw conclusions about the company's market value. Since it would be rational for the management to emit equity securities as soon as the company is overvalued, investors interpret this signal as an indication for overvaluation. Consequently, the company's market value decreases. Myers and Majluf (1984) and Myers (1984) expanded the above line of reasoning further: anticipating the just-described reaction of potential shareholders, companies would follow a pecking order in their selection of financial instruments. In general, it is expected that companies prefer internal financing sources. Only when additional capital is required will they consider borrowing. As a last resort, the possibility of issuing equity instruments is taken into consideration. Both latter options send negative signals.

1.2. Behaviouristic framework

Empirical studies have not been able to fully confirm the traditional, neoclassical or new institutional financing theories (Kahneman et al., 1991; Barberis, Thaler, 2003; Shleifer, 2000; Shefrin, 2001). As a result, the psychological approaches popularized by Kahneman and Tversky (1974) were taken over into the theory of finance, resulting in the development of behavioral finance. According to Ricciardi and Simon (2000), behavioral finance tries to explain the „what, why and how” of financing from a human perspective. The authors describe behavioral finance as an interdisciplinary interaction of psychology, sociology, and the theory of finance. Shiller (2003) sees behavioral finance theory as a social-sciences perspective on the theory of finance and as contradicting Fama's efficient-market hypothesis (Fama, 1970).

The phenomenon that people tend towards optimism or overconfidence has been discussed widely in psychological literature. Larwood and Whittaker (1977) have drawn on the findings of psychological research and have shown that managers tend to overestimate the probability of favourable outcomes. Roll (1986) resorted to the concept of optimistic hubris to explain why managers, in corporate takeovers, are often willing to pay an inflated price for a target company compared to market value. March and Shapira (1987) explain the optimism of managers with the fact that managers are convinced that they can control the risks of their own decisions. This confidence results from the leadership experience of the managers. According to Camerer and Lovo (1999), managers partially accept higher risks because they do not expect that these risks will turn out to be harmful. The authors see the cause of business failure in the optimism and overconfidence of entrepreneurs. If the success of the company depends on the personal abilities of the founder, the founder tends to overestimate his competences compared to those of his competitors. The authors describe this as „reference group neglect”. Gervais and Odean (2001) found that successful traders in investment banks tend to impute their success to their own abilities rather than to chance. They also exhibit clear signs of optimism. The authors argue that overconfidence does not lead to

wealth, but the path leading to the desired wealth might also lead to overconfidence. Moore and Cain (2007) describe that an *ex-ante* expectation about the difficulty of a task has an impact on the self-assessment of personal problem-solving skills. If a task is simpler than initially expected, most people conclude that they have solved this problem better than other persons, and vice versa.

According to Heaton (2002), it is generally agreed upon in behavioural finance that managerial optimism means that managers overestimate the probability of business success and underestimate the likelihood of business failure. Hackbarth (2008) showed in a model analysis that personality traits of managers, such as optimism or overconfidence, can lead to biased perceptions. There are two distinct types of perceptual biases: growth-perception bias and risk perception bias. Those managers with a growth perception bias overestimate the future growth of the company's income or of its investment returns. They believe that the market participants undervalue their risky securities, and therefore they believe the external funding to be overly expensive. Accordingly, such managers have a preference order analogous to the pecking order of Myers and Majluf. The situation is different for managers with a risk-perception bias. They underestimate the risk of future revenues of the company and therefore they believe debt financing to be undervalued at the market. These managers are more likely to raise equity than managers with growth perception bias. Thus, their preference-order reverses the pecking order. However, what both types of managers have in common is that their companies tend to have a generally higher level of debt. Both consider their companies to be more profitable (growth-perception bias) and robust (risk-perception bias) than other companies and assume that they do not have to fear financial distress. Malmendier et al. (2011) were partly able to confirm these results empirically. Yet, they also found these managers' preferences to be in accordance with the pecking-order theory of Myers and Majluf (1984), which is in accordance with the growth perception bias predicted by Hackbarth. In addition, Ishikawa and Takahashi (2010) found that optimistic managers avoid issuing shares on the capital market. However, this does not hold true for private placements.

In this context, the results of Fairchild's model analysis have shown that management optimism leads to higher debt levels and higher bankruptcy costs (Fairchild, 2005). Barros and Silveira (2007) differentiated between entrepreneurs and hired managers. They found empirical evidence that optimism and a higher leverage ratio are more pronounced within the group of entrepreneurs who run their own business than in the group of hired managers. In contrast, Brettel et al. (2008) distinguished between overconfidence and optimism and defined overconfidence as an underestimation of the risk of future cash flows and optimism as an overestimation of future cash-flow development. The authors could also ascertain empirically that overconfident managers tend towards a higher leverage ratio while optimistic managers do not.

Based on a sample of small businesses, Dai and Ivanov (2010) were able to show that optimistic managers tend towards short-term financing, and correspondingly encounter higher financial risks. However, the authors also find that optimistic managers

are more easily granted a loan than less optimistic managers. In addition, interest and collateral conditions are not worse compared to those for companies without optimistic leadership. Landier and Thesmar (2009) see short-term financing as advantageous for optimistic entrepreneurs since it fulfills two functions that, in conjunction, close the expectation gap between entrepreneur and investor: short-term financing enables the entrepreneur to realise his risky project and allows the investor to enforce new conditions more frequently. Adam et al. (2014) have explored the impact of management optimism on loan agreements. They showed that optimistic managers tend to agree more often to rating-dependent loans (performance-sensitive debt – PSD) than non-optimistic managers because their assessment of the future development of their business is more positive, so they expect to be able to reduce their interest rates later on. In addition, the study has shown that companies with optimistic managers tend to underperform after taking a PSD compared to other companies.

Although there are plenty of definitions for optimism in the literature, in the present paper we would like to define optimism as a systematic but unintended positivistic deviation from rationality concerning the assessment of a future development, whether it be caused by the overestimation of external factors or by the overestimation of one's own abilities (overconfidence). In contrast, we define opportunism for this paper as an intended rational behaviour following utilitarian considerations mainly due to an information advantage ahead of others in a given situation.

1.3. Research hypotheses

Based on the results that Fairchild and Hackbarth derived from their model, the present empirical study is expected to show that management optimism leads to a higher debt ratio (*Hypothesis 1*). The amount of the cost of equity and equity risk premiums are closely related to the validity of the pecking-order theory of Myers and Majluf. The direction of any effect of management optimism on these variables is not clearly predictable, since, according to Hackbarth, a reversed pecking-order preference is also thinkable. It can, however, be expected that there is an identifiable positive or negative correlation between management optimism and cost of equity or, respectively, the equity risk premium (*Hypothesis 2*). A higher debt ratio can be expected to lead to a higher credit risk and hence to higher cost of debt (*Hypothesis 3*). These increases in credit risk and debt costs are also in accordance with the findings of Dai and Ivanov as well as Landier and Thesmar. Taking into account that credit risk can also be affected directly by optimism without a change in leverage, these effects have to be decomposed. Since the cost of debt is not directly observable, it is substituted by the Altman's Z-score as a proxy. Finally, considering the overall picture, the cost of capital (weighted average cost of capital – WACC) should rise with management optimism (*Hypothesis 4*).

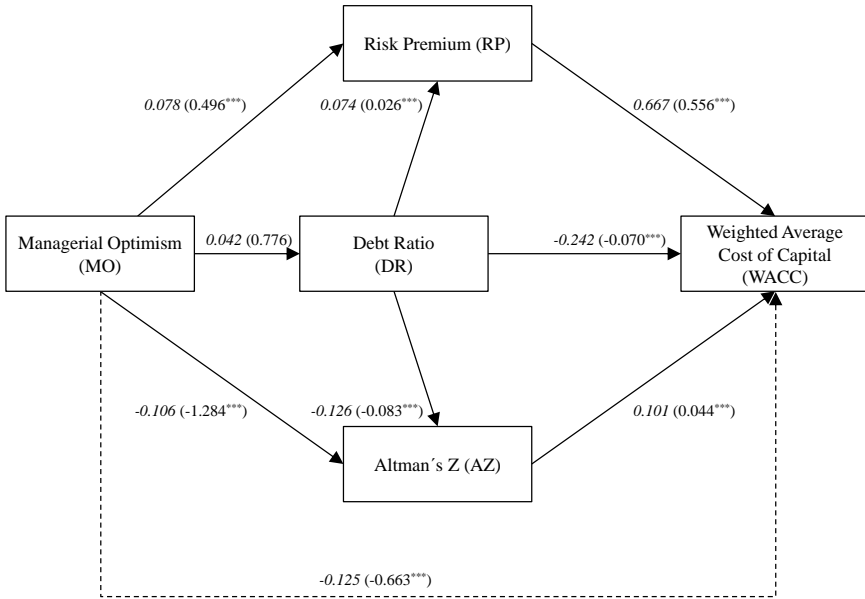
2. Methodology and sample

As Campbell et al. (2011) pointed out, recording management optimism is difficult because it is not directly observable. However, there are several methods for measuring management optimism designed mainly by Malmendier and Tate (2005). The proxies for management optimism identified by the authors are based on the managers' personal portfolio choices and on the diversification of the managers' securities. Compensation plans for managers regularly include shares and stock options of the company. In order to increase the incentive effect of those shares and stock options, trading is generally limited. In addition, companies often prohibit short selling as a means of hedging inherited risks. These limitations mean that managers are exposed to the company's risks to a large extent. From the perspective of the managers, a rational step would be to minimize the equity stake to be more diversified. However, optimistic managers overestimate the returns and believe that under their leadership the stocks will perform better than can be expected from an unbiased viewpoint. Accordingly, they defer the exercise of their stock options or purchase additional shares in order to benefit from the expected profits. The following empirical analysis is based solely on sales and purchases of shares by managers as there is no obligation to immediately disclose information on stock-option packages on an individual basis in Germany and Europe. Therefore, managers are considered optimistic when they are identified as net buyers, i.e., buyers who have made more purchases than sales, of equity securities of their company within a certain period.

As in Malmendier and Tate, in the present study, too, the past five years' average of annual transactions were recorded to determine optimism. For a positive value, i.e., an optimistic management with net purchases, the value „one” was assigned to the Boolean variable MO (management optimism); to a non-optimistic management as demonstrated by net sales, the value „null” was assigned. In contrast to Malmendier and Tate, who considered only the management optimism of CEOs, in this study all reportable managers of a company are considered. According to Glaser et al. (2008), strategic decision-making processes are the result of complex interactions between different managers. Therefore, it is essential to take the entire management into account to arrive at realistic assumptions about decision-making.

For the analysis of financing policies and the cost of capital, the variables of the research hypotheses, the debt ratio (DR), the equity risk premium (RP), the Altman's Z-score (AZ) and the weighted average cost of capital (WACC) were taken from the Bloomberg database. In contrast to Meier and Esmatyar (2015), the present study uses structural equation Modeling (SEM) to examine more accurately the effects of managerial optimism on financing policy and the cost of capital. SEM analysis, or, to be more precise, path analysis, makes it possible to decompose all individual factors that influence the cost of capital and to trace out direct and indirect effects of managerial optimism. The hypotheses formed in section 2 amount to the path-model in Figure 1.

Figure 1. Direct effects according to path analysis with standardized regression weights (unstandardized regression weights)¹



Source: authors' elaboration.

The econometric model underlying Figure 1 is a system of simultaneous regressions due to Formula 1:

$$\begin{aligned}
 WACC &= \beta_{1,MO}MO & +\beta_{1,RP}RP & +\beta_{1,DR}DR & +\beta_{1,AZ}AZ & +\varepsilon_1 \\
 RP &= \beta_{2,MO}MO & & +\beta_{2,DR}DR & & +\varepsilon_2 \\
 DR &= \beta_{3,MO}MO & & & & +\varepsilon_3 \\
 AZ &= \beta_{4,MO}MO & & +\beta_{4,DR}DR & & +\varepsilon_4
 \end{aligned} \tag{1}$$

Since the borrowing costs of most companies are not directly observable on the market, the Altman Z-score is used as a proxy (Altman, 1968, 1984). It should be noted that a higher Z-score indicates a stronger credit rating. The signs of the regression coefficients need to be interpreted inversely to the cost of debt, which should be lower with better credit worthiness.

The sample is based on data from the Bloomberg database, on information from the Federal Financial Supervisory Authority (BaFin), and on information from insider-daten.de. The Bloomberg data used included both market data and balance sheet data from the 281 CDAX companies that were listed in the index in September 2014 and

¹ * indicates p < 0.10, ** indicates p < 0.05 and *** indicates p < 0.01.

whose historical data goes back to 2002. Companies for which there were less than five years of cumulative data were not considered. For 192 companies, an intersecting set of data held by Bloomberg, the BaFin and insiderdaten.de was available. The analysis is based on this data. The BaFin information is based on directors' dealings disclosure reports pursuant to §15a Wertpapierhandelsgesetz (Securities Trading Act) and was validated against each other with the data from insiderdaten.de. A total of 12,792 transactions of managers were included, which were divided into 7,895 purchase transactions and 4,897 sales transactions. On this basis, a total of 2,304 data points were calculated and used in the study. The sample should be almost comparable to the sample used by Glaser et al. (2008). Those transactions that are attributable to the execution of stock option plans were counted as purchase transactions².

3. Findings

All results of the study are shown in Table 1, which presents all direct effects and their model statistics, and in Table 2, which differentiates the total effects in direct and indirect effects.

Table 1. Direct effects according to path analysis

	Regression Weights				
	Standardized	Unstandardized			
	Estimate	Estimate	Standard Err.	t-Value	p-Value
Debt Ratio (DR) ← Managerial Optimism (MO)	0.042	0.776	0.477	1.626	0.104
Risk Premium (RP) ← Managerial Optimism (MO)	0.078	0.496	0.163	3.038	0.002
Altman's Z (AZ) ← Managerial Optimism (MO)	-0.106	-1.284	0.328	-3.919	0.000
Risk Premium (RP) ← Debt Ratio (DR)	0.074	0.026	0.007	3.500	0.000
Altman's Z (AZ) ← Debt Ratio (DR)	-0.126	-0.083	0.016	-5.265	0.000
WACC ← Risk Premium (RP)	0.667	0.556	0.013	43.924	0.000
WACC ← Altman's Z (AZ)	0.101	0.044	0.008	5.840	0.000
WACC ← Debt Ratio (DR)	-0.242	-0.070	0.004	-15.661	0.000
WACC ← Managerial Optimism (MO)	-0.125	-0.663	0.098	-6.775	0.000

Source: authors' elaboration.

Table 2. Total effects, direct effects and indirect effects according to path analysis

	Total effects							
	Managerial optimism		Financial leverage		Altman's Z		Risk premium	
	standardised	unstandardised	standardised	unstandardised	standardised	unstandardised	standardised	unstandardised
Financial leverage	0,042	0,776	0,000	0,000	0,000	0,000	0,000	0,000
Altman's Z	-0,111	-1,349	-0,126	-0,083	0,000	0,000	0,000	0,000
Risk premium	0,081	0,516	0,074	0,026	0,000	0,000	0,000	0,000
WACC	-0,092	-0,491	-0,205	-0,059	0,101	0,044	0,667	0,556

² These transactions are not reconcilable with the information disclosed in financial reports following IFRS 2, since IFRS 2 applies to all employees of a company and not only to the management. Additionally, it does not provide for disclosure of transactions on an individual basis.

Direct effects								
	Managerial optimism		Financial leverage		Altman's Z		Risk premium	
	standardised	unstandardised	standardised	unstandardised	standardised	unstandardised	standardised	unstandardised
Financial leverage	0,042	0,776	0,000	0,000	0,000	0,000	0,000	0,000
Altman's Z	-0,106	-1,284	-0,126	-0,083	0,000	0,000	0,000	0,000
Risk premium	0,078	0,496	0,074	0,026	0,000	0,000	0,000	0,000
WACC	-0,125	-0,663	-0,242	-0,070	0,101	0,044	0,667	0,556

Indirect effects								
	Managerial optimism		Financial leverage		Altman's Z		Risk premium	
	standardised	unstandardised	standardised	unstandardised	Standardised	Unstandardised	Standardised	Unstandardised
Financial Leverage	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Altman's Z	-0,005	-0,065	0,000	0,000	0,000	0,000	0,000	0,000
Risk premium	0,003	0,020	0,000	0,000	0,000	0,000	0,000	0,000
WACC	0,032	0,172	0,037	0,011	0,000	0,000	0,000	0,000

Source: authors' elaboration.

Based on the sample and the methodology used, the effect of management optimism on leverage is positive, but very low and insignificant. The group of companies with an optimistic management shows a debt ratio that is on average 0.776% or 0.042 standard deviations higher than that of the group without an optimistic management. Thus, *Hypothesis 1* and the model results demonstrated by Fairchild and Hackbarth cannot be confirmed, although the direction of the effect is in line with theoretical assumptions. This finding also contradicts the results of the regression analysis by Meier and Esmatyar (2015), who found a negative relationship, which, however, can be explained by differences in methodology.

Optimistic managers increase the (systematic) risk of the company. Thus, management optimism has a highly significant positive impact on the equity-risk premium, which increases by 0.516% or by 0.081 standard deviations. This effect can be decomposed into a direct effect of 0.496% or, respectively, 0.078 standard deviations, and an indirect effect of 0.020%, or 0.003 standard deviations respectively, caused by a higher debt ratio. Taking into account that the increased risk premium is almost fully induced by the direct effect, this is a remarkable result, as the effect of leverage is rather small. Apparently, management optimism increases systematic risk by measures other than by leverage. Accordingly, *Hypothesis 2* cannot be refuted based on the available data.

Consistent with this aforementioned result, the influence of management optimism on the Altman's Z-score is highly significant and causes a decrease of creditworthiness by -1.349 Z-score points, or -0.111 standard deviations. In other words, companies with optimistic managers have a significantly increased risk of insolvency. In addition, *Hypothesis 3* cannot be falsified, at least not in terms of Z-scores. The implication that borrowing costs should rise due to an increased risk of insolvency is not necessarily true according to the results of Dai and Ivanov. It is again remarkable that here, too, the direct effect with -1.284 Z-score points, or -0.106 standard deviations, is much larger than the indirect effect with -0.065 Z-score points, or -0.005 standard deviations. Again, the chosen leverage ratio does not play the expected role.

The finding that optimistic managers are able to reduce the overall cost of capital (WACC) is highly significant and has quite a large effect size. Optimistic managers are

able to reduce the cost of capital by -0.491%, or by -0.092 standard deviations. *Hypothesis 4* must accordingly be rejected on the basis of the present sample. This result is more than extraordinary, as all components of the cost of capital that are under the control of the management seem to be negatively affected and, thus, a rise in the cost of capital should be expected. Splitting up the result shows a highly significant direct positive effect of management optimism on WACC. While optimistic managers reduce the cost of capital by -0.663%, or by -0.125 standard deviations, they raise the cost of capital indirectly by 0.172%, or by 0.032 standard deviations. The indirect effect can be further split up into the effect of the risk premium, the effect of the debt ratio and the effect of credit worthiness. While the effect of the risk premium is positive, the effect of leverage is negative. This is in line with the theoretical framework: a higher risk premium leads to higher WACC as it is a component of the WACC, and a higher leverage leads to lower costs of capital due to tax effects. Credit worthiness, however, shows an unexpected behavior. With an increasing Altman's Z-score, WACC also seems to rise. Although counterintuitive, the result is in line with the findings of Meier and Esmatyar (2015) and can be attributed to the findings of Dai and Ivanov, that optimistic managers are more easily granted a loan with better loan conditions. This effect is possibly also caused by fact that the WACC data used here was calculated by Bloomberg and shaped by a rating-based estimate of the cost of debt. To what extent ratings by rating agencies are independent of Altman's Z-scores cannot be assessed in this study.

As pointed out by Malmendier and Tate (2005), the distinction between opportunism and optimism is questionable. Personal portfolio decisions (directors' dealings transactions) can be interpreted as a signal that the managers' assessment of the companies' prospects is genuinely positive. It could also point to an inappropriate use of insider information (Leland, Pyle, 1977). Thus, the distinction between optimistic and opportunistic management actions is difficult because the decisions of optimistic managers often have the same characteristics as those of opportunistic managers. For the validity of the results of the present study, however, this particular distinction is important. Malmendier and Tate (2005) argue that insider information always has a temporary and irregular effect and therefore does not lead to long-lasting consequences. By considering the net purchases over five periods, a method also adopted in the present study, the effects of insider information should be largely eliminated.

Conclusion

The present study was the first to use structural equation modeling (SEM) to analyse the influence of management optimism on companies' funding policy and their cost of capital. Based on a large German sample, it was shown that companies with optimistic managers have a significantly higher equity risk premium, a significantly higher risk of insolvency, but also significantly lower costs of capital than companies without optimistic management. The debt ratio among companies with optimistic management is

comparatively higher, although this effect is small and insignificant. Accordingly, the higher equity risk and the higher risk of insolvency cannot result from the choice of leverage. The results complement previous studies of Malmendier and Tate, and Glaser et al., who mainly researched the investment behavior of optimistic managers. The results also go beyond those of an existing study by Meier and Esmatyar by a more differentiating analysis of the structure of effects.

For corporate practice, the results indicate that it is doubtful that an overconfidence bias can be reduced through debiasing techniques, i.e., by rationality assurance, leaving open the question how the effects of managerial overestimation can be limited.

There is still room left for further research, especially with regard to the rarely measurable effect of leverage and the unexpected behaviour of loan conditions. A possible explanation for both effects could lie in the problematic differentiation between optimism, overconfidence, and opportunism. Methodological improvements could be made by modelling these psychological effects as latent variables using more differentiated indicators. The same technique could be used for the cost of debt.

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