Corporate Diversification and Managerial Overconfidence

Panayiotis C. Andreou, John A. Doukas, and Christodoulos Louca*

December 10, 2011

Abstract

This study investigates the role of managerial overconfidence in the context of corporate diversification decisions. First, we find that overconfident managers are more likely to manage diversified than focused firms. Second, we find that the diversification discount is concentrated exclusively in companies managed by overconfident managers. Third, we document that the discount is greater following diversification and, most importantly, it persists for several years only for firms managed by overconfident managers. Our evidence is consistent with the view that overconfident managers miscalibrate benefits/costs associated with diversification decisions and perceive them as invariably value-creating.

Keywords: Managerial overconfidence; Corporate diversification decisions; Diversification discount; Excess value

JEL Codes: G34, G30

*Andreou, panayiotis.andreou@cut.ac.cy, and Louca, christodoulos.louca@cut.ac.cy are from Cyprus University of Technology, Department of Commerce, Finance and Shipping, 140 Ayiou Andreou Street, P.O. Box 50329, Limassol 3603, Cyprus, and Durham University, Durham, UK. Doukas, jdoukas@odu.edu, is from Old Dominion University Graduate School of Business, Constant Hall, Suite 2080 Norfolk, VA 23529-0222, USA, Tel: +01 (757) 683-5521 and Judge Business School, University of Cambridge, Cambridge, UK. We are especially grateful to Ulrike Malmendier for many insightful suggestions. We also thank D. Yermack, I. Cooper, and R. Taffler for their comments. A previous version of this paper was circulated under the title "Managerial Overconfidence and the Diversification Discount."

Corporate Diversification and Managerial Overconfidence

1. Introduction

A considerable body of academic literature investigates the impact of corporate diversification on firm value. Lang and Stulz (1994) and Berger and Ofek (1995), for instance, provide strong evidence that multi-segment firms trade at a discount compared with a portfolio of single-segment firms. The literature offers two alternative, yet compelling, explanations for the diversification discount: (i) value destruction stemming from the firm's diversified structure, per se, and (ii) methodological problems.[1] As a result, there is an on-going debate in the literature on whether diversification destroys shareholder value.

In this study, we examine whether managerial overconfidence, one of the most prominent cognitive biases of corporate managers, explains the diversification discount and reconciles prior opposing empirical findings on corporate diversification performance. Our research is motivated by several studies that provide evidence that distortions in corporate investment decisions result from overconfident managers who tend to misperceive benefits/costs arising from investment opportunities [see, e.g., Roll (1986), Heaton (2002), Malmendier and Tate (2005a, 2005b), Malmendier and Tate (2008)]. In particular, Malmendier and Tate (2008) find that overconfident CEOs are more acquisitive, on average, and destroy shareholder value mainly through diversification deals. In this spirit, we examine whether the corporate diversification discount is associated with managerial overconfidence bias, as gauged by managers' reluctance to divest firm-specific risk on their personal portfolios. Unlike previous studies that focus mainly on CEO overconfidence, we also consider the overconfidence bias among top managers, since diversification is a multifaceted

[1] For the value destruction impact of corporate diversification, see Lang and Stulz (1994), Berger and Ofek (1995), Servaes (1996), Lins and Servaes (1999), Amihud and Lev (1981), Jensen (1986), Shleifer and Vishny (1989), Rajan et al. (2000), Scharfstein and Stein (2000), and Hoechle et al. (2012). For the methodological problems literature, see Whited (2001), Mansi and Reeb (2002), Campa and Kedia (2002), Graham et al. (2002), Villalonga (2004a), Villalonga (2004b), and Glaser and Müller (2010).

decision that may require the active involvement of other top managers. To our knowledge, this study is the first empirical attempt to test the impact of managerial overconfidence behavior on firm diversification policy and shareholder value.

Our results demonstrate that the discount following the diversification decision occurs predominantly in firms managed by overconfident managers. In particular, using a corporate diversification dataset that is consistent with the literature [e.g., Berger and Ofek (1995), Campa and Kedia (2002)], the main findings of our analysis are as follows: First, we provide evidence that overconfident managers exhibit greater tendency toward corporate diversification, as more than 67% of multi-segment (diversified) firm-year observations are managed by overconfident managers, while only 53% of single-segment (focused) firm-year observations are managed by overconfident managers. Along this line, we also provide complementary evidence that early-career exposure to conglomeration waves is positively related to diversification activity, consistent with the view that personal characteristics, other than overconfidence, are important for better understanding of corporate diversification decisions. Second, studying the cross-sectional variation in the diversification discount, we find that the diversification discount is mainly concentrated in firms managed by overconfident managers. Third, when we compare the discount before and after the decision to diversify, the evidence reveals that the discount increases after diversification takes place, but only for firms run by overconfident managers. Finally, when tracing the time-series dynamics of the diversification discount, we find that the discount in firms managed by overconfident managers is created by the decision to diversify and persists more than four years following the diversification decision. In contrast, we find no such a value-loss pattern in companies managed by non-overconfident managers that pursue diversification strategies. Overall, our results are robust to (i) self-selection for the decision to diversify, (ii) unobserved

heterogeneity, (iii) single-segment firm industry composition, (iv) alternative overconfidence measure specifications, and (v) alternative overconfidence measures.

This study contributes to explanations of the observed diversification discount. In particular, our findings suggest that overconfidence increases the propensity to diversify, as overconfident managers misperceive diversification opportunities to be value-creating when they are not. As a result, managerial overconfidence erodes firm value through corporate diversification. By and large, our analysis closes the existing wedge in the literature on the impact of corporate diversification on firm value. In particular, the result that diversification is a value-enhancing strategy only for firms run by non-overconfident managers, who (rationally) choose to diversify when the benefits outweigh the costs of diversification, is in the spirit of studies that consider corporate diversification to be, at a minimum, a non–value-destroying strategy [e.g., Campa and Kedia (2002), Villalonga (2004a)]. On the contrary, the presence of a prolonged diversification discount for firms managed by overconfident managers, who (irrationally) engage in diversification decisions when the costs outweigh the benefits of diversification, is consistent with studies that consider corporate diversification to be a value-destroying strategy [e.g., Berger and Ofek (1995)].[2]

Our findings also contribute to the literature that links managerial psychological biases to poor corporate decisions [see, e.g., Malmendier and Tate (2005a, 2005b, 2008), Ben-David et al. (2007), Doukas and Petmezas (2007)]. While prior studies focus on overconfidence biases that arise from CEOs, we also consider top management team overconfidence biases because, in practice, corporate decision-making is a complex process that requires the cooperation of CEOs and other top managers. Our findings demonstrate that

[2] By the same token, our results could serve to fill a void in the literature that investigates differences in expected future asset returns between diversified and focused firms. For instance, Lamont and Polk (2001) report statistical and economic differences in the expected returns of diversified and focused firms; but, as they admit, they are unable to determine why this happens. In light of our findings, such expected return differences can be rationalized by the presence of overconfident managers who engage in unnecessary (and of lower quality) diversification activities, which are viewed as a doomed corporate strategy.

overconfidence by either top managers or influential individuals (e.g., the CEO) affects diversification performance.

The paper proceeds as follows. Section 2 lays the background for the study. Section 3 describes variable measurements and introduces the data used in the analysis. Section 4 presents empirical results, and Section 5 presents robustness checks. Finally, Section 6 describes the study's conclusions.

2. Background

2.1 Literature review

The corporate diversification literature has mainly investigated whether firms with diversified business structures relative to standalone firms trade, on average, at a discount. Despite the extensive empirical literature on the valuation consequences of diversification, there is no consensus on whether diversification destroys shareholder value. For example, Lang and Stulz (1994) and Berger and Ofek (1995) find that the market value of companies with multiple business segments is lower, compared with the value of single-segment companies operating in the same industries as the conglomerate's divisions. Similarly, Servaes (1996) and Lins and Servaes (1999) find a comparable pattern across different time periods and countries. Popular explanations for the diversification discount emphasize either agency problems arising from the separation of ownership and control, such as risk reduction [Amihud and Lev (1981)], empire building [Jensen (1986)], managerial entrenchment [Shleifer and Vishny (1989)], and corporate governance [Hoechle et al. (2012)], or agency problems between corporate headquarters and divisional managers [e.g., Stein (1997), Rajan et al. (2000), Scharfstein and Stein (2000)]. While such explanations address the impact of diversification on firm value, it is difficult to answer the more fundamental economic question of why diversified firms exist at all [Gomes and Livdan (2004)].

A different strand of the literature challenges the presence of a diversification discount, and rationalizes the existence of diversified firms. Mansi and Reeb (2002), for example, find no diversification discount after considering the combined impact of diversification on shareholders and bondholders [see also Glaser and Müller (2010)]. Graham et al. (2002) show that the discount may reflect already discounted business units acquired by firms that diversify. Villalonga (2004b), using a unique database from the Business Information Tracking Series, provides evidence of a diversification premium instead. Finally, a considerable part of the literature elaborates on self-selection issues and suggests that the diversification discount may merely reflect the endogenous nature of the decision to diversify. In that respect, Campa and Kedia (2002) and Villalonga (2004a) find that the diversification discount disappears or even turns positive after correcting for the selection bias of the decision to diversify.

Consequently, based on these two strands of scientific evidence, it is difficult to make a compelling case on whether corporate diversification destroys firm value. Most importantly, it is difficult to reconcile the opposing views suggesting either that diversification is a value-destroying strategy or a value-creating strategy. Our evidence, however, reconciles the aforementioned debate in the literature, by showing that the diversification discount concentrates only in firms managed by overconfident managers. This finding also rationalizes the existence of diversified firms.

2.2. Hypotheses development

Overconfident individuals tend to overestimate their own judgment, ability, and knowledge when comparing themselves to their peers, resulting in an underestimation of the likelihood of not achieving their objectives [Langer (1975), Larrick (1993)]. This is especially true when individuals are highly committed and feel the illusion that outcomes are

under their control [Weinstein (1980), March and Shapira (1987), Schaefer et al. (2004), Moore and Cain (2007)]. Moreover, overconfidence tends to be more severe when individuals are involved in difficult objectives—what is coined as the "difficult effect," and when they make forecasts with low predictability [Griffin and Tversky (1992)]. Finally, overconfidence is greatest when the outcome is ambiguous and there is deferred feedback [Einhorn (1980)]. Therefore, overconfident managers, relative to their non-overconfident peers, are expected to be more passionate about challenging and skills-driven activities [Hirshleifer et al. (2010)].

Corporate diversification is an arduous business activity that can enhance managerial reputation; yet, a successful outcome usually depends on superior managerial skills and ability. In addition, coordination of divisions, and sufficient knowledge and expertise in operating widely dispersed organizations represents a major challenge for any management team. In this respect, Milbourn et al. (1999) employ managerial overconfidence to rationalize CEO desire for greater scope, as indicated by the size and the diversity of a corporation. Such a desire is, furthermore, fueled by two main factors relating to diversification that stimulate overconfidence: First, the implementation of a diversification decision, primarily a managerial duty, increases the feeling of illusionary control over the diversifying outcome. Second, the results of corporate diversification strategies may materialize only after a long period, thus making diversification more difficult, less predictable, and highly ambiguous. Consequently, corporate diversification is the kind of business activity one would expect to be associated with managerial overconfidence.

Overconfidence also has implications for the performance of diversifying firms. In particular, overconfident managers may miscalibrate the (subjective) benefits/costs arising from corporate diversification (see Lichtenstein, Fischhoff and Phillips (1982) for a review of

the calibration literature).[3] For instance, overconfident managers may overestimate the precision of exogenous noisy signals [Gervais et al. (2007)]. That is, they believe that they have more precise knowledge about the future outcome of diversification than they actually do have. Furthermore, an overconfident manager would usually assess a higher probability of success in running a more diverse firm than what a rational one (non-overconfident) would assess [see, e.g., Heaton (2002), Malmendier and Tate (2008)]. In that respect, the overconfident manager will then be more likely to engage in value-destroying diversification activities that rational managers would forego. Finally, overconfident managers may underestimate the riskiness of future cash flows [Hackbarth (2008)], mostly focusing on the upside potential of an investment's outcome, and overestimate the reputational benefits of pursuing expansion through diversification, even though they may not be entirely rational in assessing the expected value of these benefits. In light of these considerations, we hypothesize that overconfidence leads to diversifying decisions of ambiguous quality, at the expense of shareholder wealth and long-term performance. Moreover, if overconfident managers carry out more diversifying decisions than their non-overconfident peers, then the average quality of diversifying decisions should be lower, a phenomenon that may rationalize the presence of the diversification discount.

3. Empirical Design and Dataset

3.1. Measuring the value of diversification

We use excess value, as developed by Berger and Ofek (1995), to measure whether diversification increases or decreases firm value. Excess value compares a firm's actual value to its imputed value if each of its business segments operated as single-segment firms. Actual

[3] Potential benefits from diversification arise from economies of scope [Teece (1980, 1982)], coinsurance effect [i.e., Lewellen (1971)], and internal capital markets [i.e., Stein (1997)], or less failures in product, labor, and financial markets [i.e., Khanna and Palepu (2000)]. Potential costs of diversification are mainly associated with internal governance costs [Rajan et al. (2000)].

firm value is the sum of the market value of equity and the book value of debt, whereas the imputed value is the sum of the imputed segment values. The imputed segment value is obtained by multiplying segment sales with a median ratio of market value to sales for single-segment firms in the same industry. Excess value measures the gain or loss from diversification and is defined as the natural logarithm of a firm's actual value to its imputed value:

$$EV = \ln\left(\frac{V}{I(V)}\right), \tag{1}$$

where *EV* is the excess value of the firm, *V* is the market value of the firm (i.e., total capital) computed by multiplying the stock price at fiscal year end with the number of shares outstanding, plus the book value of debt. The imputed value, *I*(*V*), is the sum of the imputed firm-segment values if the segments are operated as standalone firms, calculated as follows:

$$I(V) = \sum_{i=1}^{n} sales_i \times \left(Ind_i \left(\frac{V}{sales}\right)_{mf}\right), \tag{2}$$

where $sales_i$ denotes segment *i*'s value of fiscal year sales, $i = 1,\ldots, n$ denotes the business segments of the firm, while $Ind_i \left(\frac{V}{sales}\right)_{mf}$ is the multiple of total capital to sales for the median single-segment firm in segment *i*'s industry. As in Berger and Ofek (1995), industry definition is based on the narrowest Standard Industrial Code (SIC) grouping that includes at least five firms and sufficient data for computing the ratios.[4]

We choose to focus on a sales multiplier rather than on an asset multiplier, since there is a strong consensus in the literature that asset multipliers are subject to two severe problems [see, e.g., Berger and Ofek (1995), Rajan et al. (2000), Graham et al. (2002)]. First, unlike sales that are almost fully allocated across business segments and are subject to less

[4] The imputed values for 48.44% of all segments are based on the four-digit SIC code, 24.60% on the three-digit SIC code, and 26.96% on the two-digit SIC code. This is consistent with the results reported in Berger and Ofek (1995), where 44.6% matches at the four-digit SIC code, 25.4% at the three-digit SIC, code and 30% at the two-digit SIC code. Similar results are reported by Campa and Kedia (2002) for the period 1978–1996.

managerial discretion, the segments' sum of assets in the Compustat Industrial Segment (CIS) database is usually (significantly) less than the total firm's assets from Compustat Industrial Annual (CIA). This problem arises from unallocated assets across the business segments and is considered a manifestation of greater managerial discretion when allocating assets [see, e.g., Berger and Ofek (1995)]. Since there is no conventional approach to circumvent this problem, any (empirical) attempt to ratify it would either lead to the elimination of a large number of observations or to the re-allocation of the deviation between the sum of the firm's segment assets and total firm assets among the business segments, which is ad hoc and could potentially bias computation of the excess values. Second, focusing on a sales multiplier allows us to avoid potential valuation problems related to purchase versus pooling accounting of acquisitions, which is important when using asset multipliers, and under certain occasions, can induce a negative bias into excess value calculations [see, e.g., Graham et al. (2002), footnote 2].

3.2. Managerial overconfidence measures

Similar to Malmendier and Tate (2005a, 2008), we classify managers as overconfident if they fail to reduce their personal portfolio exposure to firm-specific risk. Managers are exposed to firm-specific risk via the portion of their compensation that is equity-based or via their own firm stock holdings. Moreover, managerial exposure to firm risk is exacerbated by the manager's human capital investment in the firm. Following this strand of the literature, we use *Net Buyer* measure to classify managers as overconfident when they do not reduce their own firm holdings of stocks across time. However, their failure to reduce exposure to firm stock holdings may also indicate managerial ability to time the market, possibly due to inside information, rather than overconfidence. Consequently, in order to assess the persistent overconfidence effect of managers, rather than their rational

timing, we classify managers as overconfident if they are on average *habitual Net Buyers* during their tenure. Following the same line of thought as in Malmendier and Tate (2005a), we consider the subsample of managers who keep their position for at least 6 out of the 17 years of our sample. Then, throughout the entire tenure of the manager, *Net Buyer* takes the value of 1 if during the first six years of our sample, the manager is on average a net buyer in more years than a net seller, and zero otherwise.[5]

We perform this procedure for each of the firm's managers. Then, we calculate a Management Team overconfidence measure and a CEO overconfidence measure. While most studies focus solely on CEO overconfidence, we view Management Team overconfidence as equally important. In particular, many corporate decisions, such as acquisitions of small firms or new product lines, may not necessarily involve the CEO. Therefore, both measures, CEO and Management Team overconfidence, allow us to investigate influential individuals' biases on diversification performance as well.

3.3. Sample selection criteria

Data collection consists of three steps. First, we estimate excess value using a sample of firms included in both the CIS and the CIA databases over the period 1986–2008. The data from this period are used primarily to verify that the diversification discount characteristics of our sample are consistent with the literature [see, e.g., Berger and Ofek (1995), Campa and Kedia (2002)], and to ensure that the results are not driven by differences in sample periods or data methodology treatments. Similar to Berger and Ofek (1995), Campa and Kedia (2002), Graham et al. (2002), and Santalo and Becerra (2008), we exclude firm-years where firms report segments in the financial sector (SIC 6000–6999), firm-years with firm sales less than $20 million, firm-years with a missing value of total capital, and firm-years where the

[5] Managers are net buyers (sellers) if the difference between the number of stocks held at fiscal year-end and the sum of the number of stocks held at the previous fiscal year-end and the new granted stocks is positive (negative).

sum of segment sales is not within 1% of the firm's total sales. Prior studies also eliminate firm-years when the firm does not report four-digit SICs for all of its business segments. Unlike prior studies, we retain firm-years with missing SICs when they are associated with zero sales figures, since they do not affect in any way the computation of firm imputed values.[6,7] This treatment allows us to increase the final sample of firms (firm-year observations) in the analysis by 4% (17%).[8] Finally, we also exclude firm-years with absolute excess value greater than 1.386 and firm-years with missing values in any of the main control variables we use in this analysis, in accordance with the extended model used in Campa and Kedia (2002). The final sample for the period 1986–2008 includes 14,548 firms and 82,405 firm-year observations, of which 10,312 (60,812) are single-segment and 4,236 (21,593) are multi-segment firms (firm-year observations). Of the multi-segment observations, 10,876 are two-segment, 6,470 are three segment, 2,654 are four segment, and the remainder report five or more segments.[9]

In the second step, we estimate the managerial overconfidence measures using a sample of firms included in Standard & Poor's Execucomp, during the period 1992–2008.[10] To calculate the CEO overconfidence measure, we impose several restrictions. First, we exclude firm-years with no information for CEOs. Second, some firm CEOs may change over time. In that case, we exclude firms where the new CEO is classified in the opposite category of overconfidence, compared to the former CEO. With this procedure, we avoid potential

[6] The zero sales figures could arise from managerial discretion in reporting segment sales and subsequent restatement of firm financial results.

[7] Note that the restriction that the sum of segment sales should be within 1% of the firm's total sales justifies the reliability of this treatment.

[8] As we show later in Table 2, the diversification discount, as documented by prior studies, is robust to the inclusion of these additional observations.

[9] For purposes of comparison with previous studies, our overall sample for the period 1986–1991 includes 4,966 firms and 18,100 firm-year observations. For the same time period, Campa and Kedia (2002) report 4,565 firms and 17,875 firm-year observations, while Berger and Ofek (1995) report 3,659 firms and 16,181 firm-year observations. All previous figures refer to sample sizes before eliminating missing values for the control variables.

[10] Execucomp contains information for firms included in the S&P 500, S&P Midcap 400 and the S&P SmallCap 600.

confounding effects that may arise when firm decisions made in the past, by a former CEO, affect future firm excess value under the management of the new CEO.[11] To calculate the Management Team overconfidence measure, we use the sample of firm-years for which we are able to classify CEOs as being overconfident or not. From this sample, we also exclude firm-years with missing information for more than half the members of the management team. The Securities and Exchange Commission (SEC) requires firms to report information for the top five team members: the CEO, the CFO, and the three other most highly compensated executive officers. However, Execucomp may report more or less than five executives for a particular firm and a particular year.[12] Thus, to maintain the comparability of our Managerial Team overconfidence measure across firms with different numbers of top executives, we compute the *mean* Management Team overconfidence measure of each firm. These restrictions leave us with a sample of 1,391 (1,721) firms with 11,624 (17,260) firm-year observations for the Management Team overconfidence (CEO overconfidence) measure.

Finally, to investigate the relation between managerial overconfidence and diversification discount, we use the intersection of the previous datasets over the period 1992–2008. To perform the analysis, similar to Campa and Kedia (2002), we select the sample of all single-segment firms and all diversifying firms. Diversifying firms may diversify once or multiple times. We include both types of firms—in particular, those that diversify once from single-segment to multi-segment, those that diversify once from multi-segment to multi-segment and those that diversify multiple times.[13] When overconfidence is

[11] Such confounding effects may arise from irreversible decisions, that is, (mainly bad) decisions that reduce for a long time the variety of choices available in the future [see Henry (1974), Dixit and Pindyck (1994)].

[12] Execucomp may report more or less than five executives for several reasons. First, smaller firms may report less than five top executives because they simply have less than five top executives. Other firms may report more than five top executives because some executives may be tied on compensation rank. Finally, Execucomp may backfill information on executives who belong in the top-five executive team during a particular year, but who did not necessarily belong in the top-five executive team in the backfilled years.

[13] Comment and Jarrell (1995), John and Ofek (1995), and Berger and Ofek (1996) provide evidence that refocusing firms experience increases in valuation. To avoid such confounding impacts on firm valuation, we exclude all refocusing firms—in particular, those firms that refocus once from multiple-segment to single segment, those that refocus once from multiple-segment to multiple-segment and those that refocus multiple

measured for top management teams, the sample reduces to 403 (2,799) firms (firm-year observations), while when overconfidence is measured for CEOs, the sample reduces to 515 (4,029) firms (firm-year observations).[14]

3.4. Sample selection bias

Our main analysis in subsections 4.3 and 4.4 below is based on a sample for which financial and overconfidence data are available. Such conditional analysis is expected to enhance our understanding of the impact of managerial overconfidence on diversification discount. As discussed above, however, we do not have complete data for all the firms. Therefore, we investigate whether the financial characteristics of firms with complete data differ relative to those with incomplete data. Untabulated analysis (available upon request) reveals that firms with available financial and overconfidence data are systematically different from firms with missing data. On average, firms with financial and overconfidence data are larger, as measured by both total assets and sales, and more profitable, but invest less and rely less on leverage. Therefore, we should be cautious in extrapolating the findings of this study to smaller and less financially strong firms.

4. Empirical Results

We begin our analysis by reporting descriptive statistics. We continue to document the diversification discount in our sample for purposes of comparison with the literature. Then, we investigate the relation between managerial overconfidence and the likelihood of

times. Moreover, we exclude multiple segment firms that do not change their number of segments, because our managerial overconfidence hypothesis provides no prediction.

[14] Such reductions in the data-sample are usual when investigating the intersection of corporate financial data with overconfidence data. For example, Malmendier and Tate (2008) carry out their analysis with the number of firms (firm-year observations) varying between 124 and 322 (853 and 3,540), while some of their main regression models are estimated with less than 800 observations. By the same token, Malmendier and Tate (2005) use a regression dataset that ranges from 728 to 3,742 observations.

managing a diversified firm. Finally, we explore the relation between managerial overconfidence and diversification performance.

4.1. Descriptive statistics

Table 1 reports descriptive statistics for multi-segment (diversified) firm-years and single-segment (focused) firm-years over the period 1992–2008. Similar to Berger and Ofek (1995), we find an average excess value of -8.2% for diversified firm-years but only an average excess value of -0.08% for focused firm-years. This difference is equal to -7.3% and is also statistically significant (p-value < 0.01), providing preliminary evidence in support of a diversification discount. Interestingly, compared to focused firm-years, diversified firm-years are managed by more overconfident managerial teams (p-value < 0.01) and overconfident CEOs (p-value < 0.01), which is consistent with our expectations. Finally, consistent with the results reported in Campa and Kedia (2002), we find that firm-related characteristics differ among diversified and focused firm-year observations. In comparison to the focused firm-years, diversified firm-years have greater market capitalization, larger asset base, higher sales, lower capital expenditures to sales, higher profitability, and rely more heavily on debt.

[Insert Table 1 here]

4.2. Documenting the diversification discount

In this section, similar to other studies [e.g., Campa and Kedia (2002)], we document the existence of the discount in our sample. Specifically, Table 2 reports the diversification discount for different sample periods. Following Berger and Ofek (1995), we estimate pooled ordinary least square regressions of excess value as a function of a dummy variable that

equals 1 in each year the firm is identified as diversified, and zero otherwise, *DIV-FY*, the logarithm of total assets, *Log TA*, profitability, *EBIT/SALES*, and investment expenditures, *CAPX/SALES*.

Regression (1) reports estimates of the discount for the period 1986–1991. The coefficient estimate of the diversification discount, *DIV-FY*, is -12.2% (p-value < 0.01), very close to the discount of -14.4% reported in Berger and Ofek (1995) and the -12.0% reported in Campa and Kedia (2002).[15] Regarding the coefficient estimates of control variables, namely, company size, *Log TA*, profitability, *EBIT/SALES*, and investments, *CAPX/SALES*, are positively related to excess value. Overall, these findings are consistent with the literature.

Next, we test the robustness of the estimated discount by including additional control variables based on the extended model of Campa and Kedia (2002). Regression (2) reports estimates of the discount after controlling for lagged values of firm size, *Log TA lag 1* and *Log TA lag 2*, past firm profitability, *EBIT/SALES lag 1* and *EBIT/SALES lag 2*, and past investment levels, *CAPX/SALES lag 1* and *CAPX/SALES lag 2*. We also include the ratio of long-term debt to total assets, *LEV*. Finally, we control for potential non-linear effects of firm size on the discount by including firm size squared, *ASS2*. The coefficient estimate of the discount, *DIV-FY*, remains significantly negative after inclusion of additional control variables (-10.4%, p-value < 0.01). Concerning the rest of the control variables, the results, compared to the median focused firm, show that there is strong evidence that firms with high current profitability, *EBIT/SALES*, have higher valuations (p-value < 0.01). There is also weaker evidence that firms with high past investments, *CAPX/SALES lag 2*, are valued higher than the median focused firm, though the coefficients are only marginally significant

[15] Note that the number of firm-years in our sample is 17,479, greater than the 15,287 reported in Berger and Ofek (1995), but closer to the 16,229 reported in the same replication by Campa and Kedia (2002). There are three reasons that may explain the difference. First, unlike prior studies, we keep in the analysis firm-years with missing SICs when they are associated with zero sales figures. Second, firms restate their financial results. Consequently, firms that might have been excluded in prior studies due to sample selection criteria, might have been included in our sample. Finally, CIS might add historical information of new firms to the database.

(*p*-value < 0.10). The coefficient of long-term debt to total assets, *LEV*, is positive and statistically significant (*p*-value < 0.01), suggesting that excess values increase with firm leverage levels. Finally, the coefficient of the squared firm size, *ASS2*, is negative (*p*-value < 0.01), consistent with a diminishing effect of firm size on excess value as firm size increases. Overall, the control variable results are consistent with Campa and Kedia (2002).

Regressions (3) and (4) report estimates of the discount during the periods 1992–1997 and 1998–2008, respectively. During these periods, segment data might not be directly comparable. In particular, since January 1998, SFAS 131 superseded the SFAS 14. SFAS 14 has been criticized for inconsistent segment definitions and segment under-reporting [Villalonga (2004a)]. SFAS 131 partially addresses these problems. In this respect, Berger and Hann (2003) provide evidence that, following the implementation of SFAS 131, certain firms report a greater number of segments, a pattern we confirm in our data as well. Further, business segment data after 1997 are presumed more accurate. Therefore, we investigate the robustness of the discount for the sub periods before and after implementation of SFAS 131. Our results show that the discount, *DIV-FY*, is -7.6% (*p*-value < 0.01) for the years 1992–1997 and -8.0% (*p*-value < 0.01) for the years 1998–2008, suggesting that the level of the discount is not sensitive to differing accounting standards.

Finally, regression (5) reports estimates of the discount for the period 1992–2008, that is, the period of our main analysis. During this period, the discount, *DIV-FY*, is found to be -8.1% (*p*-value < 0.01), lower in absolute terms compared to the discount for the period 1986–1991, but still highly significant.[16] Summarizing, the results in Table 2 show that the diversification discount is prevalent in our sample period and is robust to the inclusion of additional control variables.

[16] Similar to our findings, the literature documents substantial variation in the discount across time [e.g. Servaes (1996) and Campa and Kedia (2002)].

[Insert Table 2 here]

4.3. Overconfidence and the likelihood of managing a diversified firm

Univariate analysis in Table 1 shows that a greater number of diversified firm-years are managed by overconfident managers than by non-overconfident managers. This finding implies that the odds of managing a diversified firm should be higher for overconfident than for non-overconfident managers. If this relation survives in a multivariate framework, then managerial overconfidence may be useful in explaining the average diversification discount.

In this section, we address this issue. Specifically, we examine whether overconfident managers exhibit a greater tendency for corporate diversification than their non-overconfident peers. We employ a logistic regression analysis where the dependent variable is a dummy that equals 1 in each year the firm operates in multiple segments, and zero otherwise, *DIV-FY*. As key independent variables, we use Management Team overconfidence, *MTEAM-OV*, or CEO overconfidence, *CEO-OV*. We also control for firm characteristics in line with the extended model of Campa and Kedia (2002).

Table 3 reports odds ratio regression estimates of the relation between diversification and managerial overconfidence, controlling for other effects.[17] All the regressions include year dummies and standard errors adjusted for clustering at the firm level. Regressions (1) and (2) report logit estimates of the likelihood of operating firms with multiple segments. Regression (1) includes the measure of Management Team overconfidence, *MTEAM-OV*, whereas regression (2) takes in the measure of CEO overconfidence, *CEO-OV*. The results show that managerial overconfidence increases the odds of a firm having multiple segments. In particular, given that the other variables of the model are held constant, Management Team overconfidence, *MTEAM-OV*, increases the odds ratio by 1.482, while CEO overconfidence,

[17] A coefficient above (below) 1, means that the likelihood of managing a diversified firm increases (decreases) with the increase in the independent variable. A coefficient that equals 1 implies that there is equal probability of managing a diversified or a focused firm, with a change in the independent variable.

CEO-OV, increases the odds ratio by 1.444. These findings are consistent with the hypothesis that overconfident managers are more likely to manage diversified than focused firms. Concerning the coefficient estimates of the control variables, the results show that diversified firms tend to be large firms (high historical size, *Log TA lag2*) with a decrease in assets in recent past years, *Log TA*. There is also strong evidence that diversified firms exhibit low recent profitability, *EBIT/SALES*, and invest less in the past years, *CAPX/SALES lag1* and *CAPX/SALES lag2*. In contrast, firm leverage, *LEV*, does not seem to relate to corporate diversification.

As an alternative check, we also employ an ordinal regression analysis using as dependent variable the firm's number of business segments, *NUM_SEGM*. Assuming that business segment reporting corresponds to distinct internal business units [see Rajan et al. (2000)], the ordinal regression approach captures better the within diversified firm-scope variation, relative to the logit approach. Regressions (3) and (4) report ordinal estimates of the likelihood of managing a *more* diversified firm. In particular, we estimate the same model specifications as in regressions (1) and (2), but now the dependent variable measures a firm's number of segments, *NUM_SEGM*. Similar to the above-mentioned logit analysis, overconfident managers show a strong preference to manage a more diversified firm. Also, consistent with our previous evidence, the coefficients of the control variables are as expected, although some of them are not statistically significant.

[Insert Table 3 here]

Overall, the results shown in Table 3 largely support the hypothesis that overconfident managers exhibit a desire for greater scope [e.g., Milbourn et al. (1999)]. Overconfident managers, however, overestimate (underestimate) the benefits (costs) of diversification, and

thus, perceive diversification as value-creating when it is not; assuming that non-overconfident managers abstain from such activities, this, in turn, may explain the high propensity of overconfident managers to diversify. In this respect, Malmendier and Tate (2008) also find that overconfident CEOs are more likely to pursue diversified mergers of ambiguous quality. Similarly, Morck et al. (1990) find negative announcement returns in response to diversifying mergers. Such managerial proclivity, though, is expected to harm firm value and, on the aggregate level, may explain the observed diversification discount.

4.4. Other personal characteristics and the likelihood of managing a diversified firm

In this section, we examine whether managers' personal characteristics, other than overconfidence, have explanatory power on corporate diversification decisions. The psychology literature suggests that personal experiences exert a great influence on personal decisions [Nisbett and Ross (1980); Weber et al. (1993); Hertwig et al. (2004)]. For instance, Malmendier et al. (2011) provide evidence that early-life experiences have significant explanatory power for corporate financing decisions. Similarly, Malmendier and Nagel (2011) find that individual experiences of macroeconomic shocks relate to financial risk taking. Finally, Schoar and Zuo (2011) show that early-career experiences of managers affect their management style as CEOs.

Building on this literature, we provide complementary evidence on whether top management teams' and CEOs' early-career experiences in periods characterized by conglomerate waves or conglomerate break-ups, affect their willingness to diversify. We identify two such formative early-career experiences that affect a significant portion of our sample managers and CEOs: experiencing conglomerate waves and breaks-ups at the age of 25–30. Managers and CEOs who have experienced a conglomerate wave are considered to have more faith in diversification. On the other hand, managers and CEOs who have

experienced conglomerate break-ups are likely to resist diversification. To assess the role of early-career experiences, we measure Management Team conglomerate experience, *MTEAM-Conglomerates* (break-up experience, *MTEAM-Break-ups*), on an average level, by counting the number of early-career years of top managers during the age range 25–30 that coincide with a conglomerate (break-up) wave as proxied by the period 1960–1973 (1980–1989).[18] Similarly, we measure CEO conglomerate experience, *CEO-Conglomerates* (break-up experience, *CEO-Break-ups*), by counting the number of early-career years of CEOs during the age range 25–30 that correspond to a conglomerate (break-up) wave as proxied by the period 1960–1973 (1980–1989).

Table 4 reports ordinal regression results in the spirit of Table 3. Regressions (1)–(4) include measures of Management Team overconfidence/early-career experiences, whereas regressions (5)–(8) take in measures of CEO overconfidence/early-career experiences. To separate the effects of Management Team/CEO early-career experiences from the effect of higher/lower age, we also include the average age of managers or the CEO age as a control variable, respectively.

First, we include personal characteristics, independently. Both Management Teams and CEOs with early-career experiences of a conglomerate wave display a higher propensity to manage more diversified firms. Similarly, Management Teams and CEOs with early-career experiences of conglomerate wave break-ups are less likely to manage more diversified firms, albeit in a non–statistically significant manner. Then, we include all personal characteristics and managerial overconfidence to analyze whether overconfidence affects the decision to diversify, independently. Managerial Team/CEO overconfidence, as shown in regressions (4) and (8), still predicts a higher propensity to manage more diversified firms.

[18] See Montgomery (1994), Martin and Sayrak (2003), and Villalonga (2003) for a review of the relevant literature on conglomerates and break-up (i.e., de-conglomeration) waves.

Further, the CEO early-career experience of conglomerate waves, as shown in regression (8), remains positive and significant.

Overall, our analysis provides complementary evidence that managerial characteristics, other than overconfidence, may be important for determining corporate diversification decisions. Overconfidence, however, remains distinct from early-career managerial and CEO characteristics.

[Insert Table 4 here]

4.5. Managerial overconfidence and diversification performance

Thus far, we document that managerial personal characteristics are important for a better understanding of corporate diversification. However, the emphasis of this study is on managerial overconfidence, which predicts miscalibration of benefits/costs arising from corporate diversification. Therefore, in this section we investigate whether managerial overconfidence is linked with the diversification discount by analyzing the time-series patterns of diversified firms and weigh them against those of focused firms. Unlike prior studies that rely on cross-sectional data with firm-year observations, we carry out our analysis using a time-series approach that is less likely to be impaired by endogeneity concerns. For example, firms with lower excess value might diversify more frequently compared to those with higher excess value [Campa and Kedia (2002)]. Therefore, observing that diversified firm-years have lower excess value compared to focused firm-years does not necessarily imply that diversification destroys value. In this respect, time-series analysis alleviates endogeneity concerns that otherwise complicate the cross-sectional analysis. Further, a time-series approach makes it less likely that our findings are biased by any methodological problems that may arise during the estimation of the diversification discount [e.g., Whited

(2001), Campa and Kedia (2002), Villalonga (2004a, 2004b) and Santalo and Becera (2008)], since any methodological problem should affect the discount in the same way both before and after the decision to diversify.

In the analysis that follows, we first compare the cross-sectional discount of diversified firms, either managed by overconfident or non-overconfident managers, relative to focused firms. Then, we exploit the time-series patterns of excess value to gauge whether the discount emerges before or after the year of diversification. We also decompose the diversification discount into a discount driven by overconfident managers and a discount driven by non-overconfident managers. Finally, we trace out the yearly evolution of the discount around the decision to diversify.

4.5.1. Which diversified firms are discounted?

Panel A of Table 5 reports estimates of the relation between excess value, diversification, and Management Team overconfidence. All the regressions include year dummies and standard errors adjusted for clustering at the firm level.[19] Regression (1) includes a dummy variable that equals 1 for diversified firms, both before and after the diversification year, and zero otherwise, *DIV*. The results show that diversifying firms, *DIV*, exhibit a discount of -8.7% (p-value < 0.10). Regression (2) includes the after-diversification dummy, *After DIV*, defined as a dummy variable that takes the value of 1 for all firm-years after the firm becomes diversified (including the year of diversification), and zero otherwise. We also include the before-diversification dummy, *Before DIV*, which takes the value of 1 for all firm-years before the firm becomes diversified, and zero otherwise. For all diversifying

[19] Following Petersen (2009), this estimation procedure controls potential bias in the estimates of standard errors when the residuals of a firm are correlated across time and when the residuals of a firm are correlated across firms.

firms, we define as the diversification year the first incidence of diversification.[20] Regression (2) shows that the discount of diversified firms is only -4.8% (statistically insignificant) before initiating their diversification strategy, while the discount becomes equal to -11.4% (*p*-value < 0.05) after diversification. Consistent with Campa and Kedia (2002), these findings confirm the endogenous nature of corporate diversification. In particular, ignoring the discount before the initiation of diversification, we may falsely hypothesize that diversification destroys value. However, controlling for the endogenous nature of corporate diversification by using the before and after dummies, it is evident that diversification does not destroy value, on average, since as shown in the bottom of this table, the difference in the discount after diversification relative to before diversification is -6.5%, but is not statistically significant.

In regressions (3) and (4), we perform a similar analysis but we decompose the diversification discount into the discount driven by overconfident management teams and the discount driven by non-overconfident management teams. In particular, regression (3) includes the interaction of diversified firms, *DIV*, with Management Team overconfidence, *MTEAM-OV*, which results in a dummy variable that equals 1 if the firm is diversified and its management team is overconfident, and zero otherwise, *DIV * MTEAM-OV*. We also include the interaction of diversified firms, *DIV*, with non-overconfidence Management Team, *MTEAM-NOV*, which results in a dummy variable that equals 1 if the firm is diversified and the management team is non-overconfident, and zero otherwise, *DIV * MTEAM-NOV*. Compared to single-segment firms, diversified firms with overconfident management teams, *DIV * MTEAM-OV*, exhibit a discount of -12.3% (*p*-value < 0.05), whereas their counterparts managed by non-overconfident managers, *DIV * MTEAM-NOV*, exhibit a discount of only -4.5%, which, importantly, is statistically insignificant. In regression (4), we interact the

[20] Note that this estimation does not suffer from the dummy variable trap, since the sample includes focused firms as well.

before (after) diversification dummies with Management Team overconfidence, *Before DIV * MTEAM-OV (After DIV * MTEAM-OV)*, and Management Team non-overconfidence, *Before DIV * MTEAM-NOV (After DIV * MTEAM-NOV)*. The results suggest that before the decision to diversify, neither the diversified firms managed by overconfident teams nor the diversified firms managed by non-overconfident teams are discounted, relative to focused firms. However, after the decision to diversify, firms managed by overconfident managers experience a discount of -18.3% (p-value < 0.01). As shown at the bottom of the table, relative to the discount before diversification, the change in the discount after the decision to diversify is considerable and equal to -15.9% (p-value < 0.05). On the contrary, firms managed by non-overconfident managers exhibit a discount of -1.1% (statistically insignificant) after the decision to diversify, resulting in a change in the discount of 6.0% (statistically insignificant) relative to the discount before diversification.

We also provide a more direct analysis of the impact of managerial overconfidence on diversification performance using the sample of diversifying firms *only* in regression (5) by including the after-diversification dummy, *After DIV*. Consistent with the findings in regression (2), diversified firms experience a decline in their discount by -8.1% (statistically insignificant at conventional levels) compared to the before-diversification discount. In regression (6), we add in the interaction variables between the after-diversification dummy and either Management Team overconfidence, *After DIV * MTEAM-OV*, or Management Team non-overconfidence, *After DIV * MTEAM-NOV*. Consistent with our previous results based on regression (4), the evidence indicates that relative to the before-diversification discount, firms with overconfident teams are discounted by -16.3% (p-value < 0.05), whereas firms with non-overconfident managers trade at a premium of 2.9%, which is statistically insignificantly different from zero.

Panel B of Table 5 reports estimates of the relation between excess value, diversification, and CEO overconfidence. Generally, the results are qualitatively similar to the findings reported in Panel A. Hence, overconfidence by influential individuals, such as the CEO, affects diversification performance.

[Insert Table 5 here]

4.5.2. Evolution of the diversification discount

Averaging excess value across the years before and after diversification may hide valuable information concerning the persistence of the impact of managerial overconfidence on the diversification discount. To investigate this possibility, we trace the year-by-year evolution of the discount before, during, and after the decision to diversify. We introduce a series of indicator variables that denote individual years surrounding the decision to diversify. In this respect, year(0) is the year a firm decides to diversify, year(1) is the year after diversification, year(2) is two years after diversification, and so forth. Symmetrically, year(-1) is the year before the firm's diversification; year(-2) is two years before diversification, and so forth. We then decompose the impact of managerial overconfidence on the evolution of the diversification discount by creating interaction terms. Specifically, we multiply each indicator variable by the managerial overconfidence and managerial non-overconfidence dummy variables.

Panel A of Table 6 provides the coefficient estimates of the evolution of the discount for diversified firms run by overconfident, *MTEAM-OV*, and non-overconfident, *MTEAM-NOV*, managers, controlling for other factors. All regressions include year dummies and standard errors adjusted for clustering at the firm level. Regression (1) traces the dynamics of

the discount relative to focused firms.[21] As shown, diversified firms with overconfident management teams experience greater discount during the year of diversification relative to before-diversification years. It is apparent from the regression results that this discount persists into the future, even beyond four years after the year of diversification. Based on the theory of irreversible investment decisions, temporary shocks, such as a value-destroying diversified decision, can have permanent effects on company valuation due to hysteresis [see Dixit and Pindyck (1994)]. This is consistent with the observed lasting discount of diversified companies managed by overconfident managers relative to focused companies that we document earlier in this study. Moreover, such persistence of the diversification discount for firms managed by overconfident management teams coincides with theoretical predictions, according to which, overconfident management is expected to exhibit a prolonged delay in eliminating unsuccessful diversification investment decisions [Lowe and Ziedonis (2006)].

In contrast to the results we find for firms managed by overconfident management teams, no such pattern is observed for firms managed by non-overconfident management teams. For these firms, we find an overall U-shaped pattern, with a discount three years before diversification that lasts only one year after the diversification decision. Although this finding may support the hypothesis that heavily discounted firms managed by non-overconfident top management teams are more likely to diversify, it is not our intention whatsoever to claim that discounts cause diversification. Other factors such as management quality, liquidity of the market for corporate assets that these firms operate in [e.g., Schlingemann et al. (2000)], or other salient financial constraints [Malmendier and Tate (2005a)], may explain the negative relation between excess value and the discount subsequent to the diversification year. We simply argue that, for these companies, the diversification discount does not persist after the decision to diversify as it does for similar

[21] The coefficient results for this model are presented in two adjacent columns to save space; note that all coefficients are estimated concurrently using a single-regression function.

firms run by overconfident managers. In regression (2) we replicate the analysis using the sample of diversified firms only. All the results are consistent with the above findings.

The evidence thus far indicates that managerial overconfidence appears to be responsible for the diversification discount and its persistence through time, which becomes prevalent with the decision to diversify.

Panel B of Table 6 reports coefficient estimates of the evolution of the discount for diversified firms with overconfident CEOs and diversified firms with non-overconfident CEOs, controlling for other factors. In general, again, all the results are qualitatively similar to those reported in Panel A. Taken together, the results demonstrate that not all diversifying decisions are value-destroying. Diversification performance depends significantly on managerial overconfidence. The diversification discount reflects a value loss due to managerial overconfidence.

[Insert Table 6 here]

Overall, our findings suggest that diversification is, at a minimum, a non–value-destroying strategy only for firms managed by non-overconfident managers who (rationally) choose to diversify via attainable profit-maximizing incentives. On the contrary, the presence of a prolonged diversification discount precludes such an explanation for the case of firms managed by (irrational) overconfident teams, who seem to engage in unnecessary diversification actions of ambiguous quality when the costs outweigh the benefits of diversification.

5. Robustness Checks

To assess the sensitivity of our results, we carry out several robustness checks.

5.1. Self-selection on decision to diversify

Self-selection of the decision to diversify represents a critical issue when investigating the impact of diversification on firm performance. Failure to properly account for the endogeneity of the decision to diversify may bias downward the diversification discount [Campa and Kedia (2002), Villalonga (2004b)]. Endogeneity could arise from observable differences between diversified and focused firms. For example, in Tables 5 and 6, we observe that diversified firms managed by non-overconfident managers are discounted before the decision to diversify. Such concerns, however, complicate the cross-sectional analysis of the discount in particular, but not our time-series analysis. Comparing the discount before and after the decision to diversify, for firms managed by either overconfident or non-overconfident managers, alleviates such endogeneity concerns.

Endogeneity may also arise from unobserved differences between diversified and focused firms. Under the presence of this type of endogeneity, however, we would not expect the time-series patterns of the discount to differ across diversified firms managed by either overconfident or non-overconfident managers, as has been documented thus far. That is, it is very unlikely that endogeneity would affect companies managed by overconfident managers, but not (similarly) those managed by non-overconfident managers, or vice versa. As mentioned above, Table 6 shows that the time-series pattern of the diversification discount concentrate, and exhibit persistence, only for diversified firms managed by overconfident managers. This evidence repudiates the existence of endogeneity concerns. Nevertheless, we further control for this kind of endogeneity by including one and two lags of the excess value measure into our regression models.[22] Note that this procedure also reduces potential omitted-

[22] Campa and Kedia (2002) suggest that organizational structure should be treated as an endogenous outcome that maximizes firm value. In that respect, lagged excess value can be used as an instrument that encapsulates information from unobserved characteristics that relate to profiles and impact firms' values. The use of lagged excess value is further motivated by the findings of Ahn (2009), who reports that excess value has predictive power on the survival of the diversification strategy (i.e., excess value is negatively related to the probability of refocusing operations).

variable bias, such as poor corporate governance.[23] Table 7 reports the results (in the spirit of Table 5). As expected, the inclusion of the lagged excess values absorbs a substantial amount of variation, as indicated by the large increase in R^2. However, consistent with our main findings, the discount still prevails after diversification for companies managed by overconfident managers, but not for companies managed by non-overconfident managers.

[Insert Table 7 here]

5.2. Unobserved heterogeneity

Campa and Kedia (2002) find that unobserved firm characteristics explain part of the cross-sectional variation of the diversification discount. To control for such unobserved heterogeneity, we introduce firm fixed-effects. We also include the interaction variables between the after-diversification dummy and either Management Team overconfidence (CEO overconfidence), *After DIV * MTEAM-OV (After DIV * CEO-OV)*, or Management Team non-overconfidence (CEO non-overconfidence), *After DIV * MTEAM-NOV (After DIV * CEO-NOV)*. Due to the inclusion of firm fixed-effects, these interaction terms measure changes in excess value following the diversification decision. Table 8 reports the results. Generally the results are stronger than those of Table 5, supporting the view that unobserved heterogeneity does not drive our findings.

[23] Recently, Hoechle et al. (2012), viewing corporate governance as a possible explanation for the diversification discount, find that 25-30% of the diversification discount is related to poor corporate governance. Theoretically, however, overconfidence is not expected to relate to poor corporate governance, since overconfident managers believe that their actions maximize firm value [Malmendier and Tate (2005), Malmendier and Tate (2008)]. As a result, poor corporate governance is unlikely to explain our findings. Nevertheless, we use the index constructed by Gompers et al. (2003) as a proxy for corporate governance to investigate the robustness of our results. The index is reported by the Investor Responsibility Research Center (IRRC) and consists of eight publications (1990, 1993, 1995, 1998, 2000, 2002, 2004, and 2006). Following Gompers et al. (2003), we assume that between two consecutive IRRC publications, firms have the same index value as in the previous publication year. Untabulated results, available upon request, in the spirit of Table 5, reveal that poor corporate governance is negatively related to excess value, a finding that is consistent with Hoechle et al., (2012). However, as expected, this relation does not affect our results as reported. Finally, when we include both lagged excess values and corporate governance index simultaneously into our regression analysis, the index becomes statistically insignificant, thus providing support to our argument that lagged excess values mitigate omitted variable concerns.

[Insert Table 8 here]

5.3. Single-segment firm industry composition and diversification performance

The literature documents a relation between focused firm industry composition and diversification performance [see, e.g., Campa and Kedia (2002)]. In particular, excess value measures firm performance compared to the median focused firm in the industry during a particular year. Thus, changes in the industry composition of focused firms could affect the median value of focused firms, and consequently diversification performance. In this respect, Campa and Kedia (2002) find that exiting firms exhibit negative excess values during the final year before exit, while entering firms exhibit positive excess values during their first year. As a result, if overconfident managers diversify either when poorly performing focused firms exit the industry, or when high-performing firms enter the industry, then the observed diversification discount could simply be an artifact of industry composition and not necessarily a change in the firm's intrinsic value.

To assess the sensitivity of our results to such industry composition biases, we re-calculate excess value after excluding the first year observation of entering firms and the final year observation of exiting firms, and we repeat our baseline tests. As shown in Table 9, the new regression results are consistently similar to those reported in Table 5.

[Insert Table 9 here]

5.4. Additional sensitivity tests

We also perform additional sensitivity tests using (i) alternative overconfidence measure specifications, and (ii) an alternative managerial overconfidence measure. Below, we describe each of these tests in detail.

5.4.1. Alternative overconfidence measure specifications

First, we investigate whether our findings are robust to potential simultaneity between managers, defined using the *Net Buyer* measure and diversification performance. In particular, the main analysis uses a joint period to establish managerial overconfidence (e.g., the first six years of managers' tenure) and measures its impact on diversification performance over the same and the subsequent period. We repeat our analysis after excluding the first six years of each managers' tenure. This procedure ameliorates simultaneity concerns, but it does so at the cost of reducing the power of our regressions due to reliance on fewer observations.

Second, the theoretical argument of Gervais and Odean (2001) suggests that overconfidence is shaped by previous successes and failures. Therefore, it is likely that early successes heighten managerial overconfidence in the early-career stage. With more experience, individuals can better recognize their own ability. To investigate whether our findings are sensitive to overconfidence at the earlier stages of managerial careers, we replicate our analysis, requiring managers to retain their position for at least 10 out of the 17 years in our sample, rather than 6 out of the 17 years.[24]

Finally, to compute our CEO overconfidence measure, we require the CEO to be a member of the management team for a minimum period of six years, but not necessarily as a CEO. If, however, the exposure of the individual to idiosyncratic risk differs when acting as a top manager rather than as a CEO, our CEO overconfidence measure may be noisy for this

[24] Malmendier and Tate (2005) require the presence of the CEO in 10 out of 15 years in their sample.

subset of CEOs. To investigate the robustness of our results to this issue, we repeat the analysis by computing the CEO overconfidence measure using only the firm-years while in the office.

In summary, all the above-mentioned tests provide results (untabulated, but available upon request) consistent with the results reported in Table 5, supporting the view that the overconfidence measure specifications do not alter our main findings.

5.4.2. Alternative overconfidence measure

We also investigate the robustness of our findings to an alternative overconfidence measure. Specifically, we estimate a longholder overconfidence measure, following Campbell et al. (2009), Hirshleifer et al. (2010), and Malmendier et al. (2011). This measure mirrors the Holder 67 measure as in Malmendier and Tate (2005, 2008), which classifies managers as overconfident if they hold stock options that are at least 67% in-the-money in any year after the options have vested. To gauge the persistent overconfidence effect, we classify managers as overconfident if they hold stock options that are at least 67% in-the-money two times during their tenure.[25] Managers with out-of-the-money options or no options at all, during all firm-years of their tenure, are excluded from the analysis, since it is not possible to assess whether they are overconfident using the longholder measure.

We repeat our baseline analysis using longholder as a measure of overconfidence. Following Malmendier et al. (2011), we include as additional control variables, CEO stock ownership, vested options, and return controls. The results (untabulated but available upon

[25] To calculate the percentage of in-the-money stock options, we use aggregate data of unexercised vested options to calculate average strike prices and average moneyness. In particular, we compute the average profit of the portfolio of options as the division between the value of exercisable stock options and the number of unexercised exercisable stock options. Then, we compute the average exercise price of the portfolio of options as the difference between the stock price at the fiscal year end and the average profit of the portfolio of options. Finally, the percentage of in-the-money stock option is the difference between the stock price at fiscal year-end and the average exercise price, all divided by the average exercise price. The variable *longholder* equals 1 if the manager holds stock options that are at least 67% in-the-money two times during their tenures, and zero otherwise.

request) with respect to both management teams and CEO overconfidence are qualitatively similar to those reported in Table 5.

6. Conclusions

Most studies of corporate diversification investigate mainly whether conglomerates are on average valued less than industry-matched portfolios of focused firms. While no consensus explanation has emerged from this research, little is known about the impact that cognitive biases of decision makers, top management, and CEOs has in explaining the diversification discount. This paper relates managerial overconfidence to the cross-sectional variance of diversification discount and shows that the negative value impact of diversification is associated with managerial overconfidence.

More specifically, our empirical analysis shows that overconfident managers exhibit greater tendency toward corporate diversification than their non-overconfident peers. Also, we provide complementary evidence that managerial characteristics other than overconfidence, such as early-career experiences with either conglomerate waves or break-ups, may be important for determining corporate diversification decisions. Overconfidence, however, remains distinct from early-career managerial and CEO characteristics.

Further, we find that firms that diversify, on average, exhibit a discount compared to firms that remain focused. However, the diversification discount concentrates only on firms managed by overconfident rather than non-overconfident managers. In addition, when we compare the discount before and after the decision to diversify, we find that the discount is greater following diversification, but only for firms run by overconfident managers. An analogous pattern is documented when using focused firms as a benchmark. By the same token, when tracing the dynamics of the discount, we find that the discount in firms managed by overconfident managers is created by the decision to diversify and persists four years after

the diversification decision. In contrast, we find no such persistent value-loss for firms managed by non-overconfident managers. Our results are robust to several sensitivity tests.

The fact that overconfident managers exhibit a higher propensity to diversify than non-overconfident managers, in conjunction with the evidence that the diversification discount is ingrained in overconfident managerial decisions, suggests that overconfident managers tend to overestimate (underestimate) the benefits (costs) of diversification, as well as their skills in managing large and complex organizations. Hence, they perceive diversification as value-creating when it is not. Moreover, the persistence of the diversification discount several years after the decision to diversify, exclusively in firms managed by overconfident managers, provides supplemental support for the view that overconfidence bias leads to poor diversification policies that destroy shareholder value in the long-run. Collectively, our empirical results can be seen as an explanation for the two opposing strands of the diversification literature. Our evidence demonstrates that diversification is value-destroying, as documented in Berger and Ofek (1995) among others, only for firms managed by overconfident managers, and non–value-destroying in the spirit of Campa and Kedia (2002) for firms run by non-overconfident managers.

References

Ahn, S., 2009. The dynamics of diversification discount. *Asia-Pacific Journal of Financial Studies* 38, 277-310.

Amihud, Y., and B., Lev, 1981. Risk reduction as a managerial motive for conglomerate mergers. *Bell Journal of Economics* 12, 605-617.

Ben-David, I., Graham, J., and C., Harvey, 2007. Managerial overconfidence and corporate policies. *NBER working paper*.

Berger, P., and R., Hann, 2003. The impact of SFAS No 131 on information and monitoring. *Journal of Accounting Research* 41, 163-223.

Berger, P., and E., Ofek, 1995. Diversification's effect on firm value. *Journal of Financial Economics* 37, 39-65.

Berger, P., and E., Ofek, 1996. Bustup takeovers of value destroying diversified firms. *Journal of Finance* 51, 1175-1200.

Campa, J.M., and S., Kedia, 2002. Explaining the diversification discount. *Journal of Finance* 57, 1731-1762.

Campbell, T.C., Johnson, S.A., Rutherhford, J., and B., Stanley, 2011. CEO overconfidence and forced turnover. *Journal of Financial Economics* 101, 695-712.

Comment, R., and G., Jarrell, 1995. Corporate focus and stock returns. *Journal of Financial Economics* 37, 67-87.

Dixit, A., and R., Pindyck, 1994. Investment under uncertainty (*Princeston University Press*, Princeston, NJ).

Doukas, J., and D., Petmezas, 2007. Acquisitions, overconfident managers and self-attribution bias. *European Financial Management* 13, 531-577.

Einhorn, H., 1980. Overconfidence in judgment. *New Directions for Methodology of Social and Behavioral Science* 4, 1-16.

Gervais, S., and T., Odean, 2001. Learning to be overconfident. *Review of Financial Studies* 14, 1-27.

Glaser, M., and S., Müller, 2010. Is the diversification discount caused by the book value bias of debt? *Journal of Banking and Finance* 34, 2307 – 2317.

Gomes, J., and D., Livdan, 2004. Optimal diversification: Reconciling theory and evidence. *Journal of Finance* 59, 507-535.

Gompers, P., A., Ishii, J., L., and A., Metrick, 2003. Corporate governance and equity prices. *Quarterly Journal of Economics*, 118, 107-155.

Graham, J., Lemmon, M., and J., Wolf, 2002. Does corporate diversification destroy value?. *Journal of Finance* 57, 695-720.

Griffin, D., and A., Tversky, 1992. The weighting of evidence and the determinants of confidence. *Cognitive Psychology* 24, 411-435.

Hackbarth, D., 2008. Managerial traits and capital structure decisions. *Journal of Financial and Quantitative Analysis* 43, 843-881.

Heaton, J.B., 2002. Managerial optimism and corporate finance. *Financial Management* 31, 33-45.

Henry, C., 1974. Investment decisions under uncertainty: The irreversible effect. *American Economic Review* 64, 1006-1012.

Hirshleifer, D., Low, A., and S., Teoh, 2010. Are overconfident CEOs better innovators?. *Working paper*.

Hertwig, R., Barron, G., Weber., E., and I., Erev. 2004. Decisions from experience and the effect of rare events in risky choice. *Psychological Science* 15, 534-539.

Hoechle, D., Schmid, M., Walter, I., and D., Yermack, 2012. How much of the diversification discount can be explained by poor corporate governance?, *Journal of Financial Economics* 103, 41-60.

Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review* 76, 323-329.

John, K., and E., Ofek, 1995. Asset sales and increase in focus. *Journal of Financial Economics* 37, 105-126.

Khanna, T., and K., Palepu, 2000. Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups. *Journal of Finance* 55, 867-891.

Lamont, O., and C., Polk, 2001. The diversification discount: cash flows vs returns. *Journal of Finance* 56, 1693-1701.

Lang, L., and R., Stulz, 1994. Tobin's q, corporate diversification and firm performance. *Journal of Political Economy* 102, 1248-1280.

Langer, E.J., 1975. The illusion of control. *Journal of Personality and Social Psychology* 32, 311-328.

Larrick, R.P., 1993. Motivation factors in decision theories: the role of self-protection. *Psychological Bulletin* 113, 440-450.

Lewellen, W.G., 1971. A pure financial rationale for the conglomerate merger. *Journal of Finance* 26, 527-537.

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

Lichtenstein, S., Fischhoff, B., and L.D., Philips, 1982. Calibration of probabilities: the state of the art to 1980. In Kahneman, D., Slovic, P., and A., Tversky (eds), Judgement under uncertainty: Heuristics and biases. *Cambridge Press*. Cambridge. MA. 1982, 306-334.

Lins, K., and H., Servaes, 1999. International evidence on the value of corporate diversification. *Journal of Finance* 54, 2215-2239.

Malmendier, U., and G., Tate, 2005a. CEO overconfidence and corporate investment. *Journal of Finance* 60, 2661-2700.

Malmendier, U., and G., Tate, 2005b. Does Overconfidence Affect Corporate Investment? CEO Overconfidence Measures Revisited. *European Financial Management*, 11(5), 649-659.

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., Tate, G., and J. Yan, 2011. Overconfidence and early life experiences: The impact of managerial traits on corporate financial policies. *Journal of Finance* 66, 1687-1733.

Mansi, S.,A., and D., M., Reeb, 2002. Corporate diversification: What gets discounted?. *Journal of Finance* 57, 2167-2183.

March, G., and Z., Shapira, 1987. Managerial perspectives on risk and risk taking. *Management Science* 33, 1404-1418.

Martin, J.,C., and A., Sayrak, 2003. Corporate diversification and shareholder value. *Journal of Corporate Finance* 9, 37-57.

Milbourn, T.T., Boot, W.A., and A., Thakor, 1999. Megamergers and expanded scope: Theories of bank size and activity diversity. *Journal of Banking and Finance* 23, 195-214.

Montgomery, C., 1994. Corporate diversification. *Journal of Economic Perspectives* 8, 163-178.

Moore, D., and D., Cain, 2007. Overconfidence and underconfidence: When and why people underestimate (and overestimate) the competition. *Organizational Behavior and Human Decision Processes* 103, 197-213.

Morck, R., Shleifer, A., Vishny, R., 1990. Do managerial objectives drive bad acquisitions? *Journal of Finance* 45, 31-48.

Nisbett., R., and L., Ross, 1980. Human inference: Strategies and shortcomings of social judgement. *Prentice-Hall* (Englewood Cliffs, N.J.).

Petersen, M., 2009. Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies* 22, 435-480.

Rajan, R., H., Servaes, and L., Zingales, 2000. The cost of diversity: The diversification discount and inefficient investment. *Journal of Finance* 55, 35-80.

Roll, R., 1986. The hubris hypothesis of corporate takeovers. *Journal of Business* 59, 197-216.

Santalo, J., and M., Becerra, 2008. Competition from specialized firms and the diversification-performance linkage. *Journal of Finance* 63, 851-883.

Schaefer, P., Williams, C., Goodie, A., and K., Campbell, 2004. Overconfidence and the big five. *Journal of Research in Personality* 38, 473-480.

Scharfstein, D., and J., Stein, 2000. The dark side of internal capital markets: Divisional rent seeking and inefficient investment. *Journal of Finance* 55, 2537-2567.

Schlingemann, F.P., Stulz, R.M., and R.A., Walkling, 2000. Asset liquidity and segment diventures. *NBER Working Paper*.

Schoar, A., and L., Zuo, 2011. Shaped by booms and busts: How the economy impacts CEO careers and management style. *SSRN*.

Servaes, H., 1996. The value of diversification during the conglomerate merger wave. *Journal of Finance* 51, 1201-1225.

Shleifer, A., and R.W., Vishny, 1989. Managerial entrenchment, the case of manager-specific investments. *Journal of Financial Economics* 25, 123-139.

Stein, J., 1997. Internal capital markets and the competition of corporate resources. *Journal of Finance* 52, 111-133.

Stein, J., 2003. Agency, information and corporate investment. In G.M. Constantinides, M. Harris and R.M. Stulz, eds.: *Handbook of Economics of Finance* 1A (Corporate Finance). Elsevier NH. Amsterdam: 111-165.

Teece, D., 1980. Economies of scope and the scope of the enterprise. *Journal of Economic Behavior and Organization* 1, 223-247.

Teece, D., 1982. Toward an economic theory of the multiproduct firm. *Journal of Economic Behavior and Organization* 3, 39-63.

Villalonga, B., 2003. Research roundtable discussion: The diversification discount. *SSRN*.

Villalonga, B., 2004a. Does diversification cause the 'diversification discount'?. *Financial Management* 33, 5-27.

Villalonga, B., 2004b. Diversification discount or premium? New evidence from BITS establishment-level data. *Journal of Finance* 59, 479-505.

Weber, E.,U., Bockenholt, U., Hilton, D., and B., Wallace, 1993. Determinants of diagnostic hypothesis generation: Effects of information, base rates and experience. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 19, 1151-1164.

Weinstein, N., 1980. Unrealistic optimism about future life events. *Journal of Personality and Social Psychology* 39, 806-820.

Whited, T., 2001. Is it inefficient investment that causes the diversification discount?. *Journal of Finance* 56, 1667-1691.

Table 1

Descriptive Statistics: Diversified (Multi-segment) vs Focused (Single-segment) Firm-years

This table presents descriptive statistics of financial and overconfidence variables for the subsamples of diversified and focused firm-years. The sample consists of firms included in both Compustat Industrial Segment and Compustat Industrial Annual databases during the period 1992-2008 that meet sample selection criteria described in the text. Excess value is the log of the ratio of the total market value to imputed value using median industry multiplier. Management Team-overconfidence (MTEAM-OV) is a dummy variable that equals 1 if on average top managers are overconfident, and zero otherwise. CEO-overconfidence (CEO-OV) is a dummy variable that equals 1 if the CEO is overconfident, and zero otherwise. Both managers and CEOs are classified as overconfident using the Net Buyer measure. Net Buyer takes the value of 1 if during the first six years in our sample, a manager (or the CEO) is on average net buyer in more years than net seller, and zero otherwise. Total assets and sales are measured in millions of dollars. CAPX/SALES is the ratio of capital expenditures to total sales. EBIT/SALES is the ratio of earnings before interest and taxes to total sales. LEV is the leverage ratio defined as the ratio of total debt to total assets. The equality of means (medians) is tested using a t-test (Wilcoxon signed rank statistic).

		Diversified (firm-year) observations	Focused (firm-year) observations	Difference (Diversified - Focused)
Excess Value	Mean Median N	-0.082 -0.090 17,226	-0.008 0.000 49,007	-0.073*** -0.090***
MTEAM-OV	Mean Median N	0.679 1.000 2,500	0.534 1.000 3,534	0.145*** 0.000***
CEO-OV	Mean Median N	0.661 1.000 3,746	0.524 1.000 5,265	0.137*** 0.000***
Market Capitalization (Millions)	Mean Median N	3,849.290 509.049 17,226	2,437.680 257.456 49,007	1,411.610*** 251.593***
Asset total (Millions)	Mean Median N	2,906.250 430.337 17,226	1,878.020 194.049 49,007	1,028.230*** 236.288***
Sales (Millions)	Mean Median N	2,496.500 424.060 17,226	1,581.080 185.703 49,007	915.4*** 238.357***
CAPX/SALES	Mean Median N	0.075 0.038 17,086	0.127 0.043 48,390	-0.051*** -0.005***
EBIT/SALES	Mean Median N	0.051 0.071 17,060	0.045 0.070 48,791	0.006** 0.001*
LEV	Mean Median N	0.264 0.243 17,226	0.252 0.211 49,007	0.013*** 0.032***

Table 2

The Diversification Discount for Different Sample Periods

This table report coefficient estimates of Berger and Ofek (1995) regressions (BO). The dependent variable is the log of the ratio of total market value to imputed value using median industry multiplier (Excess Value). DIV-FY is a dummy variable that takes the value of 1 for the firm-years that the firm operates in multi-segments and zero otherwise. Log TA is the natural logarithm of total assets, CAPX/SALES is the ratio of capital expenditures to total sales, EBIT/SALES is the ratio of earnings before interest and taxes to total sales, LEV is the ratio of total debt to total assets and ASS2 is the square of the log of total assets. Log TA lag 1 (lag2), CAPX/SALES lag 1 (lag 2) and EBIT/SALES lag 1 (lag 2) are one (two) lag values of Log TA lag, CAPX/SALES and EBIT/SALES, respectively. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicates 10%, 5%, and 1% level of significance, respectively.

	BO 1986-1991 (1)	Extended BO 1986-1991 (2)	Extended BO 1992-1997 (3)	Extended BO 1998-2008 (4)	Extended BO 1992-2008 (5)
Const.	-0.312*** (-24.92)	-0.677*** (-19.42)	-0.727*** (-22.80)	-0.969*** (-37.31)	-0.878*** (-44.04)
DIV-FY	-0.124*** (-13.72)	-0.104*** (-11.75)	-0.076*** (-8.52)	-0.080*** (-12.61)	-0.081*** (-15.76)
Log TA	0.046*** (19.26)	0.513*** (26.83)	0.558*** (35.01)	0.546*** (46.08)	0.556*** (58.72)
CAPX/SALES	0.362*** (16.23)	0.249*** (9.80)	0.150*** (9.63)	0.124*** (10.98)	0.138*** (15.05)
EBIT/SALES	0.682*** (24.59)	0.461*** (14.17)	0.452*** (17.44)	-0.040*** (-3.91)	0.018** (2.00)
Log TA lag1		-0.165*** (-7.04)	-0.192*** (-10.47)	-0.176*** (-13.94)	-0.184*** (-17.69)
CAPX/SALES lag1		0.000 (0.04)	0.000 (0.09)	0.002* (1.78)	0.001* (1.70)
EBIT/SALES lag1		0.086*** (4.11)	-0.000 (-0.39)	0.000 (0.76)	0.000 (0.68)
Log TA lag2		-0.186*** (-13.53)	-0.215*** (-20.21)	-0.129*** (-17.32)	-0.159*** (-26.25)
CAPX/SALES lag2		0.013* (1.65)	0.000** (2.14)	0.000* (1.87)	0.000** (2.53)
EBIT/SALES lag2		0.000 (0.09)	-0.000 (-0.35)	-0.000 (-0.34)	-0.000 (-0.20)
LEV		0.056*** (5.77)	0.001 (0.08)	-0.002 (-0.19)	-0.005 (-0.67)
ASS2		-0.009*** (-9.13)	-0.007*** (-8.16)	-0.013*** (-20.80)	-0.011*** (-22.22)
No of observations	17,479	16,201	21,994	39,134	61,128
Adjusted R^2	0.091	0.151	0.171	0.116	0.127

Table 3

Regressions of Managerial Overconfidence on Diversification

This table presents odds ratio estimates of the relation between diversification and managerial overconfidence. The sample consists of firms included in both Compustat Industrial Segment and Compustat Industrial Annual databases during the period 1992-2008 that meet sample selection criteria as described in the text. Regressions (1) and (2) report logit estimates while regressions (3) and (4) report ordinal estimates. The dependent variable in regressions (1) and (2) is a dummy variable that takes the value of 1 for the firm-years that the firm operates in multi-segments and zero otherwise (DIV-FY), whereas in regression (3) and (4) the dependent variable is the number of segments (NUM_SEGM) in each year. See Tables 1 and 2 for the definition of the independent variables. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicate 10%, 5%, and 1% level of significance, respectively.

	Dependent variable			
	Diversification (firm-year) Dummy (DIV-FY)		Number of Segments (NUM_SEGM)	
	Logit Models		Ordinal Models	
	(1)	(2)	(3)	(4)
Const. 1	Yes	Yes		
Const. 1 – Const.5			Yes	Yes
MTEAM-OV	1.482* (1.72)		1.625** (2.16)	
CEO-OV		1.444* (1.79)		1.529** (2.10)
Log TA	1.197 (0.22)	1.300 (0.41)	1.261 (0.28)	1.325 (0.43)
CAPX/SALES	0.431 (-0.93)	0.561 (-0.74)	0.298 (-1.17)	0.409 (-1.05)
EBIT/SALES	0.454** (-2.01)	0.610* (-1.86)	0.443** (-2.26)	0.593** (-2.04)
Log TA lag1	0.871 (-0.62)	0.685** (-2.28)	0.803 (-0.98)	0.669** (-2.42)
CAPX/SALES lag1	0.333** (-2.48)	0.225*** (-2.84)	0.396** (-2.05)	0.256*** (-2.75)
EBIT/SALES lag1	1.231 (0.77)	1.069 (0.33)	1.285 (0.94)	1.108 (0.55)
Log TA lag2	1.900** (2.28)	1.816*** (3.01)	1.927** (2.33)	1.831*** (3.13)
CAPX/SALES lag2	0.148*** (-2.70)	0.126*** (-3.29)	0.181*** (-3.09)	0.148*** (-3.80)
EBIT/SALES lag2	1.114 (0.61)	1.253 (1.03)	1.142 (0.68)	1.272 (1.07)
LEV	0.765 (-0.44)	1.054 (0.11)	0.752 (-0.45)	1.092 (0.18)
ASS2	0.970 (-0.56)	0.983 (-0.41)	0.973 (-0.50)	0.985 (-0.35)
Year fixed effects	Yes	Yes	Yes	Yes
No of firms	403	515	403	515
No of observations	2799	4029	2799	4029
-2 Log L	-1,422.88	-2,081.62	-2,293.27	-3,389.15

Table 4

Regressions of Personal Characteristics on Diversification

This table presents odds ratio from ordinal estimates of the relation between diversification and personal characteristics. The sample consists of firms included in both Compustat Industrial Segment and Compustat Industrial Annual databases during the period 1992-2008 that meet sample selection criteria as described in the text. The dependent variable is the number of segments (NUM_SEGM) in each year. Management Team-overconfidence (MTEAM-OV) is a dummy variable that equals 1 if on average top managers are overconfident, and zero otherwise. CEO-overconfidence (CEO-OV) is a dummy variable that equals 1 if the CEO is overconfident, and zero otherwise. Management Team-Break Ups (MTEAM-Break-Ups) is a variable that counts the average number of early-career years of managers, as proxied by the ages 25-30, which coincides with a period of break-ups, as proxied by the period 1980-1989. Management CEO-Break-Ups (CEO-Break-Ups) is a variable that counts the number of early-life years of CEOs, as proxied by the ages 25-30, which coincides with a period of firm break ups, as proxied by the period 1980-1989. Management Team-Conglomerates (MTEAM-Conglomerates) is a variable that counts the average number of early-career years of top managers, as proxied by the ages 25-30, which coincides with a period of conglomerates, as proxied by the period 1960-1973. Management CEO-Conglomerates (CEO-Conglomerates) is a variable that counts the number of early-career years of CEOs, as proxied by the ages 25-30, which coincides with a period of conglomerates, as proxied by the period 1960-1973. See Tables 1 and 2 for the definition of the independent variables. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicate 10%, 5%, and 1% level of significance, respectively.

	Dependent variable							
	Number of Segments (NUM_SEGM)							
	Ordinal Models							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Const. 1 – 5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MTEAM-OV	1.706* (1.87)			1.701* (1.83)				
CEO-OV					1.538** (2.13)			1.543** (2.16)
MTEAM-Break-Ups		0.935 (-0.49)		1.026 (0.17)				
CEO-Break-Ups						0.985 (-0.25)		1.061 (0.90)
MTEAM-Conglomerates			1.166 (1.58)	1.179 (1.43)				
CEO-Conglomerates							1.104** (2.33)	1.121** (2.49)
MTEAM-Age	Yes	Yes	Yes	Yes				
CEO-Age					Yes	Yes	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No of firms	302	302	302	302	515	515	515	515
No of observations	1738	1738	1738	1738	3933	3933	3933	3933
-2 Log L	-1246.38	-1254.33	-1250.07	-1241.61	-3248.60	-3263.62	-3247.56	-3230.66

Table 5
Regressions of Excess Value on Overconfidence

Panel A: Management Team-overconfidence

This table displays ordinary least square coefficient estimates with standard errors adjusted for clustering at the firm level of extended Berger and Ofek (1995) regressions as in Campa and Kedia (2002). The dependent variable is the log of the ratio of total market value to imputed value using median industry multiplier (Excess Value). DIV is a dummy variable that takes the value of 1 for diversifying firm, both before and after the diversification, and zero otherwise. The Before DIV dummy variable equals 1 before a firm diversify and zero otherwise. The After DIV dummy variable equals 1 after a firm diversify and zero otherwise. Diversified firms are those that diversified at least once and never refocused during the sample period. Management Team-overconfidence (MTEAM-OV) is a dummy variable that equals 1 if on average top management is overconfident, and zero otherwise. Management Team non-overconfidence (MTEAM-NOV) is a dummy variable that equals 1 if on average top management is non-overconfident, and zero otherwise. Overconfident managers are classified using the Net Buyer measure. Net Buyer takes the value of 1 if during the first six years in our sample, a manager is on average net buyer in more years than net seller, and zero otherwise. See table 2 for the definition of the remaining independent variables. The test reported at the bottom, tests the null hypothesis that the After DIV dummy equals the Before DIV dummy, the (After DIV * MTEAM-OV) equals the (Before DIV * MTEAM-OV) dummy, and the (After DIV * MTEAM-NOV) dummy equals the (Before DIV * MTEAM-NOV) dummy, respectively. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicates 10%, 5%, and 1% level of significance, respectively.

	Excess Value					
	Single and Multi-segment Firms				Multi-segment Firms only	
	(1)	(2)	(3)	(4)	(5)	(6)
Const.	-0.128 (-0.23)	-0.117 (-0.21)	-0.140 (-0.25)	-0.111 (-0.20)	0.021 (0.02)	0.013 (0.01)
DIV	-0.087* (-1.82)					
DIV * MTEAM-OV			-0.123** (-2.30)			
DIV* MTEAM-NOV			-0.045 (-0.70)			
Before DIV		-0.048 (-0.82)				
Before DIV * MTEAM-OV				-0.023 (-0.32)		
Before DIV * MTEAM-NOV				-0.071 (-0.94)		
After DIV		-0.114** (-2.09)			-0.081 (-1.18)	
After DIV * MTEAM-OV				-0.183*** (-3.25)		-0.163** (-2.26)
After DIV * MTEAM-NOV				-0.011 (-0.13)		0.029 (0.33)
Log TA	0.593*** (3.32)	0.587*** (3.28)	0.588*** (3.30)	0.580*** (3.25)	0.512* (1.91)	0.488* (1.85)
CAPX/SALES	-0.084 (-0.85)	-0.081 (-0.83)	-0.087 (-0.88)	-0.084 (-0.85)	-0.056 (-0.22)	-0.050 (-0.20)
EBIT/SALES	0.302* (1.65)	0.303* (1.65)	0.306* (1.66)	0.305* (1.66)	1.337*** (3.08)	1.369*** (3.30)
Log TA lag1	-0.241*** (-4.10)	-0.240*** (4.08)	-0.241*** (-4.10)	-0.240*** (-4.08)	-0.249*** (-2.67)	-0.247*** (-2.66)
CAPX/SALES lag1	0.069 (1.05)	0.066 (1.01)	0.065 (1.01)	0.062 (0.96)	0.175 (0.76)	0.127 (0.55)
EBIT/SALES lag1	-0.017 (-0.10)	-0.018 (-0.10)	-0.015 (-0.08)	-0.013 (-0.07)	0.299 (0.93)	0.352 (1.08)
Log TA lag2	-0.219*** (-4.13)	-0.215*** (-4.06)	-0.213*** (-4.02)	-0.217*** (-4.13)	-0.143* (-1.79)	-0.140* (-1.76)
CAPX/SALES lag2	0.026 (0.31)	0.023 (0.28)	0.026 (0.31)	0.023 (0.28)	0.390 (0.99)	0.404 (1.01)
EBIT/SALES lag2	-0.018 (-0.64)	-0.018 (-0.65)	-0.018 (-0.67)	-0.018 (-0.67)	0.089 (0.22)	0.107 (0.27)
LEV	-0.300** (-2.52)	-0.299** (-2.51)	-0.295** (-2.48)	-0.286** (-2.42)	-0.260 (-1.30)	-0.215 (-1.10)
ASS2	-0.009 (-0.87)	-0.009 (-0.85)	-0.009 (-0.86)	-0.008 (-0.77)	-0.011 (-0.66)	-0.009 (-0.56)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Test: After DIV - Before DIV=0		-0.065 (-1.08)				
Test: (After DIV * MTEAM-				-0.159** (-2.31)		

OV) – (Before DIV * MTEAM-OV)=0						
Test: (After DIV * MTEAM-NOV) – (Before DIV * MTEAM-NOV)=0				0.060 (0.63)		
No of firms	403	403	403	403	179	179
No of observations	2,799	2,799	2,799	2,799	1,192	1,192
R^2	0.090	0.091	0.092	0.097	0.159	0.174

Table 5 (Continued)

Panel B: CEO-overconfidence

This table displays ordinary least square coefficient estimates with standard errors adjusted for clustering at the firm level of extended Berger and Ofek (1995) regressions as in Campa and Kedia (2002). The dependent variable is the log of the ratio of total market value to imputed value using median industry multiplier (Excess Value). DIV is a dummy variable that takes the value of 1 for diversifying firm, both before and after the diversification, and zero otherwise. The Before DIV dummy variable equals 1 before a firm diversify and zero otherwise. The After DIV dummy variable equals 1 after a firm diversify and zero otherwise. Diversified firms are those that diversified at least once and never refocused during the sample period. CEO-overconfidence (CEO-OV) is a dummy variable that equals one if CEOs are overconfident, and zero otherwise. CEO non-overconfidence (CEO NOV) is a dummy variable that equals 1 if CEOs are non-overconfident, and zero otherwise. Overconfident CEOs are classified using the Net Buyer measure. Net Buyer takes the value of 1 if during the first six years in our sample, a manager is on average net buyer in more years than net seller, and zero otherwise. See table 2 for the definition of the remaining independent variables. The test reported at the bottom, tests the null hypothesis that the After DIV dummy equals the Before DIV dummy, the (After DIV * CEO-OV) equals the (Before DIV * CEO-OV) dummy, and the (After DIV * CEO-NOV) dummy equals the (Before DIV * CEO-NOV) dummy, respectively. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicates 10%, 5%, and 1% level of significance, respectively.

	Excess Value					
	Single and Multi-segment Firms				Multi-segment Firms Only	
	(1)	(2)	(3)	(4)	(5)	(6)
Const.	-0.099 (-0.25)	-0.094 (-0.23)	-0.104 (-0.26)	-0.091 (-0.23)	0.221 (0.44)	0.243 (0.48)
DIV	-0.105*** (-2.60)					
DIV and CEO-OV			-0.140*** (-2.94)			
DF and CEO NOV			-0.068 (-1.28)			
Before DIV		-0.055 (-1.12)				
Before DIV * CEO-OV				-0.061 (-0.98)		
Before DIV * CEO-NOV				-0.051 (-0.80)		
After DIV		-0.137*** (-3.04)			-0.069 (-1.35)	
After DIV * CEO-OV				-0.183*** (3.57)		-0.110* (-1.90)
After DIV * CEO-NOV				-0.078 (-1.16)		-0.021 (-0.31)
Log TA	0.565*** (4.49)	0.562*** (4.44)	0.559*** (4.45)	0.556*** (4.39)	0.455*** (2.91)	0.3440*** (2.82)
CAPX/SALES	-0.012 (-0.14)	-0.008 (-0.10)	-0.016 (-0.20)	-0.014 (-0.17)	0.252 (1.04)	0.233 (0.96)
EBIT/SALES	0.173 (1.15)	0.173 (1.14)	0.173 (1.14)	0.173 (1.15)	1.349*** (4.74)	1.351*** (4.83)
Log TA lag1	-0.237*** (-4.91)	-0.237*** (-4.92)	-0.238*** (-4.93)	-0.238*** (-4.94)	-0.358*** (-5.07)	-0.360*** (-5.13)
CAPX/SALES lag1	0.061 (1.19)	0.058 (1.14)	0.059 (1.15)	0.057 (1.11)	0.128 (0.60)	0.118 (0.56)
EBIT/SALES lag1	-0.001 (-0.24)	-0.002 (-0.33)	-0.001 (-0.28)	-0.002 (-0.35)	0.092 (0.41)	0.103 (0.46)
Log TA lag2	-0.223*** (-5.50)	-0.219*** (-5.43)	-0.216*** (-5.31)	-0.215*** (-5.37)	-0.071 (-1.12)	-0.062 (-1.00)
CAPX/SALES lag2	-0.017 (-0.25)	-0.022 (-0.33)	-0.018 (-0.26)	-0.022 (-0.33)	0.100 (0.32)	0.102 (0.32)
EBIT/SALES lag2	0.001 (0.12)	0.001 (0.07)	0.001 (0.10)	0.000 (0.06)	0.248 (0.94)	0.238 (0.92)
LEV	-0.330*** (-3.26)	-0.326*** (-3.24)	-0.320*** (-3.15)	-0.316*** (-3.12)	-0.323** (-2.04)	-0.293* (-1.83)
ASS2	-0.006 (-0.83)	-0.006 (-0.80)	-0.006 (-0.81)	-0.005 (-0.76)	-0.004 (-0.44)	-0.003 (-0.35)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Test: After DIV - Before DIV=0		-0.082* (-1.65)				
Test: (After DIV * CEO-OV) – (Before DIV * CEO-OV)=0				-0.122** (-2.01)		

Test: (After DIV * CEO-NOV) – (Before DIV and CEO-NOV)=0				-0.027 (-0.35)		
No of firms	515	515	515	515	229	229
No of observations	4,029	4,029	4,029	4,029	1,708	1,708
R^2	0.098	0.100	0.101	0.102	0.178	0.181

Table 6

The Evolution of Excess Value and Overconfidence

Panel A: Management Team-Overconfidence

This table displays ordinary least square coefficients (estimated concurrently using a single-regression function, yet reported in two adjacent columns to save space) with standard errors adjusted for clustering at the firm level of extended Berger and Ofek (1995) regressions as in Campa and Kedia (2002). The dependent variable is the log of the ratio of total market value to imputed value using median industry multiplier (Excess Value). The single year dummy variables equals 1 in the referred year and zero otherwise. The less than three years dummy variable equals 1 before the third year of diversification, and zero otherwise. The more than three years dummy variable equals 1 after the third year of diversification, and zero otherwise. Team-overconfidence (MTeam-OV) is a dummy variable that equals 1 if on average top management is overconfident, and zero otherwise. Team non-overconfidence (MTeam NOV) is a dummy variable that equals 1 if on average top management is non-overconfident, and zero otherwise. Overconfident managers are classified using the Net Buyer measure. Net Buyer takes the value of 1 if during the first six years in our sample, a manager is on average net buyer in more years than net seller, and zero otherwise. Control variables are based on Campa and Kedia (2002). See table 2 for the definition of the control variables. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicates 10%, 5%, and 1% level of significance, respectively.

	Single and Multi-segment Firms (1)		Multi-segment Firms Only (2)	
	MTeam-OV	MTeam NOV	MTeam-OV	MTeam NOV
Less than three years before diversification	0.043 (0.43)	-0.078 (-0.87)		
Three years before diversification	-0.083 (-0.94)	-0.208** (-2.40)	-0.079 (-0.99)	-0.217** (-2.45)
Two years before diversification	0.010 (0.13)	-0.088 (-1.14)	0.019 (0.22)	-0.100 (-1.17)
One year before diversification	0.013 (0.14)	-0.175** (-2.19)	0.028 (0.29)	-0.171* (-1.95)
Diversification year	-0.193*** (-2.59)	-0.137 (-1.42)	-0.184** (-2.09)	-0.147 (-1.51)
One year after diversification	-0.125 (-1.41)	-0.258** (-2.54)	-0.136 (-1.32)	-0.279** (-2.51)
Two years after diversification	-0.324*** (-3.60)	-0.020 (-0.17)	-0.336*** (-3.09)	-0.032 (-0.24)
Three years after diversification	-0.266*** (-2.56)	-0.076 (-0.63)	-0.326** (-2.51)	-0.097 (-0.66)
More than three years after diversification	-0.221*** (-2.88)	0.005 (0.04)	-0.267** (-2.25)	-0.064 (-0.41)
Control variables	Yes		Yes	
Year fixed effects	Yes		Yes	
No of firms	403		179	
No of observations	2,799		1,192	
R^2	0.105		0.188	

Table 6 (Continued)

Panel B: CEO-Overconfidence

This table displays ordinary least square coefficients (estimated concurrently using a single-regression function, yet reported in two adjacent columns to save space) with standard errors adjusted for clustering at the firm level of extended Berger and Ofek (1995) regressions as in Campa and Kedia (2002). The dependent variable is the log of the ratio of total market value to imputed value using median industry multiplier (Excess Value). The single year dummy variables equals 1 in the referred year and zero otherwise. The less than three years dummy variable equals 1 before the third year of diversification, and zero otherwise. The more than three years dummy variable equals 1 after the third year of diversification, and zero otherwise. CEO-overconfidence (CEO-OV) is a dummy variable that equals 1 if the CEO is overconfident, and zero otherwise. CEO non-overconfidence (CEO NOV) is a dummy variable that equals 1 if the CEO is non-overconfident, and zero otherwise. Overconfident CEOs are classified using the Net Buyer measure. Net Buyer takes the value of 1 if during the first six years in our sample, a CEO is on average net buyer in more years than net seller, and zero otherwise. Control variables are based on Campa and Kedia (2002). See table 2 for the definition of the control variables. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicates 10%, 5%, and 1% level of significance, respectively.

	Single and Multi-Segment Firms (1)		Multi-Segment Firms Only (2)	
	CEO-OV	CEO NOV	CEO-OV	CEO NOV
Less than three years before diversification	0.018 (0.22)	-0.092 (-1.22)		
Three years before diversification	-0.074 (-1.12)	-0.182*** (-2.59)	-0.049 (-0.75)	-0.165** (-2.37)
Two years before diversification	-0.023 (-0.37)	-0.092 (-1.42)	0.005 (0.09)	-0.078 (-1.15)
One year before diversification	-0.030 (-0.46)	-0.111* (-1.67)	0.032 (0.43)	-0.098 (-1.38)
Diversification year	-0.186*** (-3.12)	-0.174** (-2.18)	-0.139** (-1.98)	-0.165** (-2.01)
One year after diversification	-0.131* (-1.77)	-0.209** (-2.40)	-0.063 (-0.75)	-0.199** (-2.09)
Two years after diversification	-0.322*** (-4.10)	-0.008 (-0.09)	-0.247*** (-2.79)	0.023 (0.22)
Three years after diversification	-0.275*** (-3.02)	-0.131 (-1.39)	-0.260** (-2.46)	-0.071 (-0.62)
More than three years after diversification	-0.216*** (-3.24)	-0.059 (-0.57)	-0.179* (-1.77)	-0.033 (-0.26)
Control variables	Yes		Yes	
Year fixed effects	Yes		Yes	
No of firms	515		229	
No of observations	4,029		1,708	
R^2	0.108		0.194	

Table 7

Regressions of Excess Value on Management Team-/CEO- Overconfidence Controlling for Lagged Excess Values

This table displays ordinary least square coefficient estimates with standard errors adjusted for clustering at the firm level of extended Berger and Ofek (1995) regressions as in Campa and Kedia (2002). The dependent variable is the log of the ratio of total market value to imputed value using median industry multiplier (Excess Value). The Before DIV dummy variable equals 1 before a firm diversify and zero otherwise. The After DIV dummy variable equals 1 after a firm diversify and zero otherwise. Diversified firms are those that diversified at least once and never refocused during the sample period. Models (1) and (3) report results using the Management Team-overconfidence (MTEAM-OV) defined as a dummy variable that equals 1 if on average top management is overconfident, and zero otherwise. Similarly, Management Team -non-overconfidence (MTeam -NOV) is a dummy variable that equals 1 if on average top management is non-overconfident, and zero otherwise. Models (2) and (4) report results using the CEO-overconfidence (CEO-OV) defined as a dummy variable that equals 1 if the CEO is overconfident, and zero otherwise. Similarly, CEO non-overconfidence (CEO-NOV) is a dummy variable that equals 1 if the CEO is non-overconfident, and zero otherwise. Both overconfident managers and CEOs are classified using the Net Buyer measure. Net Buyer takes the value of 1 if during the first six years in our sample, a manager is on average net buyer in more years than net seller, and zero otherwise. Excess Value lag 1 and Excess Value lag 2 are lagged 1 and 2 values of Excess Value, respectively. See table 2 for the definition of the remaining control variables. The test reported at the bottom, tests the null hypothesis that the (After DIV * MTEAM-OV) equals the (Before DIV * MTEAM-OV) dummy, the (After DIV * TEAM-NOV) dummy equals the (Before DIV * MTEAM-NOV) dummy, the (After DIV * CEO-OV) equals the (Before DIV * CEO-OV) dummy, and the (After DIV * CEO-NOV) dummy equals the (Before DIV * CEO-NOV) dummy, respectively. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicates 10%, 5%, and 1% level of significance, respectively.

	Single and Multi-segment Firms		Multi-segment Firms Only	
	(1)	(2)	(3)	(4)
Const.	-0.187 (-1.10)	0.200 (1.33)	0.130 (0.40)	0.531** (2.56)
Before DIV * MTEAM-OV	0.019 (0.80)			
Before DIV * MTEAM-NOV	-0.009 (-0.36)			
After DIV * MTEAM-OV	-0.046** (-2.35)		-0.069** (-2.54)	
After DIV * MTEAM-NOV	0.020 (0.72)		-0.000 (-0.01)	
Before DIV * CEO-OV		0.006 (0.32)		
Before DIV * CEO-NOV		-0.012 (-0.56)		
After DIV * CEO-OV		-0.039** (-2.14)		-0.045** (1.99)
After DIV * CEO-NOV		-0.009 (-0.39)		-0.013 (-0.50)
Excess Value lag 1	0.566*** (23.07)	0.563*** (28.18)	0.586*** (16.05)	0.585*** (19.53)
Excess Value lag 2	0.181*** (8.38)	0.158*** (9.25)	0.168*** (5.06)	0.144*** (5.38)
Control Variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Test: (After DIV * MTEAM-OV) – (Before DIV * MTEAM-OV)=0	-0.066** (-2.36)			
Test: (After DIV * MTEAM-NOV) – (Before DIV and MTEAM-NOV)=0	0.030 (0.86)			
Test: (After DIV * CEO-OV) – (Before DIV * CEO-OV)=0		-0.046* (-1.90)		
Test: (After DIV * CEO-NOV) – (Before DIV and CEO-NOV)=0		0.003 (0.12)		
No of firms	392	506	173	224
No of observations	2,685	3,857	1,127	1,605
R^2	0.647	0.620	0.673	0.628

Table 8

Regressions of Excess Value on Management Team-/CEO- Overconfidence Controlling for Unobserved Heterogeneity

This table displays ordinary least square coefficient estimates with standard errors adjusted for clustering at the firm level of extended Berger and Ofek (1995) regressions as in Campa and Kedia (2002), including firm fixed effects. The dependent variable is the log of the ratio of total market value to imputed value using median industry multiplier (Excess Value). The After DIV dummy variable equals 1 after a firm diversify and zero otherwise. Diversified firms are those that diversified at least once and never refocused during the sample period. Models (1) and (3) report results using the Management Team-overconfidence (MTEAM-OV) defined as a dummy variable that equals 1 if on average top management is overconfident, and zero otherwise. Similarly, Management Team-non-overconfidence (MTeam -NOV) is a dummy variable that equals 1 if on average top management is non-overconfident, and zero otherwise. Models (2) and (4) report results using the CEO-overconfidence (CEO-OV) defined as a dummy variable that equals 1 if the CEO is overconfident, and zero otherwise. Similarly, CEO non-overconfidence (CEO-NOV) is a dummy variable that equals 1 if the CEO is non-overconfident, and zero otherwise. Both overconfident managers and CEOs are classified using the Net Buyer measure. Net Buyer takes the value of 1 if during the first six years in our sample, a manager is on average net buyer in more years than net seller, and zero otherwise. See table 2 for the definition of the remaining control variables. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicates 10%, 5%, and 1% level of significance, respectively.

	Single and Multi-segment Firms		Multi-segment Firms Only	
	(1)	(2)	(3)	(4)
Const.	0.236 (0.36)	0.014 (0.03)	-0.622 (-0.75)	0.659 (0.99)
After DIV * MTEAM-OV	-0.136** (-2.04)		-0.166** (-2.37)	
After DIV * MTEAM-NOV	0.022 (0.33)		-0.001 (-0.01)	
After DIV * CEO-OV		-0.119** (-2.22)		-0.137** (-2.27)
After DIV * CEO-NOV		-0.022 (-0.33)		-0.037 (-0.58)
Control Variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
No of firms	403	515	179	229
No of observations	2,799	4029	1,192	1,708
R^2	0.715	0.688	0.753	0.705

Table 9

Regressions of Excess Value on Management Team-/CEO- Overconfidence Without Entering and Exiting Firms

This table displays ordinary least square coefficient estimates with standard errors adjusted for clustering at the firm level of extended Berger and Ofek (1995) regressions as in Campa and Kedia (2002). The dependent variable is the log of the ratio of total market value to imputed value using median industry multiplier (Excess Value). Excess value calculations are made after excluding both the first year of data of entering firms and the last year of data of exiting firms. The Before DIV dummy variable equals 1 before a firm diversify and zero otherwise. The After DIV dummy variable equals 1 after a firm diversify and zero otherwise. Diversified firms are those that diversified at least once and never refocused during the sample period. Models (1) and (3) report results using the Management Team-overconfidence (MTEAM-OV) defined as a dummy variable that equals 1 if on average top management are overconfident, and zero otherwise. Similarly, Management Team -non-overconfidence (MTeam -NOV) is a dummy variable that equals 1 if on average top management are non-overconfident, and zero otherwise. Models (2) and (4) report results using the CEO-overconfidence (CEO-OV) defined as a dummy variable that equals 1 if the CEO is overconfident, and zero otherwise. Similarly, CEO non-overconfidence (CEO-NOV) is a dummy variable that equals 1 if the CEO is non-overconfident, and zero otherwise. Both overconfident managers and CEOs are classified using the Net Buyer measure. Net Buyer takes the value of 1 if during the first six years in our sample, a manager is on average net buyer in more years than net seller, and zero otherwise. See table 2 for the definition of the remaining control variables. The test reported at the bottom, tests the null hypothesis that the (After DIV * MTEAM-OV) equals the (Before DIV * MTEAM-OV) dummy, the (After DIV * TEAM-NOV) dummy equals the (Before DIV * MTEAM-NOV) dummy, the (After DIV * CEO-OV) equals the (Before DIV * CEO-OV) dummy, and the (After DIV * CEO-NOV) dummy equals the (Before DIV * CEO-NOV) dummy, respectively. The t-statistics are reported in parenthesis below the coefficient. *, ** and *** indicates 10%, 5%, and 1% level of significance, respectively.

	Single and Multi-segment Firms		Multi-segment Firms Only	
	(1)	(2)	(3)	(4)
Const.	-0.084 (-0.15)	-0.039 (-0.09)	0.150 (0.17)	0.225 (0.43)
Before DIV * MTEAM-OV	-0.007 (-0.10)			
Before DIV * MTEAM-NOV	-0.059 (-0.76)			
After DIV * MTEAM-OV	-0.192*** (-3.39)		-0.176** (-2.27)	
After DIV * MTEAM-NOV	-0.014 (-0.17)		0.014 (0.15)	
Before DIV * CEO-OV		-0.052 (-0.79)		
Before DIV * CEO-NOV		-0.056 (-0.86)		
After DIV * CEO-OV		-0.198*** (-3.81)		-0.116* (-1.87)
After DIV * CEO-NOV		-0.093 (-1.37)		-0.026 (-0.38)
Control Variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Test: (After DIV * MTEAM-OV) – (Before DIV * MTEAM-OV)=0	-0.185** (-2.50)			
Test: (After DIV * MTEAM-NOV) – (Before DIV and MTEAM-NOV)=0	0.045 (0.46)			
Test: (After DIV * CEO-OV) – (Before DIV * CEO-OV)=0		-0.145** (-2.22)		
Test: (After DIV * CEO-NOV) – (Before DIV and CEO-NOV)=0		-0.036 (-0.45)		
No of firms	396	509	175	226
No of observations	2,617	3,695	1,103	1,580
R^2	0.104	0.103	0.165	0.174