All Is Not Lost that Is Delayed: Overconfidence and Investment Failure

André Betzer*, Inga van den Bongard**, Erik Theissen*** and Christine Volkmann****

This Draft: January 2017

Abstract

Using a unique panel data set of private German firms over the period 2002 to 2013 we analyze the relation between managerial overconfidence and investment policy in small and medium-sized firms. We construct direct estimates of managerial overconfidence that are based on sales forecasts. We find that overconfident managers are more likely to invest, and that this relation is driven by expansion investments (as opposed to replacement investments). Most importantly, we provide empirical evidence on the determinants of failed (downsized, delayed or abandoned) corporate investment projects. Controlling for socio-demographic variables and firm characteristics, we find that investment projects planned by overconfident managers are more likely to fail. When we differentiate between the three categories of failure (abandoning, delaying, and downsizing) we find that overconfident managers are more likely to delay, rather than to abandon or downsize, an investment project. We offer an explanation that is based on the theory of cognitive dissonance.

JEL: G31, G32, O16,

Keywords: Overconfidence, Small and medium-sized enterprises, corporate investment, private companies

We thank Kreditanstalt für Wiederaufbau for providing access to the data. We thank Itzhak Ben-David, Peter Limbach, Alexander Kempf, Michael Kisser, Daniel Metzger, Dean Shepard, participants of the 31st meeting of the Austrian Working Group on Banking and Finance in Klagenfurt and seminar participants at the University of Cologne and the University of Munich (LMU) for valuable comments.

* BUW – Schumpeter School of Business and Economics, Gaußstr. 20, 42119 Wuppertal, Germany; phone: +49 (0)202 439-2481, email: betzer@wiwi.uni-wuppertal.de

** University of Mannheim, Finance Area, L 9, 1-2, 68161 Mannheim, Germany; phone: +49 (0)621 181-1524; email: ivdb@uni-mannheim.de

*** University of Mannheim, Finance Area, L 9, 1-2, 68161 Mannheim, Germany; phone: +49 (0)621 181-1517, email: theissen@uni-mannheim.de

**** BUW – Schumpeter School of Business and Economics, Gaußstr. 20, 42119 Wuppertal, Germany; phone: +49 (0) 202-439-3982, email: volkmann@wiwi.uni-wuppertal.de

I Introduction

Making sound investment decisions may well be the single most important task within corporate financial management. Detailed descriptions of the NPV rule and other criteria to guide capital budgeting decisions abound in corporate finance textbooks, and are a major component of corporate finance courses taught at business schools and universities all over the world. These descriptions usually assume that, once the decision in favor of a particular project is made, the project is completed as planned. In practice, however, it is a common phenomenon that investment projects are not completed as planned. As will be shown later, 27% of planned investment projects in our sample fail. Projects may be delayed, they may be downsized, or they may be abandoned. It is of obvious importance to analyze *why* corporate investment projects can fail.

In this paper we link the outcome of planned investment decisions to measures of managerial overconfidence. Overconfident managers are known to make suboptimal investment decisions. They are too optimistic and, consequently, tend to overinvest if investable funds are available. This relation has been investigated both for large listed firms (Malmendier and Tate 2005) and for start-ups (Cassar and Friedman 2009), and it also holds in our sample. Obviously, if overconfident managers invest too much there should be an increased probability that investment projects they plan fail. The objective of our paper is to analyze whether this is indeed the case.

We have access to a unique panel data set comprising small and medium-sized German firms and spanning 12 annual surveys starting in 2003. The data set is compiled by Kreditanstalt für Wiederaufbau (KfW) and contains data on financing and investment activities of the responding firms. In particular, we know whether a firm had planned an investment project, and whether this project was realized as planned or whether it was downsized, delayed or abandoned. The data set further contains information on expectations

on future sales. We follow Landier and Thesmar (2009) and use the expectations data to construct a measure of managerial overconfidence directly inferred from managers' beliefs. We then show that overconfident managers invest more. In our main analysis we relate our measure of overconfidence to binomial variables describing the outcome of the planned investment projects while controlling for firm characteristics and socio-demographic characteristics of the CEO.

Our paper makes several important contributions. First, and most importantly, our paper is the first that relates managerial overconfidence to the success or failure of planned investment projects. "Failure" means that a planned project is delayed, downsized, or abandoned. So far, the theoretical and empirical corporate finance literature has only established a link between managerial overconfidence and the firms' investment level (see, among others, Malmendier and Tate 2005, Cassar and Friedman 2009 and Ben-David et al. 2013). Second, similar to Landier and Thesmar (2009) we employ measures of overconfidence that are directly derived from the self-reported expectations of the CEO about future sales of their firm. Because these measures are directly inferred from managers' beliefs they are arguably less affected by measurement error than indirect measures such as the proxies developed by Malmendier and Tate (2005 and 2008) or Campbell et al. (2011). In a recent paper Asker et al. (2015) state that "almost everything we know about investment at the micro level is based on evidence from public firms". Our third contribution is to extend the literature on the relation between overconfidence and corporate investment decisions to small and medium-sized firms (SMEs). Arguably, CEO overconfidence has a stronger impact on corporate decisions in SMEs than in larger firms because the CEO (who often is a large owner or even the sole owner of the firm) has a stronger position and is exposed to less checks and balances than CEOs of listed firms. Finally, ours is the first paper that differentiates between expansion investments and replacement investments.

Our results confirm previous evidence that managerial overconfidence is positively related to the level of investments. We further find that the relation between overconfidence and investment intensity is driven by expansion investments. Our most important result is that managerial overconfidence is positively related to the probability of failure of planned investment projects. In particular, we find that investment projects planned by overconfident managers are more likely to be delayed than those planned by their non-overconfident peers. We offer an explanation for this finding that is based on the concept of cognitive dissonance (Festinger 1957). Planning an investment project and then learning that it is about to fail causes a feeling of discomfort. Considering the project to only be delayed, rather than abandoned, may help reducing this feeling of discomfort, thereby re-establishing internal consistency between managerial actions and beliefs. Because overconfident managers arguably have stronger beliefs about their skills and abilities, they are also more likely to strive to reduce cognitive dissonance. This view is consistent with the result, documented by Gibbons et al. (1997), that high self-esteem individuals are more likely to engage in dissonance reduction strategies than low self-esteem individuals. The idea of a mutual reinforcement between overconfidence and cognitive dissonance has also been formulated in Malmendier and Taylor (2015).

The remainder of the paper is organized as follows. Section 2 provides a brief survey of the relevant literature. In section 3 we describe the data set and present descriptive statistics. Section 4 is devoted to the methodology and results of our statistical analysis, section 5 describes the robustness checks we have performed and section 6 concludes.

II Literature

Managerial overconfidence and corporate financial decisions

Our paper is related to previous research on managerial overconfidence and its relation to corporate financial decisions. According to Moore and Healy (2008) and Ben-David et al. (2013) there exist three distinct interpretations of the term overconfidence in the empirical literature: (1) Overestimation of one's de facto abilities, e.g. the overestimation of the probability of reaching a certain future cash flow level. The corporate finance literature uses the term "optimism" to describe this manifestation of overconfidence.[1] (2) Having excessive confidence regarding the correctness of one's beliefs, in the corporate finance literature, known as "miscalibration". (3) The above-average effect or the overplacement of one's ability compared to others. Moore and Healy (2008) note that roughly 95% of all empirical papers adopt either the first or the second interpretation.

The first measures that have been proposed are indirect measures. They infer the degree of overconfidence from observable managerial actions. Malmendier and Tate (2005) proposed several measures based on managers' net purchases of shares, their stock option holdings, and stock option exercising decisions. The intuitive idea behind these measures is that modern portfolio theory postulates that investors should diversify their asset holdings. Consequently, a rational manager should not invest too much money in the firm she is working for. In the same spirit, Kolasinski and Li (2013) define optimistic CEOs as those who buy shares of their own firm and subsequently earn a negative abnormal return over the following 180 days. Campbell et al. (2011) build on the positive relation, established in Malmendier and Tate (2005), between managerial optimism and a firm's level of investments. They develop a proxy for optimism which classifies a CEO as optimistic if her firm's industry-adjusted investment rate lies in the top-quintile of all firms for two consecutive years. Malmendier and Tate (2008) propose a different approach. They use CEO portrayals in the media in order to classify managers as optimistic or non-optimistic. All the above measures infer overconfidence indirectly from managers' actions or firm characteristics. It is thus not entirely clear that these

[1] The entrepreneurship literature calls this phenomenon also „overoptimism" (see e.g., Shepherd et al. 2015)

measures are valid proxies for managerial optimism (for critical remarks see, for example, Campbell et al. 2011).

In contrast to the studies presented so far, Ben-David et al. (2013) use CFO forecasts of the S&P 500 in order to establish direct measures of optimism and miscalibration and link both of them to corporate finance and investment decisions. Landier and Thesmar (2009) construct a measure of optimism by relating entrepreneurial expectations about the future of the firm to the actual future development. The advantage of these approaches is that they infer the level of overconfidence directly from self-reported forecasts. Arguably this should lead to lower measurement error.

Several papers have related managerial overconfidence to financing decisions. Malmendier and Tate (2005) argue that overconfident managers view external funds as overly costly. Consistent with this view Malmendier et al. (2011) report that overconfident managers use less external finance while Cordeiro (2009) and Deshmukh et al. (2013) find that overconfident managers pay lower dividends, possibly in order to build financial slack. Short-term debt exposes managers to more control by debt holders than long-term debt. Landier and Thesmar (2009) develop a model in which overconfident managers self-select into short-term debt. Consistent with the model's prediction Landier and Thesmar (2009) and Graham et al. (2013) find evidence that overconfident managers tend to use more short-term debt than non-overconfident managers.

Overconfident managers are more likely to consider their firm to be undervalued by the market. Consequently they are more likely to initiate repurchase programs (Banerjee et al. 2015) and they are more likely to complete repurchase programs (Andriosopoulos et al. 2013). Overconfidence has also been shown to affect accounting choices. Ahmed and Duellman (2013) find a negative relation between managerial overconfidence and accounting conservatism. Overconfident managers have also been found to issue more voluntary earnings

forecasts than their non-overconfident peers, and are also more likely to subsequently miss these forecasts (Hribar and Yang 2015).

The entrepreneurship literature provides strong evidence that overconfidence (1) in the form of (over-)optimism and (2) in the form of miscalibration (this second form is subsumed under the term "overconfidence" in the entrepreneurship literature, see e.g., Shepherd et al. 2015) has important implications for entrepreneurial decision making (for a detailed literature review on this topic see Shepherd et al. 2015). Overconfidence in this context can be seen as a cognitive bias and leads to overestimation of venture success (Keh et al. 2002).

Cooper et al. (1988) find that entrepreneurs of newly founded ventures systematically estimate the success rate of their own firm to be significantly higher than the success rate of similar firms. These overconfident entrepreneurs increase the probability that their venture may fail as they expand their venture in spite of negative market feedback (Mc Carthy et al. 1993) and deprive their firms of necessary resources (Hayward et al. 2006). One reason for this behavior might be that entrepreneurs take their venture as unique as well as unrepeatable and do not consider new and relevant information in their decision making (Koellinger et al. (2007). Cassar and Friedman (2009) provide evidence that overconfidence[2] affects entrepreneurial investment decisions, among others the decision to become an entrepreneur in the first place. However, on the positive side, Hayward et al. (2010) outline how overconfidence may strengthen entrepreneurial resilience in order to start subsequent ventures. Everett and Fairchild (2015) argue that overconfident managers may exert more effort than non-overconfident managers. In their model the increased effort may counterbalance the negative impact of overconfidence on the probability of success. With regard to optimism, Hmieleski and Baron (2009) provide empirical evidence that

[2] In the published version of their paper Cassar and Friedman (2009) use the term "self-efficacy" instead of overconfidence. They define it (p. 241) as "a cognitive construct that describes a person's confidence in his/her ability to perform tasks". In an earlier version of the paper (which was titled "Does Overconfidence Affect Entrepreneurial Investment") the authors used the term "overconfidence" instead.

entrepreneurial optimism is significantly negatively linked to revenue growth and employment growth of the new ventures. Lowe and Ziedonis (2006) find that entrepreneurs in start-up firms continue unsuccessful development efforts for longer periods of time than do established firms. They argue that this finding is consistent with entrepreneurial overoptimism (but do not measure overoptimism).

The notion that overconfident (or overoptimistic) managers overestimate the return from investment projects and therefore invest too much has been put forward by Roll (1986) and Heaton (2002).[3] Malmendier and Tate (2005) were the first to test this hypothesis explicitly. They construct several measures of managerial overconfidence from CEOs' portfolio holdings and find that investment decisions by overconfident managers are more sensitive to changes in cash flow than those of their peers. In a similar vein, Malmendier and Tate (2008) find that overconfident managers are more likely to make acquisitions, and that the stock market reaction to their merger announcements is more negative than for non-overconfident CEOs. The former result is confirmed by Ferris et al. (2013) while the latter finding is confirmed by Doukas and Petmezas (2007). Ben-David et al. (2013) construct a measure of overconfidence from stock market return forecasts and confirm the finding that overconfident managers tend to overinvest. We are not aware of papers that relate overconfidence to the failure of planned investment projects (including the failure of merger attempts).

Cognitive dissonance

The failure of a planned investment project is likely to generate unpleasant feelings for those involved in the project. The initial plan to undertake an investment project together with the insight that the project failed results in an inconsistency. This inconsistency produces a

[3] Goel and Thakor (2008) argue that overconfident managers have a higher chance of being promoted to CEO than their non-overconfident peers. The finding by Graham et al. (2013) that CEOs are more optimistic than the lay population is consistent with their hypothesis. Gervais et al. (2011) argue that investment decisions by overconfident managers may actually benefit shareholders because overconfidence counterbalances the effect of managerial risk aversion. The empirical finding by Galasso and Simcoe (2011) and Hirshleifer et al. (2012) that overconfident CEOs are better at promoting innovation is consistent with this view.

feeling of psychological discomfort – a phenomenon in psychology known as cognitive dissonance (Festinger 1957). According to the dissonance theory, individuals seek to reduce conflicting cognitive elements.

There are three basic ways in order to restore consistency (see also Chang et al. 2016 who relate the theory of cognitive dissonance to the disposition effect). First, individuals can alter their beliefs to make the relation between the two cognitions a consonant one. The manager could update her beliefs about her own skills and abilities, thereby recognizing that she is unable to realize the project as planned. This adjustment negatively affects the manager's self-esteem and is thus unlikely to be the method of choice to reduce cognitive dissonance. Second, individuals can restore consistency by acquiring information which outweighs the conflicting elements. If outside financing was necessary to realize the planned project, failure can be blamed on bankers who are not willing to provide funding or, alternatively, failure can be blamed on bad economic conditions. Blaming others or external factors for the undesirable outcome provides managers with a convenient excuse and preserves their belief of having made sound investment plans. A third way to reduce dissonances is to adjust the importance of one of the cognitions. For example, managers could change the perception of failed projects in such a way that it no longer appears to be inconsistent with initial beliefs. The dissonance, for instance, can be resolved by convincing oneself that the problems that arose are temporary in nature, and that the project is only delayed rather than abandoned.

We argue that overconfident managers are more likely to reduce dissonance by either blaming others or by adjusting their cognitions. One explanation for overconfidence that has been developed in the psychological literature is that being confident provides individuals with psychological benefits. In particular, it has been argued that self-confidence improves self-esteem (Alicke 1985). By this argument, we expect overconfident individuals to be characterized by high self-esteem. Gibbons et al. (1997) argue that high self-esteem

individuals are more likely to engage in dissonance reduction strategies than low self-esteem individuals. Consequently, we expect that overconfident managers are more prone to reduce dissonances in order to preserve their positive self-perception. This is consistent with the statement in Malmendier and Taylor (2015, p. 6) that "cognitive dissonance ... allows overconfident beliefs to persist."

III Data and descriptive statistics

Our analysis is based on a unique data set that contains detailed information on small and medium-sized firms in Germany. The data set is provided by KfW (Kreditanstalt für Wiederaufbau) and is collected in 12 annual surveys starting in 2003. The data set is based on a representative survey panel of small and medium-sized firms in Germany and includes privately held firms whose annual sales do not exceed € 500 million. On an annual basis, questionnaires are sent to 45,000 – 86,000 companies, with response rates ranging from 15% up to 24%. In order to ensure that the samples are approximately equally sized over the years, every two years, new companies are contacted. Besides information on firm policies (investment, innovation and financing), the panel includes general information about the company (e.g. industry sector, number of employees), balance sheet data, short-term expectations and socio-demographic information on the manager (gender, age and education level, information on the manager's tenure within the company, and an indication whether she founded the firm, acquired it, or holds a stake in it).

The survey contains a question on the amount that has been invested in the previous year. This amount is broken down into expansion and replacement investments. We use the responses to this question to test whether overconfident managers invest more. The survey further contains questions on whether a firm had planned investment projects, and whether these projects were realized as planned or whether at least one project was downsized,

delayed or abandoned. We refer to these three cases as investment failures. All firms that indicate that they had planned an investment project (no matter whether or not it was realized) were asked whether they had entered into negotiations with a bank on a loan, and whether these negotiations resulted in a loan being granted. We consider a firm as financially constrained when the manager indicated that the firm had been negotiating on a loan and the loan had not been granted.

We link the outcome of a firm's investment decision (success or failure) to our measure of managerial overconfidence, socio-demographic characteristics of the manager and firm characteristics. The inclusion of personal traits, in particular the manager's short term expectations, restricts our sample to those questionnaires which are filled in by the manager herself.[4] Table 1 shows the definitions of all variables that we use in our analysis.

Insert Table 1 about here

Our overconfidence measures are based on survey questions regarding the manager's beliefs about the future development of the firm. The manager is asked about her expectations on sales growth.[5] The question is phrased: "How do you expect the company's sales to develop compared to the previous year?", and possible answers are: "The sales will (a) increase, (b) remain constant or (c) decrease". The expectations data allows us to construct measures of managerial overconfidence directly inferred from the manager's beliefs. We follow Landier and Thesmar (2009) and set the manager's expectation variable equal to 1 if the manager expects an increase in sales, and set the variable to 0 otherwise. In order to measure biases in expectations, we need to compare expectations to realizations. Therefore, in a similar way, we set the variable actual sales growth equal to 1 if the growth rate exceeds the

[4] The survey indicates whether the person answering the questionnaire is the manager herself.
[5] There is a similar question on expected employment growth. We construct an alternative measure of overconfidence from the employment growth expectations. The results are presented as a robustness check in section 5.

average consumer price increase, and to 0 otherwise. The expectations error is the difference between the reported subjective expectation and the realization:

$$\Delta_S = EXP_{SALES} - 1_{(\Delta \ln(SALES) > CPI\%)}$$

The expectation error consists of two components: The first component is the error a rational agent would make and is unpredictable. The second component is the manager's bias in expectation and equals zero only if the manager is rational. We employ the difference between expectations and realizations as a proxy for the manager's bias in expectations. The construction of this measure requires that the firm must participate in at least two consecutive survey waves. Obviously, the rational expectation error adds noise to our proxy for the manager's bias in expectations.

To demonstrate that the difference between expectations and realizations is indeed a reasonable proxy for the manager's bias in expectations we make use of the panel structure of our dataset. The argument goes as follows (see Landier and Thesmar 2009). By definition, rational expectation errors have a mean of zero conditional on the manager's information at the time when the next period expectation is built. Hence, rational expectation errors should be orthogonal to previous rational errors. This implies that if expectation errors are correlated, the correlation is due to the biases and not due to the rational errors. Table 2 reports these correlations. In the first column, we regress the expectation error on 1-period lagged expectations errors, in the second column on 1-period and 2-period lagged expectations errors and in the third column on 1-period, 2-period and 3-period lagged expectations errors.[6] In all specifications the correlations are significant at the 1% level. These results indicate that the managers' biases in expectations are highly persistent over time.

Insert Table 2 about here

[6] The number of observations decreases when more lags are included.

The set of control variables includes socio-demographic information on the manager and firm characteristics. The survey data allow to control for these characteristics for a sizeable fraction of respondents. Overall, there is a full set of survey responses for 6,148 firm-year observations.

Table 3 reports the results of a regression analysis that relates our overconfidence measure to socio-demographic information on the manager. The results indicate that managers with a university degree, male managers, managers with more experience (i.e. longer tenure) in the firm and managers who are also the founders of their firms are more overconfident while older managers are less overconfident. These results are largely in line with previous research. Huang and Kisgen (2013) and Levi et al. (2014) provide evidence that male managers are more overconfident than their female peers. Forbes (2005) and Lee et al. (2016) find that founder-managers are more overconfident than managers who did not found their firm. Forbes (2005) also reports that younger managers are more overconfident than older managers. Graham et al. (2009) report that investors with more education are more likely to perceive themselves as competent than are investors with less education.

Insert Table 3 about here

IV Do Overconfident Managers Invest More?

Our main argument is based on the presumption that overconfident managers, because they are overly optimistic, invest more, and that therefore investment projects initiated by overconfident managers are more likely to fail. We therefore first test whether overconfident managers indeed invest more. To this end we estimate Tobit regressions. The dependent variable is investment activity, defined as the amount invested scaled by tangible assets. We

estimate separate models for total investment, expansion investments and replacement investments.[7]

The main independent variable is the expectations error Δ_S. It can take on three values, namely 1 (if the manager expects that the firm grows but it does not), 0 (if the manager's expectations are correct) and -1 (if the manager does not expect the firm to grow but it does). We estimate two versions of our model. In Model (1) we include the expectations error as defined above. In model (2) we split the expectations error into two dummy variables, one identifying firm-year observations with positive expectations errors and one identifying observations with negative expectations errors. We refer to these cases as "overconfidence" and "underconfidence", respectively.

We include as controls other variables which are likely to have an impact on the investment intensity. Specifically, we include the cash flow, the sales growth, and the natural logarithm of the number of employees as a measure of firm size. We further include a dummy variable that indicates whether the firm was financially constrained in the respective year.

We estimate Tobit models because there are many firm-year observations with zero investments. We include year and industry fixed effects and calculate cluster-robust standard errors. The results are shown in Table 4. Panel A shows the results for total investments. We find a statistically significant relation between investment intensity and overconfidence. In specification (1) the coefficient on the expectations error variable is 0.041 and is significant at the 5% level. When we split up the expectations error in specification (2) we find that the entire effect is driven by overconfident managers. The coefficient on the underconfidence dummy is close to zero, with a t-statistic of 0.03. The coefficients on the control variables reveal that firms with higher cash flows and higher sales growth invest more, while larger

[7] We also estimate

firms and financially constraint firms invest less. The coefficients on all control variables are remarkably similar in specifications (1) and (2).

Insert Table 4 about here

The results for expansion investments in Panel B are qualitatively similar to those for total investment intensity. We still find a positive relation between the expectations error and investment intensity which is driven by overconfident managers. The results for the control variables are also qualitatively similar to those in Panel A. However, the relation between firm size and investment intensity is no longer significant.

The results for replacement investments in Panel C are remarkable. The relation between the expectations error and investment intensity is now negative and significant. The results for specification (2) reveal that this is because underconfident managers invest more in replacements than overconfident managers. In fact, the coefficient for overconfident managers, albeit positive, is insignificant.

Our results confirm the finding of previous papers (e.g. Malmendier and Tate 2005, Cassar and Friedman 2009 and Ben-David et al. 2013) that overconfident managers invest more. This relation is driven by expansion investments. Having established that overconfident managers indeed invest more we now turn to our main question whether investment projects initiated by overconfident managers are more likely to fail.

V Overconfidence and Investment Failure

We restrict our attention to firms that had planned to make an investment. As noted earlier the survey contains questions on whether all investment projects were completed as planned, or whether at least one project was delayed, downsized, or abandoned. Table 5 presents summary statistics for firms with failed and successfully completed investment projects and

tests for differences in the means between the two subgroups (see Table 1 for variable definitions). We only include observations for which all variables used in the main analysis are available (4,515 firm-year observations with successfully completed projects and 1,633 firm-year observations with failed projects).

The main variable of interest is the overconfidence measure directly inferred from managers' beliefs. Table 5 provides strong evidence that overconfidence plays an important role for the outcome of an investment project. The average managerial expectation error is -0.202 in the group with successfully completed investment projects and -0.156 in the group of firms with investment failure. The difference in means is statistically significant at the 1% level. This result provides first evidence that a relation exists between managerial overconfidence and the outcome of investment projects. This finding is corroborated by the fact that 55.2% of the managers in firms with failed investment projects state that they are also the founder of the firm whereas only 45.9% of the managers in firms with successfully completed investment projects indicate that they founded the company. The difference between these percentages is highly (at the 1% level) significant. As previous research (e.g. Forbes 2005, Lee et al. 2016) documents that founders are substantially more overconfident than non-founders, this finding further supports our hypothesis that overconfidence is an important driver of investment success.

Insert Table 5 about here

Not surprisingly, the univariate analysis provides strong evidence that managers of firms with failed investment projects more often indicate that their firm is financially constrained than managers of firms with successful investment projects. Among the firms with successfully completed investment projects, only 6.4% indicate that they are constrained. In contrast, 40.2% of the companies with failed investment projects indicate that they were financially constrained. The difference in means between the two subgroups is significant at the 1% level. This result indicates that the outcome of planned investment projects is related

to the availability of funds. Note, though, that we are unable to make a statement on causality because we do not observe the quality of the planned projects. We can therefore not distinguish between cases in which a positive NPV project is not realized because of funding constraints and cases in which funds are denied because the project is unprofitable.

Furthermore, we find interesting and statistically significant socio-demographic differences (all significant at the 1% level) between managers of firms with failed and firms with successfully completed investment projects. First, managers in firms with successfully completed projects are on average older (mean: 52.3 years vs. 50.5 years) and have gained more experience in the respective company (6.9% of the managers have worked for less than 5 years vs. 10.8%) compared to managers in firms with failed investment projects. We do not find significant differences between the two groups of firms with respect to gender and the proportion of managers holding a university degree.

Finally, we find that firms with successful projects are, on average, larger than firms with failed projects. We measure size by the natural logarithm of the number of employees and find highly significant differences in the mean values (means are 42.08 and 28.48, respectively).

We next analyze the determinants of the outcome of investment projects in a multivariate framework using binary and multinomial regressions. In a first step we do not distinguish between the different categories of failing (downsizing, delaying or abandoning a project) and estimate logit models in which we relate the outcome of the planned investment projects to firm characteristics, socio-demographic characteristics of the CEO such as age, gender and education, and our overconfidence measure. In this approach, the dependent variable is equal to one if the planned investment project failed, and zero otherwise.

We estimate two logit models. In the first model we only include our treatment variable, the overconfidence measure. In the second model we add the socio-demographic variables

and the firm characteristics. Panel A of Table 6 shows the coefficient estimates of the logit models whereas Panel B displays the corresponding marginal effects.

Insert Table 6 about here

When we only include our measure of overconfidence, the expectations error, on the right-hand side we find that overconfidence significantly (at the 1% level) increases the probability of failure. The marginal effect shown in Panel B reveals that investment projects in firms with overconfident managers are 3.21% more likely to fail as compared to projects in firms ran by non-overconfident managers. This finding is confirmed when we add the socio-demographic variables as controls (model 2). While the magnitude of the coefficient on the overconfidence measure is reduced once the controls are added, the coefficient is still significant at the 5% level. The coefficients for the socio-demographic control variables imply that the probability of failure increases when the manager holds a university degree, when the manager is also the founder of the firm, and when the manager is younger. The firm characteristics also significantly affect the probability of failure. In particular, the probability is higher in financially constrained firms and in smaller firms (where size is measured by the number of employees). Inspection of the marginal effects in panel B reveals that financial constraints are an important influence on investment failure.

In a next step, we distinguish between the different categories of failing (downsizing, delaying or abandoning investment projects) in order to get a more detailed picture of why investment projects fail. We estimate multinomial logit models. We consider four categories, namely, abandoned, delayed, downsized or successful investment projects. The latter category, successfully completed projects, is the base category.

Insert Table 7 about here

Panel A of Table 7 shows the coefficient estimates while panel B reports the corresponding marginal effects. In each Panel we first show the results for abandoned versus

successful projects, followed by those for delayed versus successful projects and finally those for downsized versus successful projects. The results for the socio-demographic variables and the firm characteristics are very similar across the three categories of investment failure and are largely in line with the results presented above in Table 7. Investment projects in founder-run firms, in smaller firms, and in financially constrained firms are more likely to be abandoned, delayed, or downsized. The age of the manager and the dummy variable which indicates whether the manager holds a university degree are no longer significant.

The most remarkable results are those for the overconfidence measure. The results for the three categories of investment failure differ in a striking way. Managerial overconfidence significantly increases the probability that an investment project will be delayed, while it does not significantly affect the probabilities for abandoning or downsizing a project. The marginal effects shown in Panel B of Table 7 reveal that an overconfident manager increases the probability of delaying a project by by 2.32% in model 1 and by 1.80% in model 2. Thus, our earlier finding that investment projects planned by overconfident managers are more likely to fail than projects planned by their non-overconfident peers is due to a higher inclination of overconfident managers to delay a project. The probabilities of downsizing or abandoning a project, on the other hand, do not differ across the two groups of managers.

It thus appears that overconfident managers, when faced with difficulties, prefer to delay the investment rather than to downsize or abandon it. This is consistent with the view that overconfident managers consider the problems they are facing as transitory in nature. As we have outlined in section 2, considering a problem as transitory is one way to reduce the cognitive dissonance caused by the information that the project is facing problems. We have further argued that overconfident managers are more prone to reduce dissonances in order to preserve their positive self-perception. Our finding that overconfident managers are more likely to delay projects supports this view.

VI Robustness

In the analyses presented so far we used a measure of managerial overconfidence that is based on managerial sales forecasts. To check the robustness of our results, we also construct an overconfidence measure based on the manager's forecasts of future employment:

$$\Delta_E = EXP_{EMPLOYMENT} - 1_{(\Delta\,\text{EMPLOYMENT}\geq 1)},$$

where $EXP_{EMPLOYMENT}$ is the manager's expectation variable and is set equal to 1 if the manager expects an increase in employment and 0 otherwise. $1_{(\Delta\,\text{EMPLOYMENT}\geq 1)}$ measures actual employment growth and is set equal to 1 if the growth rate is positive and to 0 otherwise. Again, the expectations error is measured as the difference between the subjective reported expectation and the realization. We repeat the entire analysis using this alternative overconfidence proxy.

We start with the relation between overconfidence and investment intensity. The results are shown in Table 8. We no longer find a significant relation between overconfidence and total investment intensity (Panel A of Table 8). However, Panels B and C reveal that there is a significantly positive relation between overconfidence and expansion investments. and a significantly negative relation between overconfidence and replacement investments. Thus, our previous result that overconfident managers are more likely to expand their business still holds.

The results on the relation between overconfidence and investment failure are shown in Table 9 and 10. They are consistent with those presented in section 3. Most importantly, investment projects initiated by overconfident managers are significantly (at the 10% level) more likely to fail, and overconfident managers are significantly (at the 5% level) more likely to delay a project than their non-overconfident peers.

Insert Tables 9 and 10 about here

VII Conclusion

Previous research has shown that the investment level of firms with overconfident managers is more sensitive to changes in cash flow as compared to other firms (Malmendier and Tate 2005). These authors interpret their result as evidence that overconfident CEOs overinvest. If this was the case one would expect that investment projects undertaken by overconfident managers are more likely to fail. So far this hypothesis has not been tested, most likely because of a lack of suitable data. In this paper we try to fill this gap.

We use a unique panel data set provided by Kreditanstalt für Wiederaufbau (KfW). The data set comprises small and medium-sized German firms and spans the 12-year period 2002-2013. We first confirm the finding of Malmendier and Tate (2005) and others that overconfident managers invest more than their non-overconfident peers. We also show that the relation between overconfidence and investment intensity is driven by expansion investments. We do not find a similar relation for replacement investments.

We then directly test whether managerial overconfidence has a significant impact on the success or failure of planned investment projects, where "failure" means that a planned project is delayed, downsized, or abandoned. Overall, our univariate and multivariate results provide empirical evidence that managerial overconfidence is positively related to investment failure as described above. More specifically, in a multinomial context in which we distinguish between the three different categories of failure we find that our proxy for overconfidence, the managerial expectation error, is associated with a significantly higher probability that investment projects are delayed. This is consistent with the view that overconfident managers consider problems they may be facing as transitory in nature, and it is

consistent with the notion that overconfident managers are more likely to behave in a way that reduces cognitive dissonance.

Overall, our results contribute to a better understanding of the link between managerial overconfidence on the one side and corporate financial decisions and their outcome on the other side.

References

Ahmed, A.S. and S. Duellman (2013): Managerial Overconfidence and Accounting Conservatism. Journal of Accounting Research 51, 1-30.

Alicke, M. (1985): Global Self-Evaluation as Determined by the Desirability and Controllability of Trait Adjectives. Journal of Personality and Social Psychology 49, 1621-1630.

Andriosopoulos, D., K. Andriosopoulos and H. Hoque (2013): Information disclosure, CEO overconfidence, and share buyback completion rates. Journal of Banking & Finance 37, 5486-5499.

Asker, J., J. Farre-Mensa and A. Ljungqvist (2015): Corporate Investment and Stock Market Listing: A Puzzle? The Review of Financial Studies, 28, 342-390.

Banerjee, S., M. Humphery-Jenner and V. Nanda (2015): Does CEO Bias Escalate Repurchase Activity? Working Paper, May.

Ben-David, I., J. Graham and C. Harvey (2013): Managerial Miscalibration. Quarterly Journal of Economics 128, 1547-1584.

Campbell, T.C., M. Gallmeyer, S.A. Johnson, J. Rutherford and B.W. Stanley (2011): CEO Optimism and Forced Turnover. Journal of Financial Economics 101, 695-712.

Cassar, G. and H. Friedman (2009): Does Self-Efficacy Affect Entrepreneurial Investment? Strategic Entrepreneurship Journal 3, 241-260.

Chang, T., D. Solomon and M. Westerfield (2016): Looking for Someone to Blame: Delegation, Cognitive Dissonance, and the Disposition Effect. Journal of Finance 71, 267-302.

Cooper, A.C., W.C. Dunkelberg and C.Y. Woo (1988): Entrepreneurs' Perceived Chances for Success. Journal of Business Venturing 3, 97-108.

Cordeiro, L. (2009): Managerial Overconfidence and Dividend Policy. Working Paper, February.

Deshmukh, S., A.M. Goel and K.M. Howe (2013): CEO Overconfidence and Dividend Policy. Journal of Financial Intermediation 22, 440-463.

Doukas, J.A. and D. Petmezas (2007): Acquisitions, Overconfident Managers and Self-attribution Bias. European Financial Management 13, 531-577.

Everett, C.R. and R.J. Fairchild (2015): A Theory of Entrepreneurial Overconfidence, Effort, and Firm Outcomes. Journal of Entrepreneurial Finance 17, 1-26.

Ferris, S.P., N. Jayaraman and S. Sabherwal (2013): CEO Overconfidence and International Merger and Acquisition Activity. Journal of Financial and Quantitative Analysis 48, 137-164.

Festinger, L. (1957): A Theory of Cognitive Dissonance. Row Peterson, Evanston, Illinois.

Forbes, D. (2005): Are Some Entrepreneurs More Overconfident than Others? Journal of Business Venturing 20, 623-640.

Galasso, A. and T.S. Simcoe (2011): CEO Overconfidence and Innovation. Management Sciences 57, 1469-1484.

Gervais, S., J.B. Heaton and T. Odean (2011): Overconfidence, Compensation Contracts, and Capital Budgeting. The Journal of Finance 66, 1735-1777.

Gibbons F.X., T.J. Eggleston and A.C. Benthin (1997): Cognitive Reactions to Smoking Relapse: The Reciprocal Relation between Dissonance and Self-esteem. Journal of Personality and Social Psychology 72, 184–195.

Goel, A.M. and A.V. Thakor (2008): Overconfidence, CEO Selection and Corporate Governance. The Journal of Finance 63, 2737-2784.

Graham, J.R., C.R. Harvey and H. Huang (2009): Investor Competence, Trading Frequency and Home Bias. Management Science 55, 1094-1106.

Graham, J.R., C.R. Harvey and M. Puri (2013): Managerial Attitudes and Corporate Actions. Journal of Financial Economics 109, 103-121.

Hayward, M. L., D.A. Shepherd and D. Griffin (2006): A Hubris Theory of Entrepreneurship. Management Science 52, 160-172.

Hayward, M. L., W.R. Forster, S.D. Sarasvathy and B.L. Fredrickson (2010): Beyond Hubris: How Highly Confident Entrepreneurs Rebound to Venture Again. Journal of Business Venturing, 25, 569-578.

Heaton, J.B. (2002): Managerial Optimism and Corporate Finance. Financial Management 31, 33-45.

Hirshleifer, D., A. Low and S. H. Teoh (2012): Are Overconfident CEOs Better Innovators? The Journal of Finance 67, 1457-1498.

Hmieleski, K.M. and R.A. Baron (2009): Entrepreneurs` Optimism and New Venture Performance: A Social Cognitive Perspective. Academy of Management Journal 52, 473-488.

Hribar, P. and H. Yang (2015): CEO Overconfidence and Management Forecasting. Contemporary Accounting Research 33, 204-227.

Huang, J. and D. Kisgen (2013): Gender and Corporate Finance: Are Male Executives Overconfident Relative to Female Executives? Journal of Financial Economics 108, 822-839.

Keh, H.T., M.D. Foo, and B.C. Lim (2002): Opportunity Evaluation under Risky Conditions: The Cognitive Process of Entrepreneurs. Entrepreneurship Theory and Practice 27, 125–148.

Koellinger, P., M. Minniti and C. Schade (2007): "I think I can, I think I can": Overconfidence and Entrepreneurial Behavior. Journal of Economic Psychology 28, 502-527.

Kolasinski, A.C. and X. Li (2013): Can Strong Boards and Trading Their Own Firm´s Stock Help CEOs Make Better Decisions? Evidence from Acquisitions by Overconfident CEOs. Journal of Financial and Quantitative Analysis 48, 1173-1206.

Landier, A. and D. Thesmar (2009): Financial Contracting with Optimistic Entrepreneurs. The Review of Financial Studies 22, 117-150.

Lee, J.M., B.-H. Hwang and H. Chen (2016): Are Founder-CEOs more Overconfident than Professional CEOs? Evidence from S&P 1500 Companies. Strategic Management Journal, forthcoming.

Levi, M., K. Li and F. Zhang (2014): Director Gender and Mergers and Acquisitions. Journal of Corporate Finance 28, 185-200.

Lowe, R.A. and A.A. Ziedonis (2006): Overoptimism and the Performance of Entrepreneurial Firms. Management Science 52, 173-186.

Malmendier, U. and G. Tate (2005): CEO Overconfidence and Corporate Investment. The Journal of Finance 60, 2661-2700.

Malmendier, U. and G. Tate (2008): Who Makes Acquisitions? CEO Overconfidence and the Market´s Reaction. Journal of Financial Economics 89, 20-43.

Malmendier, U., G. Tate and J. Yan (2011): Overconfidence and Early-Life Experiences: The Effect of Managerial Traits on Corporate Financial Policies. The Journal of Finance 66, 1687-1733.

Malmendier, U. and T. Taylor (2015): On the Verges of Overconfidence. Journal of Economic Perspectives 29, 3-8.

McCarthy, A. M., F.D. Schoorman and A.C. Cooper (1993): Reinvestment Decisions by Entrepreneurs: Rational Decision-Making or Escalation of Commitment? Journal of Business Venturing 8, 9-24.

Moore, D.A. and P.J. Healy (2008): The Trouble with Overconfidence. Psychological Review 115, 502-517.

Roll, R. (1986): The Hubris Hypothesis of Corporate Takeovers. The Journal of Business 59, 197-216.

Shepherd, D.A., T.A. Williams and H. Patzelt (2015): Thinking About Entrepreneurial Decision Making: Review and Research Agenda. Journal of Management 41, 11-46.

Table 1. Variable list and descriptions

Variable label	Description
Failed	Indicator variable; takes a value of one if a planned investment project failed, 0 otherwise.
Expectation error (sales)	Comparison of the manager's expectation with realizations on sales: $\Delta_S = EXP_{SALES} - 1_{(\Delta \ln(SALES) > CPI\%)}$ EXP_{SALES} takes a value of one if the manager expects development, 0 otherwise. The actual sales growth is equal to 1 if the growth rate exceeds the average consumer price increase (CPI), 0 otherwise (see Landier/ Thesmar (2009)). The variable is lagged by one period.
Expectation error (employment)	Comparison of the manager's expectation with realizations on employment: $\Delta_E = EXP_{EMPLOYMENT} - 1_{(\Delta\ EMPLOYMENT \geq 1)}$ $EXP_{EMPLOYMENT}$ takes a value of one if the manager expects an increase in employment, 0 otherwise. The actual employment growth is equal to 1 if the change in employment is equal or larger than 1, 0 otherwise (see Landier/ Thesmar (2009)). The variable is lagged by one period.
University degree	Indicator variable; takes a value of one if the manager holds a university degree, 0 otherwise.
Manager is male	Indicator variable; takes a value of one if the manager is male, 0 otherwise.
Experience within the firm (0-5 years)	Indicator variable; takes a value of one if the manager gained 0-5 years of experience within the firm, 0 otherwise.
Founder status	Indicator variable; takes a value of one if the manager is the founder of the firm, 0 otherwise.
Ln(age)	Natural logarithm of the manager's age in years.
Financially constrained	Indicator variable; takes a value of one if the firm is credit constrained i.e. the application for a bank loan was denied.
Ln(# employees)	Natural logarithm of the firm's number of employees.
Cash flow	Profit or loss plus depreciation divided by tangible assets. The variable is winsorized at the 2.5% tails.
Sales growth	Change in sales in relation to previous year's sales. The variable is winsorized at the 2.5% tails.
Investment intensity	Investment volume divided by tangible assets. The variable is winsorized at the 2.5% tails.
Capacity extension intensity	Capacity extension volume divided by tangible assets. The variable is winsorized at the 2.5% tails.
Replacement intensity	Replacement volume divided by tangible assets. The variable is winsorized at the 2.5% tails.

Table 2. Correlations between Expectation Errors

The table reports the correlation between current and lagged sales-based expectation errors. The regressions are based on the entire sample. All regressions include year and industry fixed effects. T-statistics are based on cluster-robust standard errors and appear in brackets besides the slope estimates. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

Dependent variable = expectation error (sales)						
	(1)		(2)		(3)	
Expectation error (sales), t-1	0.0595***	(8.72)	0.0697***	(8.44)	0.0519***	(4.91)
Expectation error (sales), t-2			0.115***	(13.68)	0.104***	(9.71)
Expectation error (sales), t-3					0.0857***	(7.64)
Constant	-0.0924***	(-6.27)	-0.157***	(-8.91)	-0.0206	(-0.95)
Observations	24150		13854		8169	
R^2	0.0191		0.0383		0.0460	

Table 3. Determinants of Overconfidence

The table investigates whether overconfidence is explained by the manager's personal characteristics. The regression is based on the entire sample. The definitions of the variables are provided in Table 1. The regression includes year and industry fixed effects. T-statistics are based on cluster-robust standard errors and appear in brackets besides the slope estimates. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

Dependent variable = expectation error (sales)		
University degree	0.0318***	(4.80)
Manager is male	0.0216**	(2.19)
Experience within the firm (0-5 years)	0.0309***	(3.91)
Ln(age)	-0.0342**	(-2.04)
Founder status	0.0146**	(2.25)
Constant	-0.139**	(-2.12)
Observations	41327	
R^2	0.0187	

Table 4. Tobit models of investment intensity using *sales-based expectation errors*

Panel A of this table presents average marginal effects of tobit models of investment intensity. Panel B and C report separate results for capacity expansion and replacement intensity. The definitions of the variables are provided in Table 1. All regressions include year and industry fixed effects. T-statistics are based on cluster-robust standard errors and appear in brackets besides the slope estimates. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

	Dependent variable = investment intensity			
	(1)		(2)	
Expectation error (sales)	0.0405**	(2.25)		
Expectation error (sales)_(-1)			-0.000765	(-0.03)
Expectation error (sales)_(1)			0.122***	(3.19)
Cash flow	0.208***	(13.20)	0.209***	(13.27)
Sales growth	0.108**	(2.43)	0.108**	(2.45)
Ln (# employees)	-0.0272***	(-2.97)	-0.0267***	(-2.92)
Financially constrained	-0.367***	(-8.01)	-0.366***	(-7.99)
Observations	3828		3828	
	Dependent variable = capacity expansion intensity			
	(1)		(2)	
Expectation error (sales)	3.887*	(1.84)		
Expectation error (sales)_(-1)			-1.000	(-0.38)
Expectation error (sales)_(1)			9.114**	(2.21)
Cash flow	8.282***	(5.05)	8.298***	(5.07)
Sales growth	21.65***	(4.06)	21.73***	(4.08)
Ln (# employees)	-1.288	(-1.17)	-1.232	(-1.12)
Financially constrained	-14.14***	(-3.10)	-14.13***	(-3.10)
Observations	2321		2321	
	Dependent variable = replacement intensity			
	(1)		(2)	
Expectation error (sales)	-2.496**	(-2.02)		
Expectation error (sales)_(-1)			4.595***	(2.70)
Expectation error (sales)_(1)			1.493	(0.69)
Cash flow	7.290***	(7.13)	7.306***	(7.13)
Sales growth	-6.755**	(-2.31)	-6.736**	(-2.31)
Ln (# employees)	-0.266	(-0.41)	-0.227	(-0.35)
Financially constrained	-2.463	(-0.86)	-2.419	(-0.85)
Observations	2307		2307	

Table 5. Summary statistics for firms with failed and successfully completed investment projects

The sample consists of 12 survey waves between 2003 and 2014. The table gives the means and standard deviations of the variables used in this study, divided by whether the firm's investment project was successfully completed or failed. Most variables are dummies, so that the reported means stand for percentage in the category. The definitions of the variables are provided in Table 1. T-tests are conducted to test for differences between the means for firms with successfully completed and firms with failed investment projects. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

	Completed			Failed		
	#	Mean	Std. Dev.	#	Mean	Std. Dev.
Expectation error (sales)	4515	-0.202	0.589	1633	-0.156***	0.585
University degree	4515	0.481	0.500	1633	0.482	0.450
Manager is male	4515	0.919	0.273	1633	0.906	0.292
Experience within the firm (0-5 years)	4515	0.069	0.254	1633	0.108***	0.310
Founder status	4515	0.459	0.498	1633	0.552***	0.497
Age	4515	52.328	10.195	1633	50.488***	9.979
Financially constrained	4515	0.064	0.244	1633	0.402***	0.491
# Employees	4515	42.075	67.750	1633	28.484***	39.993

Table 6. Logit models of investment project failure using *sales-based expectation errors*

Panel A of this table presents coefficient estimates of logit models of investment project failure. The dependent variable is equal to one if the planned investment project failed and zero otherwise. Panel B presents average marginal effects. The definitions of the variables are provided in Table 1. All regressions include year and industry fixed effects. T-statistics are based on cluster-robust standard errors and appear in brackets besides the slope estimates. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

Dependent variable = project failure				
Panel A: Logit estimates				
	(1)		(2)	
Expectation error (sales)	0.172***	(3.19)	0.121**	(2.05)
University degree			0.173**	(2.14)
Manager is male			-0.0553	(-0.41)
Experience within the firm (0-5 years)			0.136	(1.03)
Founder status			0.286***	(3.55)
Ln(age)			-0.501**	(-2.29)
Financially constrained			2.107***	(22.93)
Ln(# employees)			-0.108***	(-3.34)
Constant	-1.512***	(-12.53)	0.442	(0.51)
Observations	6148		6148	
Pseudo R^2	0.0335		0.148	
Panel B: Average marginal effects				
	(1)		(2)	
Expectation error (sales)	0.0321***	(3.20)	0.0191**	(2.06)
University degree			0.0274**	(2.13)
Manager is male			-0.00875	(-0.41)
Experience within the firm (0-5 years)			0.0215	(1.03)
Founder status			0.0453***	(3.56)
Ln(age)			-0.0794**	(-2.30)
Financially constrained			0.334***	(27.68)
Ln(# employees)			-0.0170***	(-3.37)
Observations	6148		6148	

Table 7. Multinomial logit models of investment project failure using *sales-based expectation errors*

Panel A of this table presents coefficient estimates of multinomial logit models of investment project failure. The dependent variable is categorized as abandoned, delayed, downsized or successful investment project. The base category comprises companies that successfully completed their investment projects. Panel B presents average marginal effects. The number of observations is lower than in Table 6 because observations have been excluded if more than one answer was selected. The definitions of the variables are provided in Table 1. All regressions include year and industry fixed effects. T-statistics are based on cluster-robust standard errors and appear in brackets besides the slope estimates. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

Dependent variable = project failure				
Panel A: Multinomial logit estimates				
	(1)		(2)	
Abandoned				
Expectation error (sales)	0.0795	(0.88)	0.0304	(0.31)
University degree			0.197	(1.51)
Manager is male			-0.0932	(-0.45)
Experience within the firm (0-5 years)			-0.197	(-0.86)
Founder status			0.377***	(2.93)
Ln(age)			-0.424	(-1.17)
Financially constrained			2.753***	(19.50)
Ln(# employees)			-0.200***	(-3.82)
Constant	-3.325***	(-14.13)	-1.609	(-1.16)
Delayed				
Expectation error (sales)	0.199***	(2.94)	0.159**	(2.25)
University degree			0.141	(1.52)
Manager is male			-0.0791	(-0.48)
Experience within the firm (0-5 years)			0.245	(1.62)
Founder status			0.169*	(1.83)
Ln(age)			-0.396	(-1.59)
Financially constrained			1.810***	(16.99)
Ln(# employees)			-0.0762**	(-2.02)
Constant	-1.931***	(-13.15)	-0.344	(-0.35)
Downsized				
Expectation error (sales)	0.0581	(0.45)	0.0292	(0.23)
University degree			0.152	(0.90)
Manager is male			-0.111	(-0.40)
Experience within the firm (0-5 years)			0.113	(0.43)
Founder status			0.359**	(2.08)
Ln(age)			-0.483	(-1.04)
Financially constrained			1.660***	(8.70)
Ln(# employees)			-0.172***	(-2.69)
Constant	-3.758***	(-11.97)	-1.572	(-0.84)
Observations	5971		5971	
Pseudo R^2	0.027		0.112	

Table 7 - Continued

Dependent variable = project failure				
Panel B: Average marginal effects				
	(1)		(2)	
Abandoned				
Expectation error	0.00268	(0.49)	-0.000894	(-0.17)
University degree			0.00817	(1.18)
Manager is male			-0.00353	(-0.32)
Experience within the firm (0-5 years)			-0.0152	(-1.26)
Founder status			0.0170**	(2.47)
Ln(age)			-0.0156	(-0.81)
Financially constrained			0.119***	(15.71)
Ln(# employees)			-0.00931***	(-3.36)
Delayed				
Expectation error	0.0232***	(2.86)	0.0180**	(2.25)
University degree			0.0126	(1.22)
Manager is male			-0.00718	(-0.39)
Experience within the firm (0-5 years)			0.0311*	(1.88)
Founder status			0.0119	(1.16)
Ln(age)			-0.0370	(-1.34)
Financially constrained			0.160***	(14.41)
Ln(# employees)			-0.00482	(-1.16)
Downsized				
Expectation error	0.000585	(0.15)	-0.000160	(-0.04)
University degree			0.00301	(0.60)
Manager is male			-0.00253	(-0.31)
Experience within the firm (0-5 years)			0.00272	(0.35)
Founder status			0.00838*	(1.66)
Ln(age)			-0.0106	(-0.79)
Financially constrained			0.0290***	(5.71)
Ln(# employees)			-0.00396**	(-2.12)
Observations	5971		5971	

Table 8. Tobit models of investment intensity using *employment-based expectation errors*

Panel A of this table presents average marginal effects of tobit models of investment intensity. Panel B and C report separate results for capacity expansion and replacement intensity. The definitions of the variables are provided in Table 1. All regressions include year and industry fixed effects. T-statistics are based on cluster-robust standard errors and appear in brackets besides the slope estimates. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

Dependent variable = investment intensity				
	(1)		(2)	
Expectation error (employment)	-0.0117	(-0.63)		
Expectation error (employment)_(-1)			0.0294	(1.10)
Expectation error (employment)_(1)			0.0115	(0.38)
Cash flow	0.222***	(14.49)	0.222***	(14.49)
Sales growth	0.144***	(3.14)	0.145***	(3.15)
Ln (# employees)	-0.0281***	(-2.94)	-0.0288***	(-3.03)
Financially constrained	-0.417***	(-8.45)	-0.416***	(-8.41)
Observations	3393		3393	
Dependent variable = capacity expansion intensity				
	(1)		(2)	
Expectation error (employment)	4.416**	(2.12)		
Expectation error (employment)_(-1)			-1.696	(-0.57)
Expectation error (employment)_(1)			7.667**	(2.21)
Cash flow	9.982***	(6.33)	9.965***	(6.30)
Sales growth	21.60***	(4.04)	21.77***	(4.07)
Ln (# employees)	-1.694	(-1.50)	-1.776	(-1.58)
Financially constrained	-18.43***	(-3.86)	-18.32***	(-3.83)
Observations	2247		2247	
Dependent variable = replacement intensity				
	(1)		(2)	
Expectation error (employment)	-5.390***	(-4.04)		
Expectation error (employment)_(-1)			5.687***	(2.75)
Expectation error (employment)_(1)			-5.015**	(-2.48)
Cash flow	7.278***	(6.67)	7.276***	(6.66)
Sales growth	-6.231**	(-2.17)	-6.213**	(-2.16)
Ln (# employees)	-0.142	(-0.21)	-0.153	(-0.23)
Financially constrained	-2.463	(-0.84)	-2.451	(-0.83)
Observations	2232		2232	

Table 9. Logit models of investment project failure using *employment-based expectation errors*

Panel A of this table presents coefficient estimates of logit models of investment project success. The dependent variable is equal to one if the planned investment project failed and zero otherwise. Panel B presents average marginal effects. The definitions of the variables are provided in Table 1. All regressions include year and industry fixed effects. T-statistics are based on cluster-robust standard errors and appear in brackets besides the slope estimates. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

Dependent variable = project failure				
Panel A: Logit estimates				
	(1)		(2)	
Expectation error (employment)	0.0938*	(1.67)	0.114*	(1.88)
University degree			0.167**	(2.02)
Manager is male			-0.124	(-0.92)
Experience within the firm (0-5 years)			0.141	(1.00)
Founder status			0.233***	(2.80)
Ln(age)			-0.638***	(-2.85)
Financially constrained			2.250***	(22.87)
Ln(# employees)			-0.101***	(-2.98)
Constant	-1.472***	(-12.15)	1.043	(1.18)
Observations	5908		5908	
Pseudo R^2	0.0118		0.134	
Panel B: Average marginal effects				
	(1)		(2)	
Expectation error (employment)	0.0174*	(1.67)	0.0177*	(1.88)
University degree			0.0260**	(2.01)
Manager is male			-0.0193	(-0.92)
Experience within the firm (0-5 years)			0.0219	(1.00)
Founder status			0.0362***	(2.81)
Ln(age)			-0.0994***	(-2.86)
Financially constrained			0.350***	(27.66)
Ln(# employees)			-0.0157***	(-3.00)
Observations	5908		5908	

Table 10. Multinomial logit models of investment project failure using *employment-based expectation errors*

Panel A of this table presents coefficient estimates of multinomial logit models of investment project success. The dependent variable is categorized as abandoned, delayed, downsized or successful investment project. The base category comprises companies that successfully completed their investment projects. Panel B presents average marginal effects. The number of observations is lower than in Table 9 because observations have been excluded if more than one answer was selected. The definitions of the variables are provided in Table 1. All regressions include year and industry fixed effects. T-statistics are based on cluster-robust standard errors and appear in brackets besides the slope estimates. ***, ** and * denotes statistical significance at the 1%, 5% and 10% level, respectively.

Dependent variable = project failure				
Panel A: Multinomial logit estimates				
	(1)		(2)	
Abandoned				
Expectation error (employment)	-0.0840	(-0.85)	-0.0636	(-0.58)
University degree			0.255*	(1.81)
Manager is male			-0.256	(-1.22)
Experience within the firm (0-5 years)			-0.151	(-0.61)
Founder status			0.341**	(2.48)
Ln(age)			-0.390	(-1.03)
Financially constrained			2.889***	(19.72)
Ln(# employees)			-0.204***	(-3.78)
Constant	-3.344***	(-13.83)	-1.751	(-1.20)
Delayed				
Expectation error (employment)	0.156**	(2.18)	0.168**	(2.23)
University degree			0.149	(1.57)
Manager is male			-0.184	(-1.14)
Experience within the firm (0-5 years)			0.207	(1.28)
Founder status			0.113	(1.19)
Ln(age)			-0.608**	(-2.37)
Financially constrained			1.948***	(17.56)
Ln(# employees)			-0.0704*	(-1.76)
Constant	-1.898***	(-12.93)	0.591	(0.58)
Downsized				
Expectation error (employment)	0.175	(1.28)	0.184	(1.32)
University degree			0.0861	(0.49)
Manager is male			0.0697	(0.22)
Experience within the firm (0-5 years)			0.202	(0.72)
Founder status			0.239	(1.33)
Ln(age)			-0.618	(-1.23)
Financially constrained			1.788***	(9.22)
Ln(# employees)			-0.126*	(-1.87)
Constant	-3.775***	(-11.73)	-1.314	(-0.65)
Observations	5764		5764	
Pseudo R^2	0.0133		0.105	

Table 10 - Continued

Dependent variable = project failure				
Panel B: Average marginal effects				
	(1)		(2)	
Abandoned				
Expectation error (employment)	-0.00650	(-1.16)	-0.00610	(-1.12)
University degree			0.0106	(1.54)
Manager is male			-0.0105	(-1.03)
Experience within the firm (0-5 years)			-0.0111	(-0.93)
Founder status			0.0150**	(2.24)
Ln(age)			-0.00943	(-0.52)
Financially constrained			0.114***	(15.84)
Ln(# employees)			-0.00900***	(-3.44)
Delayed				
Expectation error (employment)	0.0187**	(2.21)	0.0193**	(2.28)
University degree			0.0130	(1.26)
Manager is male			-0.0179	(-1.00)
Experience within the firm (0-5 years)			0.0248	(1.42)
Founder status			0.00696	(0.67)
Ln(age)			-0.0611**	(-2.16)
Financially constrained			0.174***	(15.69)
Ln(# employees)			-0.00455	(-1.05)
Downsized				
Expectation error (employment)	0.00452	(1.14)	0.00453	(1.14)
University degree			0.000949	(0.19)
Manager is male			0.00368	(0.41)
Experience within the firm (0-5 years)			0.00508	(0.64)
Founder status			0.00524	(1.05)
Ln(age)			-0.0133	(-0.96)
Financially constrained			0.0325***	(6.53)
Ln(# employees)			-0.00264	(-1.41)
Observations	5764		5764	