

Internet Appendix for

“Are Overconfident CEOs Better Innovators?”¹

This appendix presents additional tables to accompany the paper “Are Overconfident CEOs Better Innovators?” The contents are as follows:

- i. Table IA.I: When testing the relation between overconfidence and research and development (R&D) expenditures in Table IV of the main paper, firms with missing R&D information are assigned a zero R&D value and kept in the sample. To ensure that our results are not driven by this substitution, Table IA.I presents results of regressions of R&D expenditures on both the options-based and press-based measures of overconfidence, after deleting firm-year observations with missing R&D.
- ii. Table IA.II: In the paper, the relation between overconfidence and innovation exists only among innovative industries. To give readers a better understanding of the classification of innovative industries, Table IA.II gives the frequency with which industries are classified as innovative in the sample. Industries are defined using two-digit SIC codes. An innovative industry is one in which the *Qcitation count* per patent for the industry is greater than the median *Qcitation count* per patent across all industries for the year. Therefore, the classification can change from year to year.
- iii. Table IA.III: In the paper, the relation between overconfidence and innovation exists only among innovative industries. To ensure that our results are not an artifact of the way we classify innovative industries, Table IA.III shows that the main results are robust to an alternative classification system, whereby an innovative industry is one in which the *Qcitation count* per firm for the industry is greater than the median *Qcitation count* per firm across all industries for the year.
- iv. Table IA.IV: In the paper, the basic control variables for the stock return volatility and R&D/Asset regressions are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, Tobin’s Q, sales growth, ROA, book leverage, cash, Log(1+tenure), Log(1+delta), Log(1+vega), and industry and year fixed effects. The basic control variables for the patent and citation count regressions are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), Log(1+vega), and industry and year fixed effects. When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. Table IA.IV checks the robustness of the main results to alternative control variables.

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- Since we do not have detailed information on a CEO's option holdings, we rely on the average moneyness of a CEO's option holdings to classify her as overconfident. As stock options are often granted at the money, the moneyness of options is influenced by the stock returns since grant date. Furthermore, it is possible that the press tends to use the words "confident" or "optimistic" more when firms perform well. Thus the confidence measures may proxy for good past stock return performance instead. In the paper, we control for lagged one-year stock return but average moneyness is likely to be influenced by stock performance subsequent to the option grant date, which may be over a few years. In Panel A, we replace lagged one-year stock return with the cumulative return over the lesser of the CEO's tenure or seven years. The cumulative return stops just before the start of the fiscal year when the dependent variable is measured. The results are robust to this alternative control for stock performance.
- In Panel B, we use an alternative method to control for past stock performance. We follow Malmendier, Tate, and Yan (2011) and include five lags of annual stock returns instead of one lag of annual stock returns. The press-based measure of overconfidence continues to be positively associated with the dependent variables. For the options-based measure, the results are weaker, especially among the full sample. However, within innovative industries, the options-based confidence measure continues to be positively associated with patent and citation counts.
- The test of including five lags of returns may be overly stringent since five lags of returns may include announcement effects surrounding the CEO's appointment. If the greater innovativeness of overconfident managers has consequences for firm value, the value consequences should be reflected in the market price at the time of the CEO's appointment. As a consequence, we expect that including the stock return for this period would in large part eliminate the effect we are trying to measure. Therefore, in Panel C we restrict the sample to firm-years in which the CEO has at least five years of tenure. As expected, the options-based confidence measure is significant in predicting all the dependent variables, with a significance level of 1% to 5%, for both the full sample and the subsample of innovative industries. The press-based measure is significant in predicting all the dependent variables, except for *TTcitation count*.
- The main control variables used in the patent and citation counts regressions are similar to those used in prior studies of the determinants of patenting activities (see, for example, Hall and Ziedonis (2001), Aghion, Van Reenen, and Zingales (2009)). To ensure that our results are not driven by omitted control variables, in Panel D we include the additional control variables used in our tests of the determinants of R&D (Tobin's Q, sales growth, ROA, book leverage, and cash). The press-based measure remains significant. The options-based measure is insignificant when looking at the full sample for the patent count and *Qcitation count* regressions. However, the strongest tests of our hypotheses are those performed within innovative industries. For both the options-based measure and the press-based measure, the results using firms within innovative industries continue to hold.

- Our controls for CEO incentives, delta and vega, are motivated by the Black-Scholes option pricing theory. To the extent that the Black-Scholes model does not apply to underdiversified executives, delta and vega may not be valid controls for CEO incentives. Therefore, in Panel E we control for CEO incentives using percentage of CEO share ownership and ratio of options held by the CEO to total shares outstanding. The results are robust to these alternative control variables.
 - Prior work shows that overconfident CEOs tend to diversify into other industries. To the extent that diversified firms can self-cite across business lines, our results may reflect the diversifying tendency of overconfident CEOs. In Panel F we include an indicator variable for multi-segment firm and the results continue to be robust.
- v. Table IA.V: Table IA.V presents results from regressions testing the robustness of both the options-based and press-based measures.
- Our measure of options-based confidence requires that the CEO exhibit late exercise once, which is different from Malmendier and Tate (2005) where the CEO is required to exhibit late exercise twice. In Panel A, the results are generally robust to an alternative measure of options-based overconfidence, *Confident CEO 2 (Options)*, where an overconfident CEO is required to exhibit late exercise twice and she is classified as overconfident the first time she holds a 67% in-the-money option. Under this check, overconfident CEO is no longer significantly associated with increased stock return volatility.
 - Firms may leak stories about their forthcoming innovations and say they are “confident” about these projects. These articles would suggest a reverse causation whereby managers are measured as overconfident as a consequence of having high innovation. We use a computer algorithm to select articles with words relating to “project” that are within 20 words of confidence-related words “confident,” “optimistic,” and variants thereof. The project-related words are 1) innovation, 2) new model, 3) new patent, 4) new product, 5) project, 6) R&D, and 7) technology; we also include variants of these project-related words. Out of the 1,106 articles referring to the CEO as confident, only 47 (4%) have a confidence-related word and project-related words within 20 words of each other. We delete these potentially problematic articles and recalculate the press-based overconfidence measure, *Confident CEO (Press) – excl problematic news*. In Panel B the results are robust to this alternative press-based measure of overconfidence.
 - When calculating the press-based measure, we cumulate articles starting from the first year the CEO is in office (for CEOs who assumed office after 1992) or 1992, when we begin our article search. In Panel C the results are generally robust to an alternative press-based measure, *Confident CEO (Press) – current*, where only news articles in the past one year are used. However, the press-based measure loses significance when predicting R&D/Assets.
 - When defining the press-based measure, we cumulate articles starting only in 1992 or later. Furthermore, CEOs with zero news mentions are classified as non-overconfident. As a result, the number of confident CEOs based on the press-based measure could be

biased downwards in the earlier years (see Table I of main paper). Therefore, in Panel D we show regression results where the sample is restricted to firm-years with at least one news article, that is, $TotalMention > 0$. The results are weaker although overconfidence continues to be positively associated with patent and citation counts within the innovative industries. In Panel E, the results are robust when we restrict the sample to year 2000 or later.

- vi. Table IA.VI: Prior work shows that overconfident CEOs tend to diversify into other industries. To the extent that diversified firms can self-cite across business lines, our results may reflect the diversifying tendency of overconfident CEOs. Therefore, Table IA.VI presents regressions of citations on the overconfidence variables, where citations are calculated excluding forward citations made by patents belonging to the same firm. Results are robust to this check.
- vii. Table IA.VII: There are many firm-years with zero patent counts or zero citation counts. To check whether the results are driven by a jump from zero patents (zero citation count) to at least one patent (citation), Table IA.VII shows results from regressions where the sample is restricted to firm-years with at least one patent or citation. Although the press-based measure loses significance for the regressions involving citation counts for the full sample, the rest of the results follow through.
- viii. Table IA.VIII: Table IA.VIII provides additional robustness checks.
 - The independent variables are lagged by one year in our tests. However, overconfidence and other variables could have a longer lagged effect on innovation. In Panel A the independent variables, including the overconfidence variables, are lagged by two years. Most of the results are robust to this check, except that the options-based measure is no longer significantly positively associated with stock return volatility.
 - Innovation is very important to technology industries and the technology boom of 1998 to 2000 was an exceptional period for such industries. To ensure that our results are not driven by the technology boom, Panel B shows that the results are robust to deleting 1998, 1999, and 2000 from the sample.
- ix. Table IA.IX: In Table IA.IX, we test the robustness of the results to alternative estimation methods instead of OLS estimation used in the paper. The results are robust to using negative binomial regressions. A negative binomial model is preferable to the Poisson model because the likelihood ratio test of no overdispersion is rejected for all regressions.
- x. Table IA.X: Table IA.X tests the robustness of Table XI “Effectiveness of Innovative Activity” in the paper.
 - In Table XI of the paper, R&D is scaled by assets while net PPE is scaled by number of employees. To ensure that the results are not due to the differing ways we scale the control variables, Panels A and B show that the results are robust to alternative scaling of R&D and net PPE. In Panel A, sales is used as a size proxy and also to scale R&D and

net PPE such that the control variables are $\text{Log}(\text{sales})$, $\text{Log}(\text{PPE}/\text{sales})$, $\text{Log}(1+\text{R\&D}/\text{sales})$, stock returns over the fiscal year, institutional holdings, $\text{Log}(1+\text{tenure})$, $\text{Log}(1+\text{delta})$, and $\text{Log}(1+\text{vega})$. In Panel B, number of employees is used to scale R&D and net PPE. Therefore, the control variables are $\text{Log}(\text{Emp})$, $\text{Log}(\text{PPE}/\text{Emp})$, $\text{Log}(1+\text{R\&D}/\text{Emp})$, stock returns over the fiscal year, institutional holdings, $\text{Log}(1+\text{tenure})$, $\text{Log}(1+\text{delta})$, and $\text{Log}(1+\text{vega})$.

- The innovation process normally has considerable lags. However, as discussed by Hall and Ziedonis (2001), much of the earlier patent literature concludes that it is hard to identify the lag structure for the production of patents from past R&D spending due to high autocorrelation in R&D spending. Therefore, Hall and Ziedonis (2001) control for contemporaneous R&D spending. In Table XI of the paper, we control for lagged R&D, but in Panel C we use contemporaneous R&D and find that the results continue to hold among the innovative industries.

xi. Tables IA.XI and IA.XII: Tables IA.XI and IA.XII check the robustness of Table XII “Overconfident CEOs and Firm Value” in the paper.

- To ensure that our options-based measure is not picking up the effects of good past stock performance, the cumulative return over the lesser of the CEO’s tenure or seven years is used as a control variable, instead of the stock return over the past fiscal year. We also include the number of months used to calculate the cumulative return and the interaction between industry price-earnings ratio and cumulative returns as additional control variables. Table IA.XI shows that the results continue to be robust to this variation.
- To ensure that the overconfidence variable is not picking up the higher return volatility of firms with overconfident CEOs, Table IA.XII shows that the results are robust when we also control for stock return volatility and the interaction of stock return volatility and industry price-earnings ratio.

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Table IA.I
Deleting Firm-Years with Missing R&D

The table presents results of regressions of research and development expenditures (R&D) on CEO overconfidence. Firm-years with missing values of R&D are deleted. Only the coefficients and *t*-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects. For column (1), the control variables are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, Tobin's Q, sales growth, ROA, book leverage, and cash. In column (2), Log(1+tenure), Log(1+delta), and Log(1+vega) are also included as control variables. When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. The number of observations in each regression is given. All independent variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

Dependent variable = R&D/Assets (%)			
	Observations	(1)	(2)
Confident CEO (Options)	5715	0.411 (1.24)	0.981*** (2.90)
Confident CEO (Press)	4917	1.097** (2.04)	1.111** (2.10)

Table IA.II
Tabulation of Innovative Industries

The table gives the frequency with which each industry in our sample is classified as innovative. Industries are defined based on two-digit SIC codes. The description for each industry is based on authors' interpretation. An innovative industry is one in which the *Qcitation count* per patent for the industry is greater than the median *Qcitation count* per patent across all industries for the year. The table is sorted based on the proportion of industry-years classified as innovative.

2-digit SIC Description	No. of years in sample	No. of years classified as innovative	Proportion of innovative years (%)
7 Agricultural services	3	0	0
12 Coal mining & coal mining services	4	0	0
16 Heavy construction - not building contractors	11	0	0
20 Food & drink products	11	0	0
21 Tobacco products	10	0	0
41 Transit & passenger transportation	6	0	0
52 Retail - building material, hardware, garden	11	0	0
10 Metal mining & metal mining services	11	1	9
23 Apparel & other finished products	11	1	9
50 Wholesale - durable goods	11	1	9
55 Retail - auto dealers & gas stations	11	1	9
17 Construction - special contractors	10	1	10
28 Chemicals & pharmaceutical products	11	2	18
33 Primary metal	11	2	18
44 Water transportation	11	2	18
47 Transportation services	11	2	18
58 Retail - eating & drinking places	11	2	18
82 Services - educational	11	2	18
15 Build construction	11	3	27
22 Textiles	11	3	27
54 Retail - food stores	11	3	27
1 Agriculture production - crops	10	3	30
56 Retail - apparel & accessory stores	11	4	36
70 Lodging places	11	4	36
78 Services - motion pictures	11	4	36
40 Railroad transportation	11	5	45
51 Wholesale - nondurable goods	11	5	45
72 Personal services	11	5	45
14 Mining & quarrying non-metallic minerals	11	7	64
24 Lumber & wood products, excl furniture	11	7	64
29 Petroleum refining	11	7	64
30 Rubber & plastic products	11	7	64
45 Air transportation	11	7	64
53 Retail - general merchandise stores	11	7	64
57 Retail - home furniture & equip stores	11	7	64
79 Services - amusement & recreation	11	7	64
31 Leather & leather products	11	8	73
99 Industrial conglomerates	11	8	73
27 Printing & publishing	11	9	82
26 Paper & allied products	11	10	91
32 Stone, clay, glass, concrete products	11	10	91
34 Fabricated products, excl mach & trans equip	11	10	91
37 Transportation equip	11	10	91
42 Motor freight transportation, warehousing	11	10	91
59 Retail - misc	11	10	91
75 Services - auto repair & parking	11	10	91
80 Services - health	11	10	91
13 Petroleum & natural gas	11	11	100
25 Household & office furniture	11	11	100
35 Commercial mach & computer hardware	11	11	100
36 Electric equip & electronic equip	11	11	100
38 Measuring & control equip, medical equip	11	11	100
39 Consumer goods	11	11	100
48 Communications	11	11	100
73 Business services	11	11	100
87 Business services - eng, acc, research, etc	11	11	100

Table IA.III
Alternative Definition of Innovative Industries

The table presents results from regressions of patent count and patent citations on CEO overconfidence, where firms are classified based on whether they belong to an innovative industry. An innovative industry is one in which the *Qcitation count* per firm for the industry is greater than the median *Qcitation count* per firm across all industries for the year. Innovative industry is lagged by one year. *Confident CEO (Options)* is an indicator variable equal to one for all years after the CEO holds options that are at least 67% in the money. *Confident CEO (Press)* is an indicator variable equal to one when the number of “confident” articles for a CEO in Factiva exceeds the number of “cautious” articles. Only the coefficients and *t*-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects, defined based on two-digit SIC codes. The control variables are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega). When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. All control variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

	No. of observations		Dependent variable = Log(1+patent)		Dependent variable = Log(1+Qcitation count)		Dependent variable = Log(1+TTcitation count)	
	Innovative Ind.	Non-Inno. Ind.	Innovative Ind.	Non-Inno. Ind.	Innovative Ind.	Non-Inno. Ind.	Innovative Ind.	Non-Inno. Ind.
			(1)	(2)	(1)	(2)	(1)	(2)
Confident CEO (Options)	7395	1544	0.160** (2.58)	-0.020 (1.20)	0.248** (2.45)	-0.060 (1.42)	0.171*** (2.60)	-0.016 (1.14)
Confident CEO (Press)	6296	1466	0.305** (2.49)	-0.029 (0.67)	0.452** (2.51)	-0.033 (0.30)	0.269** (2.05)	-0.003 (0.06)

Table IA.IV Variations in Control Variables

The table presents results of regressions of various dependent variables on CEO overconfidence, while varying the control variables. Only the coefficients and *t*-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects. The basic control variables for the stock return volatility and R&D/Asset regressions are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, Tobin's Q, sales growth, ROA, book leverage, cash, Log(1+tenure), Log(1+delta), and Log(1+vega). The basic control variables for the patent and citation count regressions are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega). When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. All control variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

In Panel A, lagged one-year stock return is replaced by cumulative stock returns over the CEO's tenure. *Cumulative return over CEO tenure* is the cumulative returns of the firm, starting from the later date of seven years ago or when the CEO begins his job, and stops just before the start of the fiscal year when the dependent variable is measured. The number of months used to calculate cumulative returns is included as an additional control variable.

In Panel B, lagged one-year stock return is replaced by five lags of past annual stock returns.

In Panel C, lagged one-year stock return is replaced by five lags of past annual stock returns. The sample of firm-years is also restricted to those observations where the CEO has a tenure of at least five years.

In Panel D, for the patent and citation count regressions, additional control variables (Tobin's Q, sales growth, ROA, book leverage, and cash) are included. These additional control variables are used in the tests of the determinants of R&D.

In Panel E, the percentage of CEO share ownership and ratio of options held by CEO to total shares outstanding (in percentage) are used as control variables for CEO incentives instead of Log(1+delta) and Log(1+vega).

In Panel F, an indicator variable for whether the firm is a multi-segment firm is included as an additional control variable in the regressions.

	Dependent variable = Stock ret. volatility (%)	Dependent variable = R&D/Assets (%)	Dependent variable = Log(1+patent)			Dependent variable = Log(1+Qcitation count)			Dependent variable = Log(1+TTcitation count)		
	Full Sample (1)	Full Sample (1)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)
Panel A: Replace one year-lagged stock return with cumulative returns over CEO's tenure											
Confident CEO (Options)	0.086** (2.37)	0.733*** (3.18)	0.110** (2.07)	0.164** (2.55)	0.012 (0.15)	0.178** (2.06)	0.289*** (2.75)	-0.024 (0.19)	0.120** (2.15)	0.178*** (2.58)	0.022 (0.28)
Confident CEO (Press)	0.208*** (3.15)	0.966** (2.45)	0.274** (2.50)	0.409*** (3.04)	-0.063 (0.43)	0.407** (2.52)	0.591*** (2.97)	-0.051 (0.23)	0.247** (2.12)	0.383*** (2.64)	-0.096 (0.63)
Panel B: Replace one-year lagged stock return with five lags of annual past returns											
Confident CEO (Options)	0.056 (1.44)	1.158*** (4.17)	0.091 (1.51)	0.135* (1.83)	0.014 (0.15)	0.165* (1.69)	0.273** (2.29)	-0.033 (0.24)	0.092 (1.45)	0.141* (1.77)	0.011 (0.12)
Confident CEO (Press)	0.239*** (3.67)	1.033*** (2.67)	0.246** (2.18)	0.382*** (2.74)	-0.092 (0.62)	0.341** (2.06)	0.531** (2.58)	-0.117 (0.52)	0.212* (1.77)	0.350** (2.32)	-0.139 (0.91)
Panel C: Replace one-year lagged stock return with five lags of annual past returns, restricted to CEOs with at least five years tenure											
Confident CEO (Options)	0.107** (1.98)	1.247*** (3.50)	0.166** (2.09)	0.282*** (2.85)	-0.037 (0.34)	0.285** (2.17)	0.547*** (3.35)	-0.160 (0.90)	0.182** (2.21)	0.312*** (2.97)	-0.029 (0.27)
Confident CEO (Press)	0.192** (2.45)	1.009** (1.99)	0.288** (1.97)	0.401** (2.28)	-0.056 (0.28)	0.422* (1.94)	0.542** (2.08)	0.059 (0.19)	0.234 (1.54)	0.300 (1.62)	0.025 (0.12)
Panel D: Control for additional variables: Tobin's Q, sales growth, ROA, book leverage, and cash											
Confident CEO (Options)			0.085 (1.64)	0.142** (2.25)	-0.023 (0.30)	0.133 (1.57)	0.240** (2.31)	-0.072 (0.59)	0.091* (1.67)	0.147** (2.17)	-0.004 (0.05)
Confident CEO (Press)			0.216** (2.03)	0.330** (2.55)	-0.072 (0.50)	0.311** (2.03)	0.459** (2.46)	-0.060 (0.28)	0.187* (1.67)	0.296** (2.14)	-0.106 (0.71)
Panel E: Replace Log(1+delta) and Log(1+vega) with % share ownership and % option holdings											
Confident CEO (Options)	0.059* (1.67)	0.494** (2.20)	0.116** (2.27)	0.150** (2.47)	0.042 (0.53)	0.183** (2.23)	0.263*** (2.65)	0.005 (0.04)	0.136** (2.53)	0.172*** (2.60)	0.054 (0.70)
Confident CEO (Press)	0.198*** (2.98)	1.051*** (2.59)	0.288*** (2.62)	0.413*** (3.08)	-0.034 (0.23)	0.428*** (2.67)	0.598*** (3.03)	-0.016 (0.07)	0.261** (2.25)	0.387*** (2.68)	-0.073 (0.47)
Panel F: Control for additional variable: Indicator variable for multi-segment firms											
Confident CEO (Options)	0.067* (1.80)	0.752*** (3.14)	0.113** (2.08)	0.157** (2.39)	0.043 (0.53)	0.183** (2.06)	0.278** (2.56)	0.022 (0.17)	0.124** (2.15)	0.174** (2.44)	0.047 (0.59)
Confident CEO (Press)	0.243*** (3.67)	1.056** (2.47)	0.269** (2.38)	0.400*** (2.94)	-0.117 (0.76)	0.415** (2.51)	0.583*** (2.90)	-0.072 (0.31)	0.250** (2.09)	0.379*** (2.58)	-0.142 (0.92)

Table IA.V Robustness of Overconfidence Measures

The table presents results of regressions of various dependent variables on CEO overconfidence while testing the robustness of the overconfidence measures. Only the coefficients and *t*-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects. The basic control variables for the stock return volatility and R&D/Asset regressions are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, Tobin's Q, sales growth, ROA, book leverage, cash, Log(1+tenure), Log(1+delta), and Log(1+vega). The basic control variables for the patent and citation count regressions are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega). When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. All control variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

In Panel A, an alternative options-based measure of overconfidence is used. *Confident CEO 2 (Options)* is an indicator variable equal to one if the CEO is overconfident, and zero otherwise. We identify the first time that the CEO holds a 67% in-the-money option, and classify her as overconfident from this point on provided she subsequently exhibits the same behavior at least one more time.

In Panel B, an alternative press-based measure of CEO overconfidence is used. *Confident CEO (Press) – excl problematic news* is an indicator variable equal to one when the number of “confident” articles for a CEO in Factiva exceeds the number of “cautious” articles; any article that has project-related words within 20 words of the words “confident”, “optimistic”, and variants of these words are excluded.

In Panel C, an alternative press-based measure of CEO overconfidence is used. *Confident CEO (Press) – current* is an indicator variable equal to one when the number of “confident” articles for a CEO in Factiva exceeds the number of “cautious” articles; only articles published in the past one year are included.

In Panel D, to test the robustness of the press-based measure, the sample is restricted to only firm-years with at least one news article.

In Panel E, to test the robustness of the press-based measure, the sample is restricted to 2000 and later.

	Dependent variable = Stock return volatility (%)	Dependent variable = R&D/Assets (%)	Dependent variable = Log(1+patent)			Dependent variable = Log(1+Qcitation count)			Dependent variable = Log(1+TTcitation count)		
	Full Sample	Full Sample	Full Sample	Innovative Ind.	Non-Inno. Ind.	Full Sample	Innovative Ind.	Non-Inno. Ind.	Full Sample	Innovative Ind.	Non-Inno. Ind.
	(1)	(1)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Panel A: Alternative options-based measure											
Confident CEO 2 (Options)	0.029 (0.77)	0.804*** (3.16)	0.114** (2.09)	0.175** (2.57)	-0.013 (0.17)	0.173* (1.95)	0.281** (2.55)	-0.054 (0.45)	0.120** (2.07)	0.176** (2.40)	0.006 (0.08)
Panel B: Alternative press-based measure calculated by excluding project-related words											
Confident CEO (Press) - excl problematic news	0.190*** (2.87)	0.828** (2.07)	0.246** (2.22)	0.378*** (2.78)	-0.081 (0.55)	0.354** (2.19)	0.527*** (2.64)	-0.079 (0.35)	0.215* (1.83)	0.340** (2.33)	-0.104 (0.68)
Panel C: Alternative press-based measure calculated using articles within the current fiscal year											
Confident CEO (Press) - current	0.123** (2.22)	0.529 (1.60)	0.235** (2.45)	0.340*** (2.89)	-0.006 (0.05)	0.329** (2.34)	0.496*** (2.94)	-0.076 (0.36)	0.215** (2.09)	0.334*** (2.68)	-0.064 (0.42)
Panel D: Restrict sample to firm-years with at least one news article											
Confident CEO (Press)	0.193*** (2.82)	0.675 (1.59)	0.178* (1.69)	0.292** (2.29)	-0.088 (0.58)	0.243 (1.55)	0.396** (2.04)	-0.109 (0.49)	0.142 (1.26)	0.248* (1.76)	-0.116 (0.77)
Panel E: Restrict sample to year 2000 and later											
Confident CEO (Press)	0.201** (2.31)	1.386*** (2.64)	0.380*** (3.04)	0.526*** (3.54)	-0.088 (0.46)	0.499*** (2.80)	0.741*** (3.50)	-0.278 (0.98)	0.348** (2.53)	0.516*** (3.13)	-0.193 (0.89)

Table IA.VI
Excluding Self-Citations

The table presents results of regressions of citation count on CEO overconfidence. The citation count excludes self-citations made by patents belonging to the same firm. Only the coefficients and *t*-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects, defined based on two-digit SIC codes. The control variables are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega). When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. All control variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

	Dependent variable =			Dependent variable =		
	Log(1+Qcitation count excluding self-citations)			Log(1+TTcitation count excluding self-citations)		
	Full Sample	Innovative Ind.	Non-Inno. Ind.	Full Sample	Innovative Ind.	Non-Inno. Ind.
	(1)	(2)	(3)	(1)	(2)	(3)
Confident CEO (Options)	0.188** (2.29)	0.275*** (2.73)	0.019 (0.16)	0.125** (2.37)	0.167** (2.53)	0.050 (0.68)
Confident CEO (Press)	0.368** (2.41)	0.529*** (2.79)	-0.027 (0.13)	0.218** (1.99)	0.338** (2.46)	-0.086 (0.61)

Table IA.VII
Restrict to Firm-Years with at Least One Patent or One Citation

The table presents results of regressions of patent and citation counts on CEO overconfidence. When running the regression involving patent counts (citation counts), firm-years with zero patents (citations) are deleted. Only the coefficients and *t*-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects, defined based on two-digit SIC codes. The control variables are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega). When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. All control variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

	Dependent variable = Log(patent)			Dependent variable = Log(Qcitation count)			Dependent variable = Log(TTcitation count)		
	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)
Confident CEO (Options)	0.197*** (2.66)	0.202** (2.39)	0.151 (1.11)	0.260*** (2.90)	0.286*** (2.83)	0.174 (1.05)	0.234*** (2.64)	0.252** (2.54)	0.183 (1.10)
Confident CEO (Press)	0.259** (2.10)	0.431*** (3.08)	-0.327* (1.70)	0.191 (1.33)	0.314* (1.88)	-0.272 (1.30)	0.184 (1.32)	0.308* (1.91)	-0.280 (1.39)

Table IA.VIII
Other Robustness Checks

The table presents results of additional robustness checks on the relation between various dependent variables and CEO overconfidence. Only the coefficients and *t*-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects. The basic control variables for the stock return volatility and R&D/Asset regressions are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, Tobin's Q, sales growth, ROA, book leverage, cash, Log(1+tenure), Log(1+delta), and Log(1+vega). The basic control variables for the patent and citation count regressions are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega). When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. Unless otherwise stated, all control variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

In Panel A, the independent variables are lagged by two periods. In Panel B, years of the technology boom – 1998, 1999, and 2000 – are deleted.

	Dependent variable = Stock return volatility (%)		Dependent variable = Log(1+patent)			Dependent variable = Log(1+Qcitation count)			Dependent variable = Log(1+TTcitation count)		
	Full Sample (1)	Full Sample (1)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)
Panel A: Lagging independent variables by two years											
Confident CEO (Options) - lag 2	0.060 (1.38)	0.719*** (2.64)	0.122** (1.96)	0.187** (2.48)	-0.013 (0.13)	0.197** (2.00)	0.316*** (2.59)	-0.055 (0.38)	0.133** (2.07)	0.188** (2.32)	0.017 (0.19)
Confident CEO (Press) - lag 2	0.248*** (2.92)	1.156** (2.54)	0.257** (2.05)	0.351** (2.30)	-0.033 (0.18)	0.401** (2.19)	0.535** (2.36)	0.016 (0.06)	0.229* (1.71)	0.314* (1.89)	-0.038 (0.20)
Panel B: Deleting years 1998, 1999, and 2000											
Confident CEO (Options)	0.083** (2.15)	0.772*** (3.40)	0.095* (1.71)	0.127* (1.87)	0.040 (0.49)	0.166* (1.81)	0.247** (2.20)	0.028 (0.21)	0.101* (1.68)	0.139* (1.88)	0.038 (0.46)
Confident CEO (Press)	0.190** (2.56)	1.280*** (2.99)	0.275** (2.43)	0.364*** (2.62)	0.069 (0.44)	0.356** (2.14)	0.486** (2.37)	0.062 (0.25)	0.252** (2.05)	0.363** (2.37)	-0.017 (0.10)

Table IA.IX
Negative Binomial Estimation

The table presents results of negative binomial regressions of patent and citation counts on CEO overconfidence. Only the coefficients and z-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects, defined based on two-digit SIC codes. The control variables are Log(sales), Log(PPE/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega). When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is added as an additional control variable. All control variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (z-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

	Dependent variable = Patent			Dependent variable = Qcitation count			Dependent variable = TTcitation count		
	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)	Full Sample (1)	Innovative Ind. (2)	Non-Inno. Ind. (3)
Confident CEO (Options)	0.268*** (2.94)	0.377*** (3.78)	-0.099 (0.62)	0.298** (2.56)	0.444*** (3.48)	-0.107 (0.57)	0.250** (2.28)	0.383*** (3.17)	-0.122 (0.67)
Confident CEO (Press)	0.430*** (3.01)	0.628*** (4.11)	-0.225 (1.19)	0.551*** (3.30)	0.817*** (4.44)	-0.394 (1.51)	0.452*** (2.83)	0.663*** (3.83)	-0.333 (1.60)

Table IA.X
Robustness of Table “Effectiveness of Innovative Activity”

The table shows results from regressions that test the effect of overconfident CEO on the effectiveness of innovation for given research and development (R&D) expenditures, while checking for the robustness of the results to variations in the control variables. Only the coefficients and *t*-statistics associated with the confidence variables are shown. Each cell in the table is from one regression of the dependent variable on either *Confident CEO (Options)* or *Confident CEO (Press)*, control variables, and year and industry fixed effects. The basic control variables are Log(sales), Log(PPE/Emp), Log(1+R&D/Asset), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega). When using the press-based overconfidence measure, the number of news articles, *TotalMention*, is also added as an additional control variable. Unless otherwise stated, all control variables are lagged by one year. Variable definitions are provided in the Appendix of the paper. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

In Panel A, sales is used to scale R&D and net PPE. Therefore, the control variables are Log(sales), Log(PPE/sales), Log(1+R&D/sales), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega).

In Panel B, number of employees (Emp) is used to scale R&D and net PPE. Therefore, the control variables are Log(Emp), Log(PPE/Emp), Log(1+R&D/Emp), stock returns over the fiscal year, institutional holdings, Log(1+tenure), Log(1+delta), and Log(1+vega).

In Panel C, contemporaneous Log(1+R&D/Assets) is used instead of lagged Log(1+R&D/Assets).

	Dependent variable = Log(1+patent)			Dependent variable = Log(1+Qcitation count)			Dependent variable = Log(1+TTcitation count)		
	Full Sample	Innovative Ind.	Non-Inno. Ind.	Full Sample	Innovative Ind.	Non-Inno. Ind.	Full Sample	Innovative Ind.	Non-Inno. Ind.
	(1)	(3)	(5)	(1)	(3)	(5)	(1)	(3)	(5)
Panel A: Scaling by sales									
Confident CEO (Options)	0.063 (1.23)	0.121* (1.95)	-0.022 (0.29)	0.101 (1.21)	0.216** (2.13)	-0.085 (0.70)	0.073 (1.35)	0.132** (1.96)	-0.006 (0.08)
Confident CEO (Press)	0.225** (2.11)	0.323** (2.51)	-0.057 (0.38)	0.321** (2.06)	0.442** (2.35)	-0.041 (0.18)	0.199* (1.76)	0.292** (2.11)	-0.089 (0.57)
Panel B: Scaling by number of employees									
Confident CEO (Options)	0.052 (1.02)	0.128** (2.08)	-0.049 (0.63)	0.092 (1.10)	0.229** (2.27)	-0.101 (0.83)	0.065 (1.20)	0.141** (2.10)	-0.020 (0.27)
Confident CEO (Press)	0.231** (2.22)	0.303** (2.43)	-0.027 (0.18)	0.331** (2.18)	0.406** (2.24)	-0.001 (0.00)	0.208* (1.89)	0.271** (2.04)	-0.058 (0.37)
Panel C: Replace lagged Log(1+R&D/Assets) with contemporaneous Log(1+R&D/Assets)									
Confident CEO (Options)	0.063 (1.23)	0.114* (1.86)	-0.019 (0.24)	0.099 (1.20)	0.204** (2.04)	-0.077 (0.63)	0.072 (1.34)	0.123* (1.86)	-0.003 (0.04)
Confident CEO (Press)	0.193* (1.87)	0.281** (2.29)	-0.068 (0.46)	0.261* (1.76)	0.356** (2.04)	-0.059 (0.26)	0.161 (1.47)	0.242* (1.83)	-0.100 (0.65)

Table IA.XI

Robustness of Table “Overconfident CEOs and Firm Value” – Controlling for Cumulative Returns

The table presents results of regressions of Tobin’s Q on CEO overconfidence and an industry instrument for firm growth opportunities, while controlling for cumulative stock returns. Panel A shows results when CEO overconfidence is measured using either *Confident CEO (Options)* or *Confident CEO (Press)*. Panel B shows results when CEOs are divided into categories of low overconfidence, moderate overconfidence, and high overconfidence. *Cumulative return over tenure* is the cumulative return of the firm, starting from the later date of seven years ago or when the CEO begins his job, and stops just before the start of the fiscal year when the dependent variable is measured. Variable definitions are provided in the Appendix of the paper. All independent variables are lagged by one year. All continuous independent variables are scaled to have zero mean and a standard deviation of one. All regressions include year and industry fixed effects. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

Panel A. Confident CEO (Options) and Confident CEO (Press)							
	Dependent variable = Tobin's Q						
	Full Sample			Innovative Ind.		Non-Innovative Ind.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Industry PE	0.056*** (3.28)	-0.019 (0.79)	0.014 (0.70)	-0.047 (1.43)	-0.015 (0.53)	0.057 (1.63)	0.041 (1.54)
Confident CEO (Options)		0.371*** (7.46)		0.325*** (6.00)		0.405*** (4.67)	
Confident CEO (Options)* Ind. PE		0.082*** (2.81)		0.094*** (2.65)		0.009 (0.21)	
Confident CEO (Press)			0.442* (1.95)		0.514 (1.65)		0.270 (1.56)
Confident CEO (Press)* Ind. PE			0.119 (0.89)		0.134 (0.88)		0.162 (1.24)
TotalMention			0.273*** (5.59)		0.269*** (4.59)		0.334*** (4.16)
Log(sales)		-0.282*** (6.69)	-0.457*** (8.00)	-0.298*** (6.37)	-0.473*** (7.12)	-0.179** (2.39)	-0.389*** (4.29)
Log(PPE/Emp)		-0.008 (0.17)	-0.003 (0.06)	0.050 (0.93)	0.078 (1.29)	-0.133* (1.84)	-0.180*** (2.63)
Cumulative return over CEO tenure		0.545*** (6.52)	0.538*** (6.44)	0.632*** (5.75)	0.622*** (5.61)	0.349*** (5.63)	0.378*** (5.77)
Cumulative return*Ind. PE		-0.098** (2.11)	-0.100** (2.04)	-0.150** (2.37)	-0.157** (2.32)	0.063* (1.85)	0.046 (1.17)
# months for calculating cumulative return		-0.247*** (6.69)	-0.207*** (5.28)	-0.310*** (6.39)	-0.288*** (5.49)	-0.132*** (3.17)	-0.091** (2.18)
ROA		0.218*** (3.58)	0.350*** (5.21)	0.294*** (4.48)	0.387*** (5.57)	0.057 (0.51)	0.256** (1.98)
# segments		-0.100*** (3.42)	-0.097*** (3.22)	-0.082** (2.32)	-0.094*** (2.62)	-0.124** (2.57)	-0.085* (1.73)
Observations	8907	8114	7040	5435	4630	2679	2410
Adjusted R ²	0.112	0.200	0.215	0.196	0.208	0.230	0.266

Panel B. Different Degrees of Overconfidence

	Dependent variable = Tobin's Q		
	Full Sample (1)	Innovative Ind. (2)	Non-Innovative Ind. (3)
Industry PE	-0.024 (0.98)	-0.052 (1.60)	0.054 (1.46)
Confident CEO (Low)*Ind. PE	0.020 (0.61)	0.031 (0.73)	-0.007 (0.15)
Confident CEO (Med)*Ind. PE	0.045 (1.26)	0.054 (1.24)	0.038 (0.57)
Confident CEO (High)*Ind. PE	0.197*** (3.12)	0.210*** (2.79)	0.018 (0.16)
Confident CEO (Low)	0.224*** (3.88)	0.197*** (2.66)	0.205*** (2.59)
Confident CEO (Med)	0.295*** (4.46)	0.182*** (2.89)	0.491*** (3.58)
Confident CEO (High)	0.673*** (6.82)	0.642*** (5.79)	0.682*** (3.78)
Log(sales)	-0.268*** (6.39)	-0.285*** (6.14)	-0.161** (2.15)
Log(PPE/Emp)	-0.008 (0.18)	0.051 (0.94)	-0.142* (1.96)
Cumulative return over CEO tenure	0.495*** (5.85)	0.578*** (5.25)	0.294*** (4.57)
Cumulative return*Ind. PE	-0.104** (2.22)	-0.154** (2.41)	0.060 (1.48)
# months for calculating cumulative return	-0.251*** (6.80)	-0.313*** (6.47)	-0.132*** (3.18)
ROA	0.218*** (3.59)	0.294*** (4.50)	0.061 (0.55)
# segments	-0.097*** (3.33)	-0.077** (2.20)	-0.123** (2.54)
Observations	8114	5435	2679
Adjusted R ²	0.204	0.201	0.235

Table IA.XII**Robustness of Table “Overconfident CEOs and Firm Value” – Controlling for Stock Return Volatility**

The table presents results of regressions of Tobin’s Q on CEO overconfidence and an industry instrument for firm growth opportunities, while controlling for lagged stock return volatility. Panel A shows results when CEO overconfidence is measured using either *Confident CEO (Options)* or *Confident CEO (Press)*. Panel B shows results when CEOs are divided into categories of low overconfidence, moderate overconfidence, and high overconfidence. Variable definitions are provided in the Appendix of the paper. All independent variables are lagged by one year. All continuous independent variables are scaled to have zero mean and a standard deviation of one. All regressions include year and industry fixed effects. Standard errors are corrected for clustering of observations at the firm level (*t*-statistics are in parentheses). *, **, and *** measure significance at the 10%, 5%, and 1% level, respectively.

Panel A. Confident CEO (Options) and Confident CEO (Press)						
Dependent variable = Tobin's Q						
	Full Sample		Innovative Ind.		Non-Innovative Ind.	
	(1)	(2)	(3)	(4)	(5)	(6)
Industry PE	-0.040*	-0.016	-0.053	-0.045	0.002	0.046
	(1.71)	(0.69)	(1.62)	(1.41)	(0.06)	(1.54)
Confident CEO (Options)	0.297***		0.212***		0.418***	
	(6.18)		(4.45)		(4.56)	
Confident CEO (Options)* Ind. PE	0.056**		0.061**		0.051	
	(2.24)		(1.98)		(1.15)	
Confident CEO (Press)		0.375		0.405		0.265
		(1.62)		(1.28)		(1.44)
Confident CEO (Press)* Ind. PE		0.129		0.156		0.109
		(0.93)		(1.00)		(0.82)
TotalMention		0.310***		0.311***		0.344***
		(5.34)		(4.29)		(3.92)
Log(sales)	-0.173***	-0.372***	-0.179***	-0.374***	-0.124	-0.370***
	(3.65)	(6.06)	(3.47)	(5.63)	(1.42)	(3.16)
Log(PPE/Emp)	0.030	0.034	0.088	0.129**	-0.107	-0.183***
	(0.67)	(0.73)	(1.59)	(2.13)	(1.52)	(2.71)
Stock return	0.544***	0.511***	0.620***	0.618***	0.374***	0.290***
	(6.95)	(6.18)	(5.56)	(5.08)	(6.34)	(6.99)
Stock return*Ind. PE	-0.084**	-0.109***	-0.130**	-0.174***	0.000	-0.018
	(2.30)	(3.07)	(2.56)	(3.25)	(0.01)	(0.59)
ROA	0.287***	0.411***	0.359***	0.441***	0.113	0.323**
	(4.43)	(5.73)	(5.33)	(6.07)	(0.85)	(2.11)
# segments	-0.106***	-0.103***	-0.084**	-0.096**	-0.133***	-0.099*
	(3.42)	(3.21)	(2.19)	(2.49)	(2.73)	(1.92)
Stock return volatility	0.268***	0.211***	0.337***	0.273***	0.100	0.055
	(5.85)	(4.45)	(6.18)	(5.00)	(1.21)	(0.62)
Stock return volatility*Ind. PE	0.036*	0.031	0.033	0.027	0.048	0.024
	(1.69)	(1.39)	(1.14)	(0.88)	(1.56)	(0.75)
Observations	8114	7040	5435	4630	2679	2410
Adjusted R ²	0.211	0.220	0.206	0.216	0.241	0.255

Panel B. Different degree of overconfidence

	Dependent variable = Tobin's Q		
	Full Sample	Innovative Ind.	Non-Innovative Ind.
	(1)	(2)	(3)
Industry PE	-0.044*	-0.059*	0.000
	(1.91)	(1.82)	(0.00)
Confident CEO (Low)*Ind. PE	0.017	0.019	0.015
	(0.53)	(0.47)	(0.36)
Confident CEO (Med)*Ind. PE	0.041	0.054	0.036
	(1.14)	(1.28)	(0.50)
Confident CEO (High)*Ind. PE	0.124**	0.128**	0.119
	(2.40)	(2.02)	(1.36)
Confident CEO (Low)	0.107*	0.053	0.138*
	(1.95)	(0.78)	(1.74)
Confident CEO (Med)	0.165**	0.009	0.448***
	(2.32)	(0.12)	(3.09)
Confident CEO (High)	0.660***	0.578***	0.782***
	(6.97)	(5.54)	(4.66)
Log(sales)	-0.171***	-0.182***	-0.113
	(3.67)	(3.62)	(1.31)
Log(PPE/Emp)	0.029	0.089	-0.117
	(0.65)	(1.62)	(1.64)
Stock return	0.526***	0.601***	0.360***
	(6.83)	(5.46)	(6.28)
Stock return*Ind. PE	-0.094***	-0.143***	-0.002
	(2.60)	(2.84)	(0.07)
ROA	0.268***	0.343***	0.088
	(4.18)	(5.13)	(0.67)
# segments	-0.104***	-0.082**	-0.133***
	(3.39)	(2.15)	(2.73)
Stock return volatility	0.216***	0.281***	0.047
	(4.83)	(5.40)	(0.56)
Stock return volatility* Ind. PE	0.034	0.031	0.044
	(1.55)	(1.07)	(1.36)
Observations	8114	5435	2679
Adjusted R ²	0.218	0.213	0.251