

Online Appendix

This appendix contains the results of a series of robustness tests and additional analyses. A summary of the additional tests is as follows:

- ❖ Table OA-1: This table contains models that examine the impact of an exogenous drop in option compensation (as motivated by FAS 123R) on the relation between CEO overconfidence and firm value (measured by Tobin's Q).
- ❖ Table OA-2: This table splits the sample into quartiles based upon the CEO's wealth-to-performance sensitivity measure.
- ❖ Table OA-3: This table contains the results of regressions that control for various measures of the CEO's option holdings and wealth-to-performance sensitivity.
- ❖ Table OA-4: This table analyzes the relation between *Holder67* and option intensity after controlling for the *Longholder* measure of CEO optimism.
- ❖ Table OA-5: This table analyzes the relation between the media-based measure of overconfidence and option intensity after controlling for the *Longholder* measure of CEO optimism.
- ❖ Table OA-6: This table contains regressions that controls for the CEO's General Ability Index.
- ❖ Table OA-7: This table contains alternative model-specifications (Fama-Macbeth regressions and Tobit regressions with lower and upper bounds as applicable to the dependent variable).
- ❖ Table OA-8: This table contains regressions that analyze the relation between CEO overconfidence and pay-to-performance sensitivity.

Table OA-1: Reduction in option compensation and firm value

This table contains OLS models that examine the impact of an exogenous drop in option compensation (as motivated by FAS 123R) on the relation between CEO overconfidence and firm value (measured by Tobin's Q). All models include firm and year fixed effects and use standard errors clustered by firm. The column header states the sample that is under analysis. See Appendix B for variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Sample	All Firms	Option Intensity (2004) = 0	Option Intensity (2004) > 0	Option Intensity (2004) Bottom 50%	Option Intensity (2004) Top 50%
	[1]	[2]	[3]	[4]	[5]
Holder67	0.112*** [0.010]	0.116* [0.092]	0.094* [0.061]	0.048 [0.414]	0.150** [0.019]
FAS 123R	0.145** [0.025]	-0.048 [0.770]	0.195*** [0.004]	0.054 [0.486]	0.167 [0.152]
Holder67 *FAS 123R	0.012 [0.838]	0.059 [0.462]	0.004 [0.957]	0.134* [0.073]	-0.055 [0.476]
Ownership(%)	0.503 [0.403]	-0.725 [0.544]	0.855 [0.218]	-0.228 [0.892]	0.280 [0.614]
Tenure	-0.021* [0.061]	-0.008 [0.685]	-0.030** [0.023]	-0.018 [0.230]	-0.016 [0.210]
Age	0.005 [0.552]	0.033 [0.216]	0.002 [0.857]	0.001 [0.917]	0.005 [0.716]
Firm Size	-0.527*** [0.000]	-0.345 [0.188]	-0.539*** [0.000]	-0.669*** [0.001]	-0.392** [0.023]
Financial Leverage	0.070 [0.771]	-0.712* [0.074]	0.245 [0.367]	0.269 [0.297]	0.070 [0.855]
Firm Age	-0.042*** [0.009]	-0.022 [0.508]	-0.048*** [0.008]	0.020 [0.436]	-0.096*** [0.000]
Stock Volatility	2.454 [0.288]	9.421* [0.060]	-0.210 [0.936]	5.161 [0.103]	-0.029 [0.994]
Stock Return	0.017 [0.566]	0.066 [0.136]	0.003 [0.934]	0.057 [0.167]	-0.008 [0.839]
Market-to-Book	0.158*** [0.003]	-0.040 [0.810]	0.182*** [0.001]	0.064 [0.547]	0.248*** [0.000]
HHI	-0.000 [0.148]	-0.000* [0.091]	-0.000 [0.297]	-0.000** [0.040]	-0.000 [0.379]
Free Cash Flows	-0.157 [0.169]	-0.117 [0.627]	-0.126 [0.342]	-0.045 [0.773]	-0.177 [0.436]
R&D	0.061 [0.593]	-0.539 [0.260]	0.160** [0.029]	-0.064 [0.725]	0.269*** [0.000]
PP&E	-0.630** [0.041]	0.054 [0.869]	-0.824** [0.037]	-0.580* [0.098]	-0.437 [0.448]
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	No
Observations	3,951	811	3,140	1,597	1,688
R-squared	0.100	0.095	0.122	0.091	0.149

Table OA-2: Regressions by wealth-to-performance sensitivity quartile

This table contains regression models that split the sample into quartiles based on the CEO's *Wealth-to-Performance Sensitivity* from Edmans et al. (2009), as sourced from Alex Edman's website. The regressions include fixed effects as indicated in the table footer and cluster standard errors by firm. See Appendix B for variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Wealth-to-Performance Sensitivity Quartile	1	1	2	2	3	3	4	4
Holder67	0.035*** [0.003]	0.054*** [0.007]	0.021** [0.047]	0.032** [0.038]	0.052*** [0.000]	0.071*** [0.000]	0.048*** [0.001]	0.065*** [0.010]
Ownership(%)	-0.590* [0.057]	-0.185 [0.715]	-0.318 [0.368]	-0.247 [0.679]	0.120 [0.596]	0.051 [0.904]	0.071 [0.534]	0.332* [0.075]
Tenure	0.000 [0.806]	-0.000 [0.934]	0.000 [0.731]	0.001 [0.541]	-0.000 [0.872]	-0.002 [0.367]	0.001 [0.435]	0.001 [0.819]
Age	-0.004*** [0.000]	-0.006*** [0.001]	-0.004*** [0.000]	-0.005*** [0.004]	-0.003*** [0.000]	-0.003 [0.141]	-0.002** [0.023]	-0.004 [0.144]
Firm Size	0.033*** [0.000]	0.047** [0.013]	0.043*** [0.000]	0.029 [0.121]	0.053*** [0.000]	0.028 [0.124]	0.053*** [0.000]	0.045** [0.011]
Financial Leverage	-0.052 [0.116]	-0.104* [0.094]	-0.129*** [0.000]	-0.197*** [0.002]	-0.060 [0.119]	-0.054 [0.378]	-0.119*** [0.010]	-0.114 [0.121]
Firm Age	-0.001*** [0.006]	-0.011 [0.660]	-0.001* [0.056]	-0.069* [0.074]	-0.002*** [0.000]	0.000 [0.996]	-0.003*** [0.000]	-0.095 [0.242]
Stock Volatility	1.975*** [0.000]	1.316** [0.019]	3.356*** [0.000]	1.881*** [0.003]	1.328** [0.015]	0.803 [0.300]	0.661 [0.343]	-0.545 [0.565]
Stock Return	0.000 [0.973]	0.005 [0.476]	0.001 [0.847]	-0.007 [0.403]	-0.006 [0.479]	-0.004 [0.648]	0.002 [0.825]	-0.000 [0.982]
Market-to-Book	0.048*** [0.000]	0.034*** [0.000]	0.051*** [0.000]	0.036*** [0.000]	0.043*** [0.000]	0.038*** [0.000]	0.032*** [0.000]	0.027*** [0.004]
HHI	0.000 [0.760]	-0.000 [0.852]	-0.000*** [0.006]	-0.000*** [0.001]	-0.000 [0.719]	-0.000 [0.345]	-0.000 [0.427]	0.000 [0.371]
Free cash flows	-0.030 [0.309]	-0.014 [0.682]	-0.011 [0.796]	0.006 [0.911]	-0.150*** [0.003]	-0.035 [0.527]	-0.049 [0.426]	0.057 [0.274]
R&D	0.038** [0.015]	0.006 [0.879]	0.008 [0.601]	-0.069* [0.085]	0.024 [0.196]	-0.021 [0.714]	0.016 [0.473]	-0.008 [0.877]
PP&E	-0.031* [0.081]	-0.092** [0.033]	-0.040** [0.032]	-0.074 [0.102]	-0.027 [0.229]	-0.110* [0.061]	-0.043 [0.114]	-0.028 [0.668]
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,975	2,980	3,167	3,178	3,295	3,303	3,328	3,342
R-squared	0.315	0.241	0.316	0.267	0.276	0.221	0.199	0.088

Table OA-3: Regressions controlling for measures of CEO wealth, option-holdings, lagged option intensity, and wealth-to-performance sensitivity

This table contains regressions that control for measures of option holdings or wealth-to-performance sensitivity. *Option Value/Total Pay* is the value of the CEO's vested but unexercised options scaled by her total pay (Execucomp: opt_unex_exer_est_val/tdc1). The variable *ln(#Options)* is the natural log of one plus the number of vested but unexercised options. *Wealth-to-Performance Sensitivity* is the CEO's wealth-to-performance sensitivity from Edmans et al. (2009) as sourced from Alex Edman's website, and *ln(Wealth-to-Performance Sensitivity)* is the natural logarithm thereof. The dependent variable is the firm's option intensity and the models are OLS regressions that include fixed effects as indicated and cluster standard errors by firm. The models include all control variables from Table 2 and a constant (suppressed). See Appendix B for variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent	Option Intensity									
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Holder67	0.056*** [0.000]	0.075*** [0.000]	0.032*** [0.000]	0.041*** [0.000]	0.042*** [0.000]	0.046*** [0.000]	0.028*** [0.000]	0.038*** [0.000]	0.028*** [0.000]	0.037*** [0.000]
Option Value/Total Pay	-0.012*** [0.000]	-0.022*** [0.000]								
ln(#Options)			0.024*** [0.000]	0.004** [0.049]						
Wealth-to-Performance Sensitivity					-0.002*** [0.000]	-0.002*** [0.000]				
Lagged Wealth-to-Performance Sensitivity					0.001*** [0.000]	0.001*** [0.000]				
Lagged Option Intensity							0.378*** [0.000]	0.105*** [0.000]		
ln(Lagged Wealth-to-Performance Sensitivity)									0.021*** [0.000]	0.017*** [0.000]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	12,771	12,809	12,772	12,810	12,765	12,803	12,397	12,434	12,765	12,803
R-squared	0.251	0.203	0.252	0.153	0.273	0.215	0.352	0.163	0.242	0.154

Table OA-4: Models controlling for *LongHolder*

This table contains OLS regression models that control for the *LongHolder* measure of optimism. We obtain the *LongHolder* measure from Clemens Otto which is only available up until 2005 (as used in Otto (2014)). Columns [1]-[3] include models that use industry and year fixed effects; Columns [4]-[6] include models that use firm and year fixed effects. All models contain the control variables from Table 2. See Appendix B for variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent Variable	Option Intensity					
	[1]	[2]	[3]	[4]	[5]	[6]
Holder67	0.037*** [0.000]		0.035*** [0.006]	0.042*** [0.000]		0.046** [0.014]
LongHolder		-0.054*** [0.001]	-0.060*** [0.000]		-0.070 [0.155]	-0.070 [0.140]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	No	No	No
Firm Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	12,772	4,024	4,024	12,810	4,028	4,028
R-squared	0.238	0.257	0.259	0.152	0.088	0.090

Table OA-5: Media-based measures of overconfidence - controlling for *LongHolder*

This table contains media-based measures of overconfidence and controls for the *LongHolder* measure. The media-based measures are available for the years 2000-2006. The measures we use are: net *News Ratio*, which is defined as (Overconfident News – Non-Overconfident News)/(Overconfident News + Non-Overconfident News); *Net News* which is the difference between the number of overconfident and the number of non-overconfident news reports; *Positive News Indicator* which is an indicator that equals one if the number of ‘overconfident’ media reports is greater than the number of ‘non-overconfident’ ones. We obtain the *LongHolder* measure from Clemens Otto which is only available up until 2005 (as used in Otto (2014)). All models contain the control variables from Table 2, contain year and industry fixed effects and use standard errors clustered by firm. See Appendix B for variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent Variable	Option Intensity		
	[1]	[2]	[3]
News Ratio	0.068*** [0.003]		
LongHolder	-0.054*** [0.008]		
Net News		0.012*** [0.000]	
LongHolder		-0.056*** [0.006]	
Positive News Indicator			0.108*** [0.000]
LongHolder			-0.057*** [0.005]
Controls	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Observations	2,417	2,433	2,433
R-squared	0.286	0.290	0.292

Table OA-6: Controlling for the general ability index

This table contains OLS models that examine the relation between overconfidence and CEO compensation after controlling for the CEO's General Ability Index (Custodio Ferreira and Matos, 2013). The models include all control variables from Table 2, year and industry fixed effects and use standard errors clustered by firm. See Appendix B for variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent Variable	Option Intensity [1]	Equity Intensity [2]	Cash Intensity [3]	Option Intensity [4]	Equity Intensity [5]	Cash Intensity [6]
Holder67	0.033*** [0.000]	0.018** [0.020]	-0.029*** [0.000]	0.033*** [0.000]	0.018** [0.016]	-0.029*** [0.000]
GA Index	0.001 [0.739]	0.014*** [0.001]	-0.021*** [0.000]	0.005 [0.326]	0.018*** [0.002]	-0.021*** [0.000]
Holder67*GA Index				-0.007 [0.334]	-0.007 [0.383]	-0.000 [0.954]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,890	9,890	9,890	9,890	9,890	9,890
R-Squared	0.243	0.199	0.276	0.243	0.199	0.276

Table OA-7: Fama-Macbeth and Tobit regressions

This table contains panel models that use alternative specifications to examine the relation between CEO overconfidence and performance. Columns 1-3 use Fama-Macbeth regressions. Columns 4-6 use Tobit models that have a lower bound of zero and an upper bound of one and use standard errors clustered by firm. See Appendix B for variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Model Dependent Variable	Fama-Macbeth			Tobit		
	Option Intensity [1]	Equity Intensity [2]	Cash Intensity [3]	Option Intensity [4]	Equity Intensity [5]	Cash Intensity [6]
Holder67	0.038*** [0.000]	0.022*** [0.000]	-0.026*** [0.000]	0.042*** [0.000]	0.020*** [0.008]	-0.025*** [0.000]
Ownership(%)	-0.281*** [0.006]	-0.483*** [0.000]	0.500*** [0.000]	-0.494*** [0.000]	-0.602*** [0.000]	0.502*** [0.000]
Tenure	-0.000 [0.699]	-0.001*** [0.009]	0.002*** [0.003]	-0.001 [0.423]	-0.002*** [0.006]	0.002*** [0.002]
Age	-0.003*** [0.000]	-0.004*** [0.000]	0.003*** [0.000]	-0.004*** [0.000]	-0.004*** [0.000]	0.002*** [0.000]
Firm Size	0.041*** [0.000]	0.061*** [0.000]	-0.069*** [0.000]	0.053*** [0.000]	0.069*** [0.000]	-0.071*** [0.000]
Financial Leverage	-0.094*** [0.000]	-0.092*** [0.000]	0.061*** [0.005]	-0.101*** [0.001]	-0.087*** [0.001]	0.062*** [0.003]
Firm Age	-0.002*** [0.000]	-0.002*** [0.000]	0.001*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	0.001*** [0.000]
Stock Volatility	2.277*** [0.000]	1.498** [0.014]	-0.718 [0.237]	1.651*** [0.000]	0.764** [0.019]	-0.725*** [0.007]
Stock Return	-0.005 [0.564]	0.004 [0.598]	-0.016** [0.019]	-0.003 [0.541]	0.004 [0.451]	-0.012*** [0.003]
Market-to-Book	0.035*** [0.000]	0.029*** [0.000]	-0.021*** [0.000]	0.040*** [0.000]	0.032*** [0.000]	-0.025*** [0.000]
HHI	-0.000*** [0.003]	-0.000*** [0.000]	0.000** [0.024]	-0.000 [0.127]	-0.000 [0.482]	-0.000 [0.658]
Free Cash Flows	-0.065* [0.069]	-0.051 [0.210]	0.016 [0.649]	-0.065** [0.046]	-0.080*** [0.009]	0.030 [0.222]
R&D	0.044*** [0.000]	0.037*** [0.000]	-0.035*** [0.000]	0.035** [0.014]	0.023* [0.067]	-0.032*** [0.003]
PP&E	-0.030*** [0.000]	-0.024*** [0.001]	0.028** [0.012]	-0.024 [0.139]	-0.025* [0.095]	0.025** [0.042]
Year Fixed Effects	No	No	No	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	12,772	12,772	12,772	12,772	12,772	12,772
R-squared	0.162	0.191	0.238	0.2077	0.2309	1.2597
Number of Year Groups	17	17	17			

Table OA-8: Pay-to-performance sensitivity

This table contains OLS models that examine the relation between CEO overconfidence and pay-to-performance sensitivity. The models include all control variables from Table 2, year and industry fixed effects, a constant (suppressed) use standard errors clustered by firm. See Appendix B for variable definitions. Brackets contain p-values and superscripts ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent Variable	ln(Cash) [1]	ln(Cash) [2]	ln(Cash) [3]	ln(Total Pay) [4]	ln(Total Pay) [5]	ln(Total Pay) [6]
Holder67	0.075*** [0.000]	0.067*** [0.000]	0.065*** [0.000]	0.120*** [0.000]	0.115*** [0.000]	0.111*** [0.000]
Stock Return	0.001*** [0.009]		0.001*** [0.005]	0.000 [0.867]		-0.000 [0.959]
Holder67*Stock Return	0.037*** [0.000]		0.035*** [0.000]	0.058*** [0.000]		0.056*** [0.000]
ROA		-0.022 [0.635]	-0.033 [0.491]		0.106 [0.193]	0.104 [0.201]
Holder67*ROA		0.266*** [0.003]	0.265*** [0.003]		0.186* [0.077]	0.172 [0.103]
Ownership(%)	-0.703*** [0.005]	-0.714*** [0.005]	-0.714*** [0.005]	-1.480*** [0.000]	-1.489*** [0.000]	-1.498*** [0.000]
Tenure	0.003 [0.125]	0.002 [0.136]	0.003 [0.120]	-0.000 [0.918]	-0.000 [0.855]	-0.000 [0.909]
Age	0.006*** [0.000]	0.006*** [0.000]	0.006*** [0.000]	-0.001 [0.771]	-0.000 [0.809]	-0.000 [0.816]
Firm Size	0.252*** [0.000]	0.250*** [0.000]	0.252*** [0.000]	0.478*** [0.000]	0.476*** [0.000]	0.476*** [0.000]
Financial Leverage	-0.042 [0.441]	-0.022 [0.689]	-0.027 [0.632]	-0.232*** [0.001]	-0.213*** [0.002]	-0.208*** [0.002]
Firm Age	0.003*** [0.000]	0.003*** [0.000]	0.003*** [0.000]	-0.001 [0.449]	-0.001 [0.477]	-0.001 [0.479]
Stock Volatility	-2.644*** [0.000]	-2.204*** [0.000]	-2.270*** [0.000]	1.735** [0.032]	2.681*** [0.002]	2.512*** [0.003]
Market-to-Book	0.031*** [0.000]	0.031*** [0.000]	0.027*** [0.000]	0.135*** [0.000]	0.134*** [0.000]	0.130*** [0.000]
HHI	0.000* [0.070]	0.000* [0.067]	0.000* [0.073]	0.000 [0.310]	0.000 [0.313]	0.000 [0.337]
Free Cash Flows	0.292*** [0.000]	0.271*** [0.000]	0.266*** [0.000]	0.223*** [0.001]	0.185*** [0.006]	0.175*** [0.010]
R&D	0.024 [0.321]	0.025 [0.298]	0.026 [0.269]	0.089*** [0.007]	0.093*** [0.005]	0.094*** [0.005]
PP&E	-0.025 [0.396]	-0.024 [0.414]	-0.025 [0.394]	-0.161*** [0.000]	-0.157*** [0.000]	-0.159*** [0.000]
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,815	12,843	12,815	12,815	12,843	12,815
R-squared	0.494	0.494	0.495	0.561	0.560	0.562