Empirical Paper

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Testing trade-off theory and pecking order theory under managerial overconfidence

Abstract: We address our research to the problem of managerial overconfidence and financing behavior. The aim of the paper is, hence, to ascertain the pattern of financing decisions of overconfident managers and identify the relevant capital structure theory (trade-off or pecking order theory) that can be used to explain financing decisions of overconfident managers. We collected a sample of 145 private companies. The degree of overconfidence was distinguished by surveying the managers on overestimation, overplacement, and overoptimism. The financial data covers the period of 2010–2015. We calculated static ratios of capital structure and uncovered the determinants of capital structure. We then unveiled the target debt ratios using Fama and French methodology and identified the difference between target and actual debt ratios. We also calculated the value of deficit and the sources of financing according to Shyam-Sunder and Myers. We found that the companies managed by overconfident managers use higher value of equity and display similar debt ratios. They also utilize reverse pecking order preference—trying to use internal funds and then turning to equity. Moreover, we noted that companies managed by overconfident managers come closer to target debt ratios and implement more risky fixed assets financing strategies. The significance of our research is that we contribute to the understanding of capital structure decisions by taking into account behavioral biases and conducting comprehensive research on both static and dynamic capital structure.

Keywords: trade-off theory, pecking order theory, overconfident managers
JEL Classification: G32, G40

1 Introduction

Raising capital and decide on capital structure still seems to be puzzle. Still, much research has been devoted to investigating the issue, and there are theories that have been developed to try to explain company-financing behavior. There is especially a lot of research that tackles this by applying trade-off theory (TOT) and pecking order theory (POT) assumptions. The results, however, of extensive attempts leave us with no consistent answer.

The lack of consensus on a theory that might explain financing decisions was a trigger to bring other factors into the analysis. Recently, behavioral factors have been included into explaining financing decision-making. One of intensively studied behavioral bias herein is overconfidence.

Overconfidence is one of the most catastrophic cognitive biases [Plous, 1993], yet although there is much research on overconfidence, there is no one measure of overconfidence. Indeed, while the financing and capital structure of companies managed by overconfident managers has been researched, the results

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of such study provide no consistent conclusions: some show that companies managed by overconfident managers use excessive debt, whereas others show debt conservatism.

In our study, we posed several research questions on financing decisions of companies managed by overconfident managers and the aim of the study is to carry out comprehensive research in this field. We want to identify applied static debt ratio and the factors affecting financing decisions. We, hence, attempted to ascertain the target capital structure for each company (according to TOT) and to recognize the distance of actual capital structure from target capital structure, as well as the value of deficit and sources of deficit financing (according to POT). The analysis was carried out by comparing two subsamples: companies managed by overconfident managers and companies managed by nonoverconfident managers.

The originality of our research lies in our applying a unique way of identifying and measuring overconfidence. The added value is that we comprehensively tackled the problem of financing and capital structure. We tried to find a pattern in the static and dynamic capital decisions and to recognize the factors affecting applied capital structure. Of note, most of the existing research compares only debt ratio differences of companies managed by overconfident and nonoverconfident managers. We contribute research into the capital structure decision-making of overconfident managers by calculating not only debt ratio or financial leverage but also recognizing the financing strategy of fixed assets. Herein, we applied TOT and the methodology of setting a target debt ratio [Fama and French, 2002]. We applied POT and methodology of calculating a value of deficit and sources of its financing [Shyam-Sunder and Myers, 1999]. This approach (setting a target debt ratio, calculating deficit, and ascertaining sources of financing) has never been previously applied in research on overconfidence and financing decisions.

Our research covers the unique characteristics of managers (overconfidence) and the specific features of companies (general and financial data). The companies assessed in our work are private Polish companies. We chose Poland because this country has low research coverage, yet it is quite interesting in terms of applied capital structure theories. Poland has a specific geopolitical location and has an economic culture that seeks close political and economic connection with Western countries. This is quite important because most research on overconfidence is on management practices in well-established Western countries (especially the United States), but individual cognitive process depends on cultural context (e.g., Exposure individualism and collectivism). The concepts of individualism and collectivism have been widely discussed. Chui et al. [2010] and Ferris et al. [2013] find that people in an individualistic culture are more likely to be overconfident. According to the GLOBE report the dimension of collectivism and individualism [House et al., 2004; Antonczyk and Salzmann, 2014], the collectivism index for Poland is 5.74, whereas for the United States it is 5.77 (on 1–7 scale), which makes possible comparative research findings.

Finding the answer as to how companies run by overconfident managers are financed is quite important because it will help to recognize overconfident managers, to decide upon their hiring, and to predict what their financing pattern decisions are to be. So far the research findings are inconclusive on the impact of overconfidence on the financing decisions, but in 2015 Kahneman [2015] interviewed for *The Guardian* said that he would eliminate overconfidence if he had a magic wand.

The paper is organized in the following manner. Section 2 contains a literature review on the TOT and the POT. Section 3 refers to the problem of overconfidence. Section 4 is a literature review on the issue of financing decisions taken by overconfident managers. In this section, we also developed a hypothesis that is to be tested. Section 5 contains a description of methodology implemented. Section 6 contains research findings, especially a description of the sample and a verification of the hypotheses. Conclusions are included in the Section 7.

2 TOT and POT—literature review

TOT that is based on research of Modigliani and Miller [1963] including taxes, and later extension with bankruptcy and financial distress costs [Warner, 1977], and the contribution from the agency literature [Jensen and Meckling, 1976], suggest that firms have a unique optimal capital structure. The optimal

capital structure is a balanced relation between the debt advantages and costs. Debt advantages include tax advantage of debt financing (i.e., debt tax shields) and the agency benefits of debt. Debt costs consist of the costs of financial distress and the agency costs of debt. Static TOT assumes that in order to increase company value, companies set optimal capital structure by taking into account benefits and costs of debt. According to TOT, companies set a target individual optimal capital structure and attempt to achieve it [Jalilvand and Harris, 1984].

The TOT assumes that every company has its own optimal capital structure, which is used in every penny raised. Every additional capital is gained to keep this optimal capital structure stable, to minimize the cost of capital and maximize the company value [Jensen and Meckling, 1976; Miller, 1977].

The POT developed by Myers and Majluf [Myers, 1984; Myers and Majluf, 1984] and extended by Lucas and McDonald [1990] is based on the information asymmetry between managers and investors of public companies. Herein, managers possess more detailed information about the financial standing, future prospects, and true value of a company than do outside investors. According to Myers [1984], firms primarily finance their activities with retained earnings. If reinvested earnings are inadequate, then the company uses debt securities. If retained earnings and debt securities are not available or sufficient, firms will subsequently issue shares. Thus, the order of financial sources used is as follows: internal funds from profits, debt securities, and finally stocks.

The POT assumes that companies do not have any optimal capital structure, but the capital structure is simply the result of capital-raising decisions. Hence, the gaining of new funds is affected by several factors, including asymmetric information and signaling problems linked to external financing. The theory also touches upon profitability, dividend, and investment decisions. According to this theory, all companies prefer internal to external financing and debt to equity. Moreover, all additional capital is gained by following a specific hierarchy and capital structure might show higher or lower leverage [Myers, 1984; Myers and Majluf 1984; Shyam-Sunder and Myers, 1999]. This theory thus explains why profitable companies have low debt ratios.

Quite often these two theories are perceived as competing [Shyam-Sunder and Myers, 1999; Matemilola et al. 2012; Adair and Adaskou, 2015; Serrasqueiro and Caetano, 2015]. While empirical evidence seems to support the POT prediction, for example, Rajan and Zingales [1995] and Fama and French [2002] among others, Bradley et al. [1984] seem to think that rather than TOT that is actually more valid. It can be argued, however, that both these theories are helpful in explaining financing behavior, as each theory emphasizes different issues and different way of decision-making. In TOT, all additional capital-raising activity follows target capital structure (with cost of capital, debt advantages, and financial distress taken into account). In POT, the company decides the order of money-raising activity (with dividends, investments, profit, asymmetric information, and signaling problems taken into account) no matter what the cost of capital is and no matter what the capital structure will be. Hence, the capital structure according to POT is simply the result of investment decisions and the hierarchy of capital gaining. In actuality, both theories explain certain aspects of financing decisions, as each theory focuses on different factors and different ways of gaining capital. Therefore, in our study, in its title and in accordance with Cotei and Farhat [2009], we do not use the word "versus."

Capital structure decisions, despite the aforementioned, however, still seem not to be explained, although there are a lot of research and many factors included in these research. Recently behavioral factors have been employed in explaining financing decisions. One of the intensively studied behavioral biases is overconfidence.

3 Managerial overconfidence—literature overview

Overconfidence is one of many biases and fallacies that have impact on cognitive processes. Overconfidence, however, is the most pervasive, and overconfidence is perceived as prevalent and catastrophic [Plous, 1993, p. 217]. Of note, research in cognitive psychology finds that in certain situations, the majority of persons display overconfidence.

There is no one definition and measure of overconfidence. Eventually, overconfidence was defined as a complex phenomenon. Moore and Healy [2008] assigns three dimensions to overconfidence: (1) overestimation of one's actual performance (relative to objective standard), (2) overplacement of one's performance (relative to others), and (3) overoptimism in one's beliefs.

Generally, overconfident people: do not listen to others' opinion because they think they possess better knowledge (overestimation), they think they are better than other people at a particular task (overplacement), attribute success to own abilities and failure to that of others' (self-serving bias), they overestimate their ability to control events (the illusion of control), overestimate probability of positive results and underestimate the failure, and underestimate completion times and overestimating the quality of their performances (the planning fallacy), and are too optimistic about the future (wishful thinking).

In the previous research, there are many ways of identifying managerial overconfidence. The widely used proxies for managerial overconfidence was developed by Malmendier and Tate [2005] and is based on the following: options (longholder, holder 67), shares (net buyer), and press. Another way of identifying overconfident CEOs was proposed by Lin et al. [2005] and was constructed upon how often overconfident managers made upward-biased earnings forecasts. The method based on frequency of M&A was proposed first by Doukas and Petmezas [2007] and was built on how often overconfident managers conduct M&A. A still further method developed by Hayward and Hambrick [1997] considered CEOs' relative compensations. All of these methods require information that might be collected from analyzing annual reports or financial press. These, however, all identify overconfidence by behavior, not by held beliefs. And managerial behavior might result not from managerial beliefs but from the strategy implemented by the company (e.g., frequency of M&A). What is more, those measures might be applied only to listed companies because these companies release forecasts and information about CEO's compensation.

No matter how overconfidence was identified and measured, it is perceived as one of the most pervasive biases that strongly affect decisions. Overconfident decision-making has been also observed in financial decisions. Managerial overconfidence leads to a higher probability of failure for newly established companies [Cooper et al. 1988; Russo and Schoemaker, 1992; Busenitz and Barney, 1997; Camerer and Lovallo, 1999; Simon and Houghton 2003; Fitzsimmons and Douglas, 2005; Lee et al., 2016], overinvestment—even in negative NPV projects [Gervais et al. 2002; Heaton, 2002; Malmendier and Tate, 2005; Hirshleifer et al., 2012], lower propensity of dividend payment and lower level of dividend ratio [Brav et al., 2005; Ben-David et al. 2007; Cordeiro, 2009; Deshmukh et al. 2013; Al-Ghazali, 2014], more optimistic financial forecasts [Hribar and Yang, 2010; Hilary and Hsu, 2011; Libby and Rennekamp, 2012], and earnings management [Kasznik, 1999; Hribar and Yang, 2010; Hilary and Hsu 2011; Schrand, and Zechman, 2012; Ahmed and Duellman, 2013; Hwang et al. 2014].

The relationship between overconfidence and financing decisions has been subjected to much research that resulted in inconsistent findings.

4 Managerial overconfidence and financing decisions—literature review

Research studies that can be found are on the way the companies managed by overconfident manager are financed, especially when debt ratio is concerned. When static capital structure ratios have been focused upon, researchers noted that overconfident managers keep higher debt ratios than do managers showing no overconfidence [Hackbarth, 2004; Ben-David et al. 2007; Barros and Silveira, 2008; Hackbarth, 2008; Hackbarth, 2009; Park and Kim, 2009; Fedyk, 2014; Rihab and Lotfi, 2016]. The explanation for such higher debt ratios is that overconfident managers underestimate the probability of failure and they cannot see the risk connected with the use of excessive debt. Agency theory helps also to explain the excessive debt ratios. Herein, owners are aware of managerial overconfidence and try to curb overinvestment by using higher debt ratios to mitigate managers. In our research we also will attempt to verify the following hypothesis concerning static capital structure (hypothesis 1):

Hypothesis 1: companies managed by overconfident managers have higher leverage.

All of the aforementioned studies are comparison between actual debt ratios of companies managed by overconfident managers and that of nonoverconfident managers. Yet, such research does not tackle the issue of target capital structure (target debt ratio) and how far is the actual debt ratio of companies managed by overconfident or nonoverconfident manager from their target debt ratio. In this study, therefore, we will attempt to calculate the target debt ratio for each company and discern how actual debt ratio differs from the target debt ratios for companies managed by overconfident managers and by nonoverconfident managers. We assume that overconfident managers overestimate the financial standing so the actual is, in reality, worse. We also assume that overconfident managers underestimate the probability of failure and they use higher debt ratios than their financial standing justifies. This means that the companies managed by overconfident managers have lower target debt ratios than the actual. We have, hence, proposed a hypothesis to tackle the problem of target and actual capital (debt) structure—Hypothesis 2:

Hypothesis 2: companies managed by overconfident managers have higher actual debt ratio than target debt ratio indicate.

Another group of researchers have dealt with the issue of dynamic decisions on overconfident managers' capital rising. Lin et al. [2008] find that the optimistic CEOs place higher importance of debt use relative to equity. Indeed, the ratios of net debt issues to total external financing are 53% and 49% for the optimistic and the nonoptimistic CEOs, respectively. Optimistic CEOs seem to issue more debt than non-optimistic CEOs. These research findings are consistent with the static capital structure conclusions, hence Hypothesis 3:

Hypothesis 3: companies managed by overconfident managers use more debt to finance deficit.

With regard to the financing decisions of overconfident managers, Heaton [2002] thinks that these individuals refrain from utilizing external financing, especially debt financing, and they attempt to rely solely upon internal financing. Indeed, Malmendier et al. [2011] find that the frequency with which overconfident managers access any external finance (debt or equity) is significantly lower than that of nonoverconfident managers. However, if they choose external financing, they raise 32 cents more debt to cover an extra dollar of deficit than their peers. Malmendier et al. [2011] in explaining these low debt ratios, called this effect "debt conservatism." They hold the opinion that optimistic managers believe that capital markets perceive firm's securities to be undervalued, and hence, they refrain from external financing. Herein, Hackbarth [2008] also discovers that overconfident CEOs that show "risk perception bias" tend to consider that their debt is undervalued while equity is overvalued, thus they prefer equity to debt financing. This observed "overconfidence-induced reverse pecking order" approach also confirms the results of the greater frequency of share issuance by overconfident CEOs. What is more, Banerjee et al. [2015] show that overconfident CEOs seem to be more likely to conduct secondary equity offerings and raise larger sums when doing so. In trying to find consensus, Fairchild [2007] developed a model showing that among companies using low debt ratios, there are more overconfident managers, and that among companies using high debt ratios, there are more overconfident managers.

The lack of consistency in current research findings gives a good rationale for further research and for attempts to explain financing decision of companies managed by overconfident managers.

5 Methodology

To identify and measure the overconfidence, we followed the methodology of Wrońska-Bukalska [2016] who assumed (after Moore and Healy, 2008) that overconfidence is a complex phenomenon consisting of overestimation, overplacement, and overoptimism. She uses a survey to identify the overconfidence and developed an original method of overconfidence measuring. The survey consists of three parts: the first part (testing overestimation) identifies the scoring dimension and the level of participant confidence in their knowledge; the second part (testing overplacement) detects how participants perceive their future success in relation to other people's successes; and the third part (testing overoptimism) identifies how participant

expect outcomes. The Likert scale was used in the survey. Depending on the results, points are given (–1 if below the middle of the scale, 0 if the middle of the scale, or 1 if above the scale) in each dimension for each person in the sample. The assigned points are then summed up for each participant. The minimum is –3 (indicating strong underconfidence) and the maximum was +3 (indicating strong overconfidence).

To test the static capital structure ratios and to verify Hypothesis 1, we followed the methodology of Rajan and Zingales [1995] in calculating leverage ratios. We presented the data in absolute terms (in thousands PLN) and as the percentage of total assets. We also calculated the ratios indicating financing strategy—the relation of equity to fixed assets and the relation of long-term capital (the sum of equity and long-term liabilities) to fixed assets. To establish the differences in debt ratios, we additionally calculated financial leverage ratio (debt to equity). We subsequently tested the differences using statistical hypothesis testing under the null hypothesis formulation. The null hypothesis is that the there is no difference between two independent group (subsamples): companies managed by overconfident and by nonoverconfident managers.

To test the determinants of capital structure and the financing strategy we utilized the methodology of Titman and Wessels [1988], Bauer [2004], and Anderloni and Tanda [2014]. We identified several dependent variables: debt ratio (the relation of total liabilities to total assets), equity financing ratio (the relation of equity to fixed assets), the long-term financing ratio (the sum of equity and long-term liabilities in the relation of fixed assets), and financial leverage (debt to equity). We employed the following as independent variables: overconfidence, risk (standard deviation of ROA), effects of financial leverage (EFL; the difference between ROE and ROA as a measure of effect of financial leverage), tangibility (share of fixed assets in total assets), size (natural logarithm of Total Assets), and dividend ratio (the relation of dividend paid to net profit). In this part, we carried out the analysis only in relative terms (ratios). To identify the importance of the independent variables, we employed regression analysis for evaluating the relationships among these variables.

Because we expect to find positive coefficient correlation between size and tangibility, we utilized either the first or the second as variables (tangibility or size variable). As equity financing and long-term financing are both calculated in the relation to fixed assets, we employed size as independent variable (instead tangibility, as tangibility is connected with equity and long-term financing). For debt ratio and financial leverage, we used tangibility as the independent variable.

To test the TOT and to verify Hypothesis 2, with regard to target ratio, we followed the methodology of Fama and French [2002] and Ilgaz [2012]. They postulated that there is a target leverage that companies try to adjust to. While Ilgaz [2012] calculated target leverage for both book and market leverage ratios, unlike Ilgaz [2012] we focused only on one dependent variable—book debt ratio (not financial leverage, or equity or long-term financing) to make our research results comparable with others regarding static capital structure decisions. Fama and French [2002] assumed that target leverage ratio depends on profitability, investment, size (natural logarithm of total assets) and notax shield (research and development expenses and depreciation). Ilgaz [2012], in contrast, presupposed that target debt ratio depends on other factors such as: earnings before interest and tax over total assets (profitability), market value over total assets (MV to BV), depreciation over total assets (no-tax shield), logarithm of total assets (size), plant, property and equipment over total assets (tangibility), research and development expenses over total assets (innovativeness), research and development dummy (=1 if R&D expense exists, 0 otherwise), and industry leverage.

We adopted most of the variables, but not all, especially because we dealt with private companies that have no market value based on stock price. Another reason is that we do not have access to some data (especially R&D expenses). Although most studies on determinants of capital structure use both tangibility (fixed assets to total assets) and size (natural logarithm of total assets) variables, we excluded variable size based on natural logarithm of total assets as we found it correlated with tangibility. We therefore, employed the following variables: profitability (as the proxy for financial distress, calculated as the relation of EBITDA to total assets), dividend ratio (as the proxy for agency costs, calculated as the relation of dividend to net profit—the higher dividend, the lower the demand for debt to be used as a tool for mitigating managerial activity), tangibility (as the proxy for stockholder-bondholder agency problems, calculated as the relation

of fixed assets to total assets—the higher tangibility, the higher the demand for debt, especially long-term), depreciation (proxy for non-interests tax shield, calculated as the depreciation to total assets—the higher non interest tax shield, the lower the demand for debt and interest tax shielding). We then applied the following equation:

$$\text{Target debt ratio} = b0 + b1 * \text{profitability} + b2 * \text{dividend payout ratio} + b3 * \text{tangibility}$$
$$+ b4 * \text{depreciation ratio} + e$$

This equation describes how profitability, dividend payout ratio, tangibility, and noninterests tax shield affect the target leverage. We use estimation of the coefficient beta to construct the firms' annual target leverage ratios. After Ilgaz [2012], and Flannery and Hankins [2013], we employed GMM (generalized methods of moments) estimation method to derive adequate estimates of regression analysis for identifying the target debt ratio. Our estimation procedure is done using STATA software (just as Ilgaz [2012] did) and we used the coefficient beta to construct each firm's target leverage ratio.

Instead of dynamic analysis of capital structure adjustment decisions (how fast companies adjust their leverage ratio to target leverage ratio), we implemented static analysis that is focused on identifying the target leverage ratio for each company. Hence, we aimed at investigating the differences in target leverage ratio between companies managed by overconfident and non-overconfident managers. Moreover, to establish whether there are any statistically significant differences in target leverage ratio, we applied Mann Whitney U test. The null hypothesis is that the there is no difference between two independent group (subsamples): companies managed by overconfident and non-overconfident managers.

We also calculated the difference between target and actual debt ratio. The difference tells us how far each company is from its target leverage. The difference might be positive—meaning that target ratio is higher than actual one; the difference might be negative—meaning that target ratio is lower than actual leverage ratio. To ascertain whether there are any statistically significant differences between target and actual leverage ratio for both subsamples we employed Mann Whitney U test. The null hypothesis is that there is no difference between two independent groups (subsamples): companies managed by overconfident and nonoverconfident managers.

To test the POT and to verify Hypothesis 3, we followed the methodology of Shyam-Sunder and Myers [1999] and Cotei and Farhat [2008] in identifying the sources of financial deficit. To do so, they use following variables: dividend payment, capital expenditure, net increase in working capital and cash holdings. To establish the sources of financing, they use increase in equity and increase in debt. Their equation of financial deficit and funds is as follows:

$$Div + CapExp + \Delta NWC - C = DEF = \Delta E + \Delta D$$

We subsequently extended their research by decomposing all elements of the model into the basic, especially the increase in net working capital into which was broken down into: increase in inventory (Inv), increase in operating receivables (Rec), and increase in operating liabilities (Pay). We also decomposed the increase in equity into: increase in share capital as a proxy of shares issuance (Share), and increase in reserve capital as a proxy of earning investment (Res); and increase in debt into: increase in long-term bank loan (LTD), and increase in short-term bank loans (STD). Our attitude is presented in the following equation:

$$Div + CapEx + \Delta Inv + \Delta Rec = DEF =$$

$$= \Delta E + \Delta D + C = (\Delta Share + \Delta Res) + (\Delta LTD + \Delta STD + \Delta Pay) + C$$

We therefore analyzed the data in relative terms. We normalized the financial deficit and the sources of financing data related to total assets. We also tested the differences between two subsamples using the statistical hypothesis testing under the null hypothesis formulation. The null hypothesis is that there is no difference between two independent groups (subsamples): companies managed by overconfident managers and companies managed by nonoverconfident managers.

We also implemented regression analysis after Shyam-Sunder and Myers [1999], Cotei and Farhat [2008], and Lin et al. [2008]. The dependent variables are: increase in debt (D), long-term bank loans (LTD), short-term bank loans (STD), payables (Pay), equity (E), share capital (Share) and reserve capital (Res), whereas independent are overconfidence (OC) and the value of deficit (DEF). All the proxies used in regression models are normalized by being related to total assets. By using regression analysis, we established whether managerial overconfidence has impact on the financing decisions.

6 Research findings

6.1 Data and sample

The research sample covers not only specific managerial characteristics (overconfidence) but also the particularities of companies (general and financial data). The companies included in our research are private Polish companies. We utilized these examples because in Poland, private companies are dominant, being more than 90% of all active entities.

The period of our research covers the years of 2010–2015. We believe that this 6-year period is sufficient to reveal financial end-results of overconfident manager decisions. Initially, we obtained a database of 5,000 companies from register court data, and set certain conditions in our research: the chosen companies should have been established before 2010 and had run for the whole 2010–2015 period, they should have had the same president for the whole period of 2010–2015, had a complete financial statement made available, should not be operating in insurance and banking. These restrictions left 438 companies in the database. We then applied non-probabilistic sampling method (convenience sampling). Herein, choice of the method and sample size were determined by the limited budget, short time to collect the data, and willingness (or rather unwillingness) of the company's CEO to take part in survey. Subsequently, we implemented PAPI, CAPI, and CATI techniques of collecting data. Eventually, we obtained 145 pieces of data, achieving a 33% feedback ratio. The total number of observations (company-years) is 725 (the year 2010 is only the base). All financial data were collected from Emis/Notoria Service.

By means of the overconfidence survey results, we created two subsamples: companies run by overconfident managers (78 companies with 390 observations) and by nonoverconfident managers (67 companies with 335 observations).

The collected data not only described the managers, but also described about the companies and their financial data. Because the surveyed companies deviate from each other in terms of financial data and ratios, the outliers were identified and excluded (following Manoj and Senthamarai Kannan, 2013).

Table 1 presents some basic statistics describing the sample. The sample consists of 145 companies from several diverse industries: manufacturing (34%), constructions (9%), trade (38%), and service (19%)

Table 1. Basic statistics describing the sample

Variables	The sample		Subsample of overconfident managers		Subsample of nonoverconfident managers		*p*-value
	Mean	Median	Mean	Median	Mean	Median	
Employees	225	25	265	25	192	25	0.187
Company age	18	16	17	15	18	17	0.276
The size of management board	1.7	1.0	1.7	1.0	1.8	2.0	0.295
Number of shareholders	9.9	2.0	9.9	2.0	9.9	2.0	0.831
Manager's age	54 years	55 years	55 years	56 years	55 years	55 years	0.374
Managerial ownership	50%	50%	49%	50%	51%	50%	0.725
Years as a president	12	11	11	11	13	11	0.178

Note: Significant at *p < 0.10; **p < 0.05; ***p < 0.01.

industries. Shapiro–Wilk test reveals non-normal distribution of the data. We then utilized non-parametric test of Kruskal–Wallis for k-groups to detect whether the overconfident managers are dominant in some industries. We got the test value of –2.409 and p-value 0.492. As the p-value is higher than 0.05, we assume that there is no differences between the groups as for the presence of overconfidence managers. That means that there is no statistical difference in the distribution of overconfident managers among the industries.

According to the data we obtained, the average company employs 25 people, has been in business for 16 year old, is managed by one person (manager and CEO), and there are only two shareholders (the owners). The average manager is 55 year old, has been president for 11 years and possesses app. 50% stake in the company. A more thorough analysis did not reveal any statistically significant differences in the basic statistics of the sample due to managerial overconfidence. This means that the characteristics of the company managed by overconfident and non-overconfident managers are similar and there are no statistically significant differences. We expect that the characteristics of the company did not impact upon financial decisions and performance, and that the only reason for differences would have been overconfidence.

6.2 Static ratios of capital structure and its determinants

Table 2 lists the obtained descriptive statistics o the sample's capital structure in absolute terms and in relative terms. Additionally, the ratios describing financing strategy are shown. Here, the Shapiro-Wilk test reveals a non-normal distribution of the data. Thus, we applied the non-parametric tests of U Mann- Whitney for two independent groups to detect whether there are any differences between the group of overconfident and non-overconfident managers. The data included in the Table 2 allows us to test the Hypothesis 1—that companies managed by overconfident managers have higher debt ratio.

We found some differences in absolute values: the value of total assets and fixed assets is higher for companies managed by overconfident managers, albeit, only the value of fixed assets with statistical significance. A higher value of total assets in companies managed by overconfident managers means that they have greater demand for more capital (equity and liabilities). Thus, companies managed by overconfident have higher values of equity and total liabilities (both with statistical significance). Having

Table 2. Descriptive statistics of static ratios of capital structure

Variables	Formula	The sample		Subsample of overconfident managers		Subsample of nonoverconfident managers		*p*-value
		Mean	Median	Mean	Median	Mean	Median	
Value of total assets	Thousands PLN	77,152	4,702	139,472	4,897	23,031	4,353	0.238
Value of fixed assets	Thousands PLN	51,728	1,005	103,216	1,275	7,014	860	0.000***
Value of equity	Thousands PLN	47,495	2,113	89,060	2,085	11,399	2,278	0.064*
Value of total liabilities	Thousands PLN	29,657	1,926	50,413	1,935	11,633	1,926	0.014**
Value of long-term liabilities	Thousands PLN	14,170	9	28,623	0.0	1,619	32	0.244
Debt ratio	Total liabilities to total assets	0.6	0.5	0.6	0.5	0.5	0.5	0.283
Financial leverage	Total liabilities to equity	1.3	0.7	1.3	0.7	1.3	0.7	0.537
Equity financing	Equity to fixed assets	−20.7	1.6	−17.1	1.3	−23.8	2.1	0.000***
Long-term financing	Long-term liabilities and equity to fixed assets	27.0	1.9	−16.7	1.7	65.1	2.4	0.000***

Note: Significant at *p < 0.10; **p < 0.05; ***p < 0.01.

higher values of total liabilities and similar values of long-term liabilities means that companies managed by overconfident managers also have higher short-term liabilities.

The higher value of every balance sheet item of companies managed by overconfident managers results in similar debt ratios and levels of financial leverage for companies run either by the overconfident and non-overconfident managers. This is quite surprising because we expected to find a higher debt ratio (D to total assets) and a higher leverage ratio (D to E). We can therefore conclude that the Hypotheses 1 was not confirmed.

Looking deeper into financing strategies, we found that companies managed by overconfident managers have lower (statistically significant) Equity and Long-term financing ratio. Moreover, the fixed assets in companies managed by overconfident managers are financed to a less extent by equity and by long-term capital (the sum of equity and long-term liabilities). We can hence conclude that companies managed by overconfident managers implement more risky strategies in financing fixed assets, having at the same time, similar debt ratios and a similar financial leverage (D/E) as that of companies run by nonoverconfident managers.

We also discern that companies managed by overconfident managers have higher value of total assets and higher value of liabilities, but this leads to similar debt ratios. Our results contradict that in previous research leading to the conclusion that companies managed by overconfident managers have higher debt ratios [Hackbarth, 2004; Ben-David et al., 2007; Barros and Silveira, 2008; Hackbarth, 2008; Hackbarth, 2009; Park and Kim, 2009]. After evaluating the financing strategies, we have concluded that companies managed by overconfident managers implement aggressive strategies. This culmination is in line with previous research indicating that overconfident managers hold an aggressive attitude to financing policy.

The next step of our analysis was to uncover to find the factors affecting financing decisions. Table 3 provides the statistics describing the determinants of capital structure. Herein, we applied the nonparametric of Mann Whitney U test for two independent groups to detect whether there are any differences between the activity of overconfident and nonoverconfident managers.

As indicated, companies managed by overconfident managers show higher effects of financial leverage (differences between ROE and ROA) and higher tangibility (fixed assets in relation to total assets). What is more, companies managed by overconfident managers also have lower dividend payout ratios (but not with statistical significance). The finding that companies managed by overconfident managers have lower dividend ratios is in line with previous research [Brav et al., 2005; Ben-David et al., 2007; Cordeiro, 2009; Deshmukh et al., 2013; Al-Ghazali, 2014]. Of note, the two subsamples do not differ in the level of risk.

Table 4 lists the results of regression analysis. In generating Table 4, we prepared four models for four dependent variables: debt ratio, financial leverage ratio, equity financing the fixed assets, and a long-term capital financing the fixed assets. We found positive coefficient correlation between size and tangibility so we utilized one of them only. For the dependent variables debt ratio (total liabilities in relation to total assets) and financial leverage (total liabilities in relation to total assets) we employed the independent variables: overconfidence (OC), risk, EFL, tangibility, dividend ratio. For the dependent variables of equity

Table 3. Descriptive statistics of factors affecting capital structure

Variables	Formula	The sample		Subsample of overconfident managers		Subsample of nonoverconfident managers		p-value
		Mean	Median	Mean	Median	Mean	Median	
EFL	ROE-ROA	0.06	0.04	0.06	0.05	0.06	0.03	0.001***
Risk	SD of ROA	0.07	0.05	0.08	0.05	0.07	0.05	0.620
Tangibility	Share of fixed assets in total assets	0.31	0.23	0.34	0.29	0.28	0.20	0.000***
Dividend ratio	The relation of dividend paid to net profit	0.91	0.46	0.81	0.45	1.0	0.46	0.782

Note: Significant at *p < 0.10; **p < 0.05; ***p < 0.01.

financing and long-term financing (both calculated in the relation to fixed assets) we also employed the independent variables: overconfidence, risk, EFL, size, dividend ratio (we excluded tangibility as it is correlated with size and used in calculating Equity and Long-term financing). Betas and *p*-value (the latter in brackets) are included in the Table 4.

We found that in two regression models, overconfidence is statistically important. Managerial overconfidence has impact on equity and long-term financing. Overconfidence is, however, irrelevant for debt ratio and financial leverage. Our study saw that companies managed by overconfident and nonoverconfident managers keep similar debt ratios and financial leverage. Thus, overconfidence has no impact on the capital structure in term of debt-equity relationships. We did find that overconfidence is negatively correlated with financing strategy (both equity and long-term). This means that the higher overconfidence, the more risky the way of fixed assets financing. Moreover, overconfidence is the only factor affecting the level both equity and long-term financing strategy. In addition, the effects of financial leverage, risk, size, and dividend ratio are not important. We found it difficult to compare our results with previous research because as far as we know, we are the first to use those ratios in researching the determinants of capital structure. We might think that in our sample managerial overconfidence is present in financing decision (especially fixed assets financing strategies) despite the attempts of apparent rationalizing capital structure decisions by overconfident managers (debt ratios and financial leverage).

We found a positive impact of effect of financial leverage on debt ratio and financial leverage. This means that the higher EFL, the higher the usage of debt. This finding is consistent with the theory which indicates that the positive effects of financial leverage justify the usage of debt. We might think that profitability (presented in our model by EFL) and capital structure are positively correlated, this being in line with the assumptions of TOT [Myers, 1984; Titman and Wessels, 1988; Fama and French, 2002], but we found a negative impact of tangibility on debt ratio and financial leverage. This infers that the higher tangibility (share of fixed assets in total assets), the lower the usage of debt in favor of equity. This is quite surprising as Titman and Wessels [1988], Rajan and Zingales [1995], Booth et al. [2001], Baker and Martin [2011] found positive relation between tangibility and capital structure. Still, Bauer [2004] for Czech companies and Malinić et al. [2013] for Serbian companies found a negative relation and concluded that a negative relation is present in empirical studies for developing countries (especially CEE), whereas developed countries exhibit a positive relation.

The risk and dividend ratio seem not to have impact on every dependent variable (debt ratio, leverage and financing strategy). The results we obtained on factors affecting debt ratio and financial leverage reveal that in deciding on the capital structure (debt ratio and financial leverage), both groups of managers (overconfident and nonoverconfident) do not differ in their attitude, and they include the same (quite rational) factors in their decision-making processes.

We think that the Hypothesis 1 was not confirmed as the companies managed by overconfident managers have similar debt ratios to that run by non-overconfident managers, but at the same time they implement the more risky strategy of fixed assets financing.

Table 4. Results for regression analysis

Variables	Debt ratio	Financial leverage	Equity financing	Long-term financing
Overconfidence	−0.015 (0.195)	−0.138 (0.179)	−2.328 (0.003***)	−2.321 (0.003***)
EFL	0.520 (0.000***)	3.280 (0.000***)	8.344 (0.260)	8.371 (0.258)
Risk	0,006 (0,979)	−0,756 (0,647)	1.098 (0.501)	1.079 (0.508)
tangibility	−0.147 (0.009***)	−0.827 (0.032**)	—	—
Size	—	—	−1.064 (0.843)	−1.064 (0.843)
Dividend ratio	−0.006 (0.308)	−0.051 (0.174)	−0.171 (0.962)	−0.198 (0.956)
R-square	0.151	0.135	0.050	0.049
F statistics, (*p*-value)	8.550 (0.000***)	7.460 (0.000***)	2.351 (0.042**)	2.338 (0.043**)

Note: Significant at *p* < 0.10; **p* < 0.05; ***p* < 0.01.

6.3 Testing the trade-off theory

To test whether TOT assumptions are good descriptors of capital structure decisions, we implemented the methodology of Fama and French [2002] and Ilgaz [2012]. Their approach employs a GMM approach to finding estimates (betas) used later for identifying the individual firm's target leverage ratio. After Fama and French [2002] and Ilgaz [2012], we chose to examine: profitability, dividend ratio, tangibility and depreciation. Table 5 presents the statistics describing proxies. We also applied Shapiro-Wilk test to reveal nonnormal distribution of the data, and the non-parametric test of Mann Whitney U test for two independent groups to detect whether there are any differences between the group of overconfident and non-overconfident managers.

We found that companies managed by overconfident managers differ (with statistical significance) in terms of profitability and tangibility from companies managed by nonoverconfident managers. Companies managed by overconfident managers have lower profitability and higher tangibility. Furthermore, dividend payout ratio is lower for companies managed by overconfident managers, while depreciation ratio is higher, but the differences between two subsamples are not substantial (p-value higher than 0.100).

The next step of our analysis is to identify beta estimates by using GMM method (on STATA software). Table 6 presents the derived estimates and statistic tests.

Herein, all the GMM variable estimates are statistically significant with p-value lower than 0.1. Having identified the estimates, we calculated a target debt ratio for each company. We use GMM estimates as betas in the following equation:

$$\text{Target debt ratio} = b0 + b1 * \text{profitability} + b2 * \text{dividend payout ratio} + b3 * \text{tangibility} + b4 * \text{depreciation ratio}$$

After calculating the target debt ratio, we investigated whether there is any difference between the target debt ratio in the subsamples. In doing so we applied the nonparametric test of U Mann-Whitney for two independent groups to detect if there are any differences between the decisions of overconfident and non-overconfident managers. Later, we calculated the difference between the target debt ratio and an

Table 5. Descriptive statistics for proxies for trade-off theory (TOT) variables

Variables	Formula	The sample		Subsample of overconfident managers		Subsample of nonoverconfident managers		*p*-value
		Mean	Median	Mean	Median	Mean	Median	
Profitability	EBITDA to total assets	0.10	0.09	0.09	0.09	0.11	0.09	0.002***
Dividend ratio	Dividend to net profit	0.91	0.46	0.81	0.45	1.0	0.46	0.782
Tangibility	Fixed assets to total assets	0.31	0.23	0.34	0.29	0.28	0.20	0.000***
Depreciation ratio	Depreciation to total assets	0.03	0.02	0.04	0.02	0.03	0.02	0.179

Note: Significant at *p* < 0.10; **p* < 0.05; ***p* < 0.01.

Table 6. Results of variables coefficient estimates

Variable	Estimates	Standard error	*p*-value	*t* statistics
Constant	0.59966	0.03476	0.000***	17.25
Profitability	−0.51063	0.13240	0.000***	−3.86
Dividend	0.00901	0.00458	0.049**	1.97
Tangibility	0.38470	0.05765	0.000***	6.67
Depreciation	−0.77435	0.16317	0.092*	−1.88

Table 7. Descriptive statistics for target debt ratio

Variables	Formula	The sample		Subsample of overconfident managers		Subsample of nonoverconfident managers		p-value
		Mean	Median	Mean	Median	Mean	Median	
Target leverage	—	0.66	0.65	0.65	0.64	0.69	0.67	0.000***
Difference	Difference between target and actual debt ratio	0.12	0.15	0.10	0.14	0.13	0.16	0.000***

Significant at *p < 0.10; **p < 0.05; ***p < 0.01.

actual debt ratios, and again the identified differences were tested with U Mann Whitney statistics. Table 7 presents the results of target debt ratio analysis.

We found lower target leverage ratios for companies managed by overconfident managers. This implies that these companies should not use higher leverage. A mixture of factors justifies the lower target leverage ratio: lower profitability (higher financial distress costs assumes lower leverage), lower dividend ratio (which requires to use debt as the tool of mitigating agency costs instead of dividend), higher tangibility (and higher demand for debt), and higher depreciation (and lower demand for debt and interest tax shield).

We also found a positive difference between target leverage ratio and actual leverage ratio in both subsamples. This infers that analyzed companies from both subsamples implement lower leverage than they are should. We find it surprising; but the difference between target and actual debt ratios is lower for companies managed by overconfident managers. This suggests that companies managed by overconfident managers are closer to their target ratio, but still the actual leverage is lower than target ratio.

Our findings (that companies managed by overconfident are closer to the target debt ratio) mean that companies managed by overconfident managers use higher leverage by being closer to target leverage than companies managed by non-overconfident managers. In this way our findings confirm the results of most research pointing that companies managed by overconfident managers use higher leverage [Hackbarth, 2004, 2008, 2009; Ben-David et al. 2007; Barros and Silveira, 2008; Park and Kim, 2009; Fedyk, 2014; Rihab and Lotfi, 2016].

At the same time our findings contradict hypothesis 2 (assuming that companies managed by overconfident managers have a higher actual debt ratio than a target debt ratio indicates).

6.4 Testing the pecking order theory

After Shyam-Sunder and Myers [1999] and Cotei and Farhat [2008], albeit with some corrections, we use following equation to calculate deficit:

$$Div + CapEx + \Delta Inv + \Delta Rec = DEF =$$

$$= \Delta E + \Delta D + C = (\Delta Share + \Delta Res) + (\Delta LTD + \Delta STD + \Delta Pay) + C$$

Table 8 lists the descriptive statistics describing the capital structure of the sample. These include the deficit presented in absolute values and sources of the financing in relative terms in relation to total assets. We used total assets as the reference point (denominator) because the value of total assets do not differ (with statistical significance) between two subsamples while the value of deficit does. This effect might distort the research results. Shapiro-Wilk test revealed a nonnormal distribution of the data. We then applied the non-parametric test that is Mann Whitney U test for two independent groups to detect whether there are any differences between the results of overconfident and nonoverconfident managerial activity.

We found differences in the absolute values of deficit. Herein, companies managed by overconfident managers have lower deficit in absolute terms, which leads to lower demand for financing. However, the deficit in relation to total assets does not differ significantly between two subsamples.

According to the results of this part of the study, the main source of deficit is investment spending. Companies managed by overconfident managers invest in fixed assets substantially more than do companies managed by nonoverconfident managers. Such investments are responsible for almost half of the deficit. This end result is in line with that of previous research on overinvestment by overconfident managers [Gervais et al., 2002; Heaton, 2002; Malmendier and Tate, 2005; Hirshleifer et al., 2012]. This also means that companies managed by overconfident managers implement more strict control to inventory increase and receivables increase. Companies managed by overconfident managers also try to curb dividend payout (which was indicated by the data shown in Table 3) so as to mitigate internal outflows.

As for the sources of financing, we found that companies managed by overconfident managers present lower increases in debt and higher increases in equity (the latter with statistical significance) than do companies managed by non-overconfident managers. Moreover, cash holdings are slightly higher in companies managed by overconfident managers. This indicates that companies managed by overconfident managers prefer internal sources of financing (cash holdings coming from operating cash flows and retained earnings) and external equity (issuing new shares). Herein, the greater increases in equity lead to higher values of equity. This finding is consistent with the observation that companies managed by overconfident managers have higher equity values (Table 3).

The next step of the analysis is to regress the relation between sources of financing and overconfidence and deficit. Table 9 contains the results of regression analysis.

We found that overconfidence is negatively connected with debt gain, especially long term, but this relation is not statistically significant. We also discovered that overconfidence is positively connected

Table 8. Descriptive statistics of proxies for POT testing

Variables	Formula	The sample		Subsample of overconfident managers		Subsample of nonoverconfident managers		*p*-value
		Mean	Median	Mean	Median	Mean	Median	
Deficit	Thousand PLN	62.575.0	167.0	49.765.0	187.6	73.555.0	131.0	0.100*
Deficit ratio	Deficit to total assets	0.0852	0.0542	0.0813	0.0693	0.0885	0.0518	0.537
Investment	CapEx to total assets	0.042	0.018	0.047	0.021	0.039	0.016	0.007***
Debt	Increase in debt to total assets	0.005	0.000	0.001	0.000	0.008	0.000	0.112
Equity	Increase in equity to total assets	0.027	0.017	0.048	0.015	0.012	0.017	0.035**
Cash holdings	Cash holdings to total assets	0.163	0.069	0.175	0.076	0.152	0.063	0.684

Note: Significant at *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

Table 9. Results of regression analysis

Variables	Debt	Equity	Long-term bank loan	Short-term bank loans	Payables	Share capital	Reserve capital
OC	−0.001	0.015	−0.002	0.001	0.000	0.002	0.018
	(0.675)	(0.012)**	(0.377)	(0.804)	(0.865)	(0.091)*	(0.002)***
DEF	0.044	−0.010	0.053	0.080	−0.090	0.004	−0.008
	(0.000)***	(0.721)	(0.000)***	(0.000)***	(0.000)***	(0.383)	(0.775)
R square	0.025	0.011	0.043	0.084	0.083	0.006	0.016
F statistics	7,359	3,259	12,617	25,659	25,346	1,658	4,738
(*p*-value)	(0.001)	(0.039)	(0.000)	(0.000)	(0.000)	(0.091)	(0.009)

Note: Significant at *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

(with statistical significance) with the increase of equity—both external (issuing new shares) and internal (retained earnings). This might explain the higher value of equity in companies managed by overconfident managers (Table 3).

The results also indicate that the companies managed by overconfident managers show reverse preference for external financing. They use internal sources of financing first and then turn to issuing shares, while debt is the last source of financing deficit.

To sum up, our Hypothesis 3 again was not confirmed and we found that the value of deficit is lower for companies managed by overconfident managers. What is more, the main source of deficit is capital spending. We suspect that overconfident managers implement more conservative attitude toward working capital management. Hence, the deficit is financed by using more equity than non-overconfident managers do. Thus, managerial overconfidence is positively correlated with equity increase. This confirms the findings of Heaton [2002] and Malmendier et al. [2011] who think that overconfident managers refrain from gaining external financing, especially from debt financing and try to rely only on internal financing. This explains the observed relatively low debt ratios in companies managed by overconfident managers. After Malmendier et al. [2011] we can call this "debt conservatism".

7 Conclusions

The aim of our paper was to discern the financing decision-making pattern of overconfident managers'. In summarizing our findings, we can conclude that: companies managed by overconfident managers have higher values of equity, but similar debt ratios; they have lower target debt ratios, but their actual debt ratios are closer to target debt ratios; and they show reverse pecking order preference (internal funds first and then issuance of new shares). This is accompanied by higher value of total assets, higher value of fixed assets, lower profitability, lower dividend ratios, and higher investment in fixed assets.

Our findings contradict all three of our hypotheses that assumed that companies managed by overconfident managers have higher debt ratios, have higher actual debt ratio than target debt ratio and that they use more debt to finance deficit. Although our findings contradict the assumption included in our research hypotheses, we find the behavior of overconfident mangers consistent and that they present specific pattern of action: they show higher demand for capital (higher total value of assets, higher value of fixed assets and higher tangibility and higher CapEx), and they show quite a rational attitude toward debt financing (using similar debt ratios to those of companies managed by nonoverconfident managers and using similar increase in debt to finance deficit to those of companies managed by nonoverconfident managers) and they rely more on internal funds and equity.

Our research findings do not support the research results showing a higher leverage ratio and higher propensity of gaining debt capital in companies run by the overconfident that were provided by Barros and Silveira [2008], Ben-David et al. [2007], Fedyk [2014], Hackbarth [2004], Hackbarth [2009], Hackbarth [2008], Rihab and Lotfi [2016], Park and Kim [2009], Ben-David et al. [2007] and Lin et al. [2005]. Our findings are, however, in line with those of Heaton [2002] and Malmendier et al. [2011] who think that overconfident managers refrain from gaining external financing, especially from debt financing and try to rely only on internal financing. After Malmendier et al. [2011], we can call it "debt conservatism"' as this explains the relatively low debt ratios of companies run by the overconfident. Our research indicates that the dynamic behavior of overconfident managers in gaining capital that is shown in static ratios reveals that they use more equity and practice debt conservatism and have reverse preference for capital. These conclusions are consistent with that of Heaton [2002], Malmendier et al. [2011], Hackbarth [2008], Banerjee et al. [2015].

We might think that overconfident managers would more easier to convince owners to provide them with more money. Still, managers must have convinced the owners in the recruitment process of the merits of the way they apply management practices [Pfeffer et al., 1998; Paredes, 2004; Anderson and Brion, 2010; Mahmoodi et al., 2013; Phua et al., 2018]. To tell overconfident manager from nonoverconfident (rational) is difficult, as behavior of the overconfident makes them appear to be more competent than nonoverconfident. Still, professional lenders (banks) detect the overconfidence quite quickly as the relation between managers and banks is not a matter of trust, but of simple calculations.

We think that our different results on financing decisions are the result of different proxies for overconfidence and different sampling (public or private companies) than that in previous research. The attitudes to financing found in our paper might be the result of the specific characteristic of our sample. The companies in our sample (both managed by overconfident and nonoverconfident managers) are private companies with a low level of agency costs and information asymmetry between the managers and the owners. Thus, there is no need to use debt as a tool to mitigate managers and as a tool of signaling.

The TOT has been tested so far for listed companies with agency problems. We, in contrast, studied private companies where most of the managers are owners at the same time. The problem of agency costs between managers and owners might be different in private and public companies, so there is no need to use debt as a tool to mitigate managers in private companies.

POT was also developed for public and listed companies where information asymmetry and signaling issues are present. Contrarily, we analyzed private companies where most of the managers are the owners at the same time. The problems of information asymmetry and signaling issues might be different in private than in public companies.

We think that overconfident managers believe that financial institutions (especially banks) undervalue firm's prospects and that is why overconfident manager refrain from obtaining debt financing. This is consistent with the notions put forward by Hackbarth [2008] who found that overconfident CEOs with "risk perception bias" tend to consider that their debt is undervalued while equity is overvalued, hence they prefer equity to debt financing ("overconfidence-induced reverse pecking order").

But our findings point a future direction of research—investment decisions. In every regression model we developed, tangibility and the value of fixed assets were found to be the most important factors affecting financing decisions. By using more equity, companies managed by overconfident managers implement the more risky strategies of fixed assets financing. Hence, we hold that overconfidence affects the investment decisions, and we intend to find out to what extent investment decisions are affected by managerial overconfidence.

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