Investor Sentiment and Stock Option Vesting Terms

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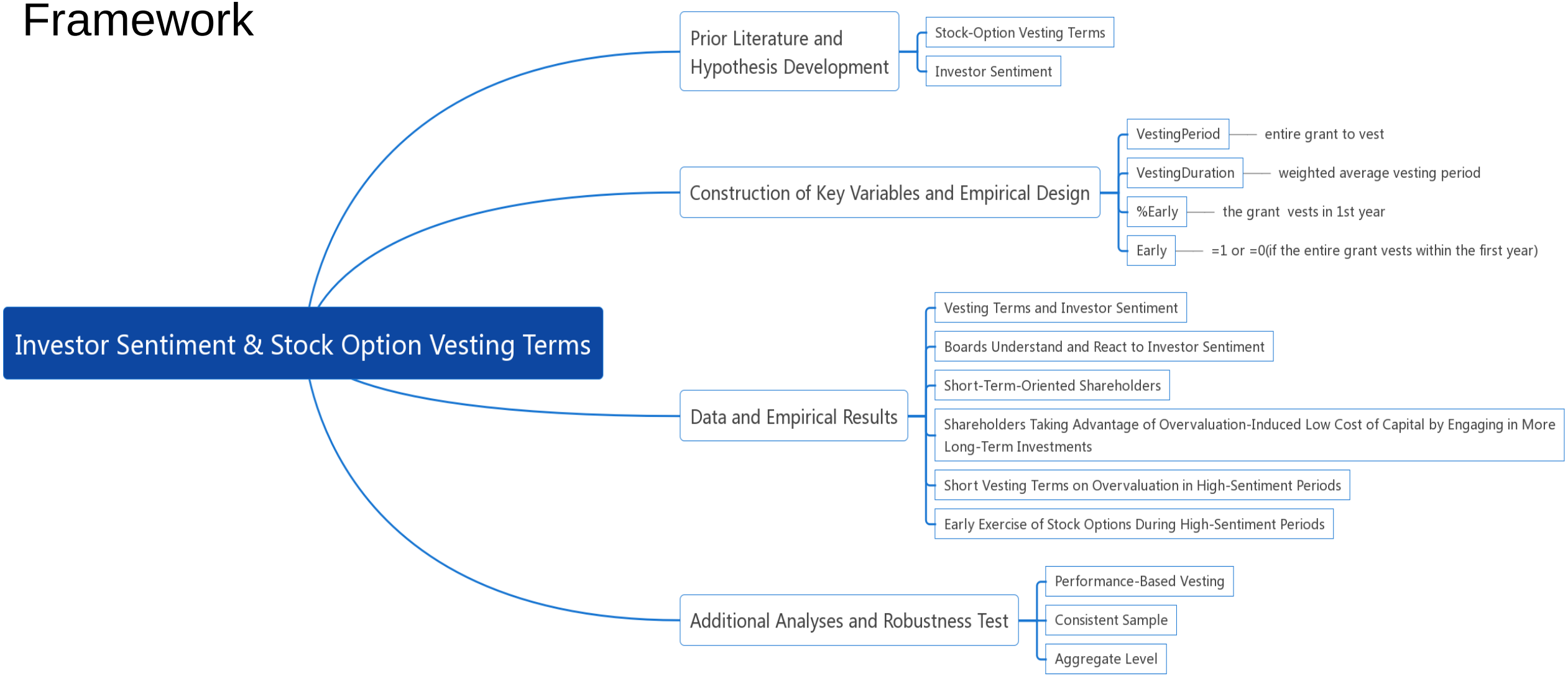
Abstract/Conclusion

- The negative relation between investor sentiment and vesting terms of executives' stock options.
- Boards actively monitor and adjust vesting terms based on changing market conditions.
- Presenting empirical evidence that short-term-oriented compensation incentives can play an important role in explaining managers' investment behavior during a speculative stock market.

Framework


Investor Sentiment & Stock Option Vesting Terms
Prior Literature and Hypothesis Development
Stock-Option Vesting Terms
Investor Sentiment
Construction of Key Variables and Empirical Design
VestingPeriod
entire grant to vest
VestingDuration
weighted average vesting period
%Early
the grant vests in 1st year
Early
=1 or =0(if the entire grant vests within the first year)
Data and Empirical Results
Vesting Terms and Investor Sentiment
Boards Understand and React to Investor Sentiment
Short-Term-Oriented Shareholders
Shareholders Taking Advantage of Overvaluation-Induced Low Cost of Capital by Engaging in More Long-Term Investments
Short Vesting Terms on Overvaluation in High-Sentiment Periods
Early Exercise of Stock Options During High-Sentiment Periods
Additional Analyses and Robustness Test
Performance-Based Vesting
Consistent Sample
Aggregate Level

Prior Literature and Hypothesis Development

Stock-Option Vesting Terms

- new grants of stock options can be used to effectively manage CEO incentives
- the effectiveness of compensation contracts de- pends on the level of stock options and the details of the vesting terms
- granting stock options with long vest- ing terms can extend managers' investment horizon
- long vesting terms can further reduce managers' risk- seeking incentives and exacerbate this type of agency conflict
- we focus on sentiment- driven overvaluation and its impact on vesting terms of new stock-option grants.

Investor Sentiment

- stocks tend to be overvalued in high-sentiment periods （negatively associated，stronger in high-sentiment）
- firms avoid providing long-term forecastslong & firms are more likely to release high pro forma earnings in high- sentiment periods
- we expect firms to grant stock options with short vesting terms during high-sentiment periods （**Hypothesis 1**.There is a negative association between investor sentiment and vesting terms.）.

Key Variables and Empirical Design

Measurement of Vesting Terms

- **VestingPeriod:** tme for entire grant to vest
- **VestingDuration:** weighted average vesting period
- **%Early:** % grant that vests in the first year
- **Early:** =1(entire grant vests within the 1st year)
  =0(otherwise)

Measurement of Investor Sentiment

- Market-wide : the Michigan Consumer Sentiment Index (MCSI)
- Firm-specific(not focused on): economic theory suggests that firm-specific overvaluation tends to be highly transitory , which mitigates shareholders' incentives to grant short vesting terms for the purpose of taking advantage of low-cost capital

Key Variables and Empirical Design

Vesting Term Model

- **Vesting**

$$=\beta 0 +\beta 1\text{Sentiment}+\beta 2\text{SFAS123(R)} +\beta 3\text{PConstrained}+\beta 4\text{AbnormalCash} +\beta 5\text{CFO}+\beta 6\text{Chair}+\beta 7\text{CEOPower} +\beta 8\text{ShareOwned}+\beta 9\text{RetirementAged} +\beta 10\text{NewCEO}+\beta 11\text{LogAssets}+\beta 12\text{BM} +\beta 13\text{ReturnVolatility}+\beta 14\text{ROA} +\beta 15\text{AbnormalReturn}+\beta 16\text{InstOwn}+\beta 17\text{NAnalyst} +\beta 18\text{Debt}+\beta 19\text{R\&D}+\beta 20\text{M\&A3m} +\beta 21\text{SEO3m}+\beta 22\text{TB3m}+\beta 23\text{Trend}+\varepsilon. (1)$$

Vesting Term Model

- **Pr(Early =1)**

$$=\_x0001\_\ \delta 0 + \delta 1\text{Sentiment} + \delta 2\text{SFAS 123(R)} + \delta 3\ \text{PConstrained} + \delta 4\text{AbnormalCash} + \delta 5\text{CFO} + \delta 6\text{Chair} + \delta 7\text{CEOPower} + \delta 8\ \text{ShareOwned} + \delta 9\text{RetirementAged} + \delta 10\text{NewCEO} + \delta 11\text{LogAssets} + \delta 12\text{BM} + \delta 13\text{ReturnVolatility} + \delta 14\text{ROA} + \delta 15\text{AbnormalReturn} + \delta 16\text{InstOwn} + \delta 17\text{NAnalyst} + \delta 18\text{Debt} + \delta 19\text{R\&D} + \delta 20\text{M\&A3m} + \delta 21\text{SEO3m} + \delta 22\text{TB3m} + \delta 23\text{Trend} + \varepsilon. (2)$$

Key Variables and Empirical Design

Sentiment	The Michigan Consumer Sentiment Index, which is a monthly variable scaled to range between zero and one.
SFAS 123(R)	An indicator variable taking the value of one for the post-SFAS 123 period, zero otherwise.
PConstrained	The proportion of constrained equity holdings to total equity holdings, measured as the ratio of the sum of the estimated Black–Scholes (BS) value of unvested options and the value of unvested stocks to the sum of the estimated BS value of all (unvested and vested) options and the value of all (unvested and vested) equity stocks at the beginning of the fiscal year.
AbnormalCash	Abnormal cash compensation in year $t-1$, measured as a CEO's (CFO's) cash compensation minus average cash compensation of CEOs (CFOs) in the same two-digit SIC industry, year, and firm size decile, scaled by average cash compensation of the same group.
CFO	An indicator variable taking the value of one for CFOs and zero otherwise;
Chair	An indicator variable taking the value of one if the CEO is also the chair of the board, and zero otherwise, in year $t-1$.
CEOPower	The difference between the total cash compensation of the CEO and that of the next-highest-paid executive, scaled by the total current compensation of the next-highest-paid executive, in year $t-1$.
ShareOwned	The percentage of outstanding shares owned by the CEO/CFO at the end of year $t-1$.
RetirementAged	An indicator variable taking the value of one if the CEO's age is greater than or equal to 62 in year $t-1$.
NewCEO	An indicator variable taking the value of one for new CEOs, and zero otherwise.
LogAssets	The natural logarithm of total assets in year $t-1$.
BM	The book to market ratio in year $t-1$.
ReturnVolatility	Annualized standard deviation of daily stock returns over the prior 252 trading days.
ROA	Return on assets, calculated as income before extraordinary items divided by average total assets in year $t-1$.
AbnormalReturn	Market adjusted firm return over one year ending the month before the option grant date.
InstOwn	The percentage of shares held by institutional investors prior to option grants, obtained from Thomson Financial Spectrum 13F Institutional Holdings Database.
NAnalyst	The number of analysts following the firm in year $t-1$, obtained from the Institutional Brokers' Estimate System.
Debt	Total debt scaled by total assets in year $t-1$.
R&D	Research and development expense, which is replaced by zero when missing, scaled by total assets, year $t-1$.
M&A3m	The number of mergers and acquisitions undertaken by the firm in three months prior to option grants.
SEO3m	The percentage increase in shares outstanding (net issuance) in three months prior to option grants.
TB3m	Risk-free rates, measured as the three-month Treasury Bill rate.
Trend	A trend variable, standardized to range between zero for the first period in our sample to one for the last period in the sample.

Data and Empirical Results

Table 1. Sample Reconciliation

Sample Filters	Number of Observations
Option Grants ("EMPO," "ISO," "NONQ," "OPTNS") for CEO and CFO with nonmissing shares, transaction, and vesting date	781,073
Less:	
Grants where the vesting date is before the transaction date	−782
Grants where the vesting period is greater than 120 months	−251
Total grant-level data	780,040
Aggregating option grants at the firm-person-month level	86,744
Less:	
Observations missing data from Compustat	−19,203
Observations missing data from CRSP	−12,475
Observations not in Execucomp	−37,028
Final sample	18,038

Table 2. Descriptive Statistics

Variable	N	Mean	Minimum	Q1	Median	Q3	Maximum
VestingPeriod	18,038	38.091	0.000	36.000	36.000	48.000	72.000
VestingDuration	18,038	25.223	0.000	24.000	24.120	30.000	58.875
Early	18,038	0.364	0.000	0.250	0.267	0.333	1.000
%Early	18,038	0.147	0.000	0.000	0.000	0.000	1.000
Sentiment	18,038	0.472	0.000	0.323	0.464	0.642	1.000
SFAS 123(R)	18,038	0.745	0.000	0.000	1.000	1.000	1.000
PConstrained	18,038	0.322	0.000	0.142	0.286	0.467	1.000
AbnormalCash	18,038	0.004	−0.747	−0.223	−0.022	0.139	1.686
CFO	18,038	0.333	0.000	0.000	0.000	1.000	1.000
Chair	18,038	0.334	0.000	0.000	0.000	1.000	1.000
CEOPower	18,038	0.436	−1.000	0.000	0.291	0.760	2.529
ShareOwned	18,038	0.928	0.000	0.039	0.133	0.477	19.010
RetirementAged	18,038	0.108	0.000	0.000	0.000	0.000	1.000
NewCEO	18,038	0.047	0.000	0.000	0.000	0.000	1.000
LogAssets	18,038	7.834	1.910	6.542	7.763	8.972	14.465
BM	18,038	0.493	−0.161	0.254	0.415	0.638	2.057
ReturnVolatility	18,038	0.410	0.140	0.262	0.358	0.499	1.196
ROA	18,038	0.043	−0.434	0.015	0.050	0.089	0.241
AbnormalReturn	18,038	0.053	−0.714	−0.177	0.005	0.215	1.688
InstOwn	18,038	0.567	0.000	0.382	0.683	0.844	1.000
NAnalyst	18,038	13.900	0.000	6.000	12.000	20.000	67.000
Debt	18,038	0.213	0.000	0.053	0.192	0.325	0.763
R&D	18,038	0.034	0.000	0.000	0.000	0.044	0.308
M&A3m	18,038	0.204	0.000	0.000	0.000	0.000	3.000
SEO3m	18,038	0.003	−0.061	−0.002	0.000	0.004	0.205
TB3m	18,038	0.022	0.000	0.001	0.003	0.028	6.170

Notes. This table presents descriptive statistics for the sample (18,038 firm-month-executive observations) from 1996 to 2016. The variable definitions are provided in the appendix. All continuous variables are winsorized at the 1st and 99th percentiles.

Data and Empirical Results(Univariate Analyses)

Table 3. Univariate Relations of *VestingPeriod* and *VestingDuration* with Investor Sentiment (N = 18,038)

Investor Sentiment Quantile	*VestingPeriod*	*VestingDuration*
Low sentiment	40.54	26.48
Q2	40.46	26.44
Q3	38.51	25.16
Q4	36.39	24.23
High sentiment	24.42	18.78
High-Low	−16.12***	−7.70***
	(−31.04)	(−20.68)

Notes. This table presents the relationship between investor sentiment quintiles and *VestingPeriod* and *VestingDuration*. The definitions of our variables of interest are as follows: Sentiment is the monthly Michigan Consumer Sentiment Index; *VestingPeriod* is vesting period in months, calculated as the time between the grant date and the vesting date of the last tranche of the grant; *VestingDuration* is vesting duration in months, calculated as the average number of months to vest for the options in a grant, weighted by the number of options that vest over a given period. *t*-statistics are reported in parentheses.

***$p < 0.01$.

Table 4. Univariate Relations of *%Early* and *Early* with Investor Sentiment (N = 18,038)

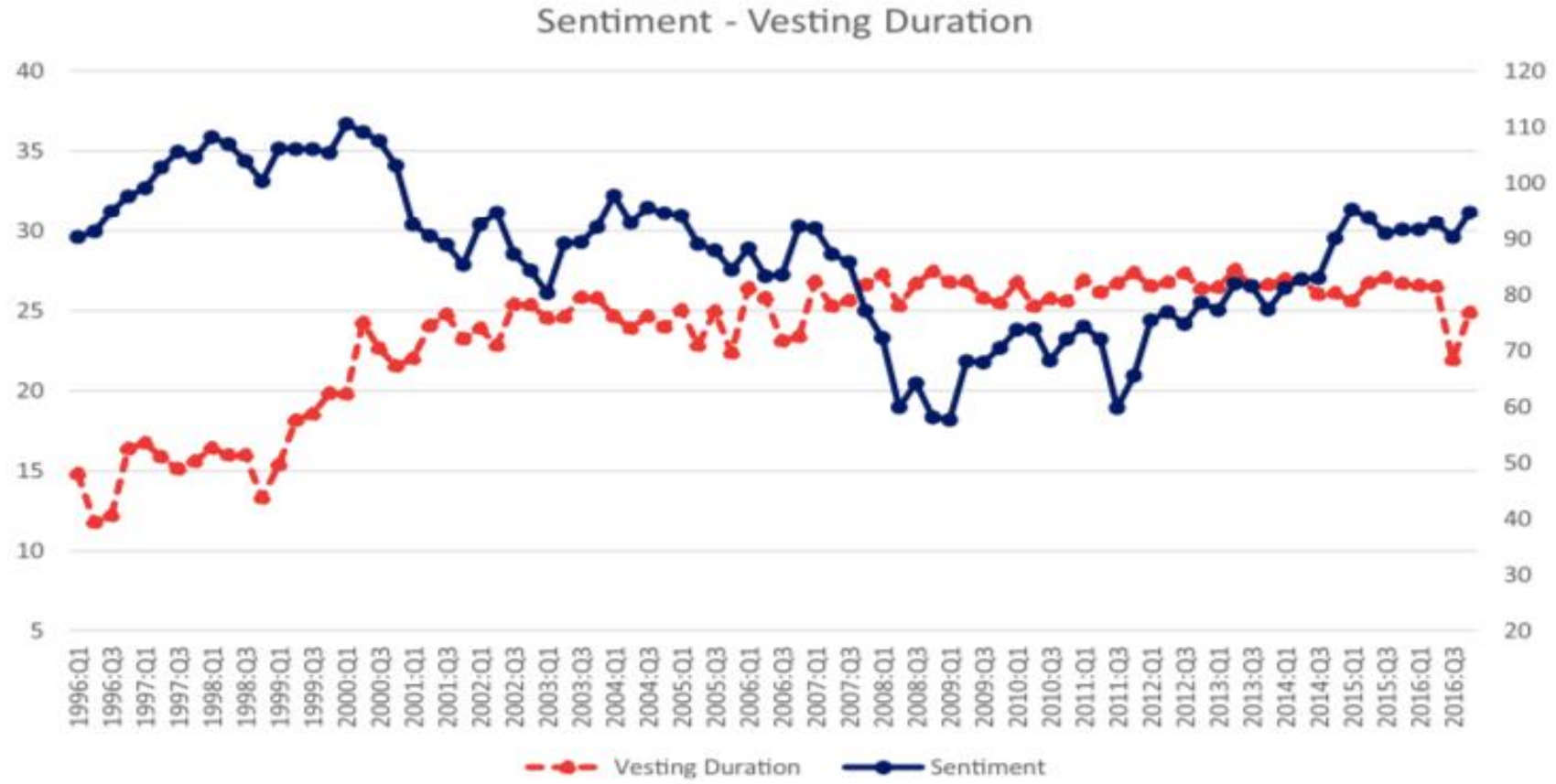
Investor Sentiment Quantile	*%Early*	*Early*
Low sentiment	31.70%	0.086
Q2	31.61%	0.088
Q3	36.34%	0.138
Q4	39.46%	0.184
High sentiment	61.92%	0.510
High-Low	30.22***	0.424***
	(27.06)	(32.12)

Notes. This table presents the relationship between investor sentiment quintiles and *%Early* and *Early*. The definitions of our variables of interest are as follows: Sentiment is the monthly Michigan Consumer Sentiment Index; *%Early* is the percentage of total options vesting in the first year; *Early* is an indicator variable taking a value of one if all of the option grants vest in the first year, and zero otherwise. *t*-statistics are reported in parentheses.

***$p < 0.01$.

Data and Empirical Results(Univariate Analyses)

Figure 1. (Color online) Investor Sentiment and Vesting Duration



Notes. This figure presents the average quarterly *VestingDuration* (left scale) and investor *Sentiment* (right scale) from 1996 to 2016. *VestingDuration* is vesting duration in months, calculated as the average number of months to vest for the options in a grant, weighted by the number of options that vest over a given period. We compute the average of *VestingDuration* using all option grants in a given calendar quarter. *Sentiment* is the Michigan Consumer Sentiment Index averaged at the quarterly level.

Vesting Duration is substantially lower during high nvestor- sentiment periods.

Data and Empirical Results (Multivariate Analyses-- Sentiment and VP and VD)

Vesting

$$=\beta 0 +\beta 1\text{Sentiment}+\beta 2\text{SFAS123(R)} +\beta 3\text{PConstrained}+\beta 4\text{AbnormalCash} +\beta 5\text{CFO}+\beta 6\text{Chair}+\beta 7\text{CEOPower} +\beta 8\text{ShareOwned}+\beta 9\text{RetirementAged} +\beta 10\text{NewCEO}+\beta 11\text{LogAssets}+\beta 12\text{BM} +\beta 13\text{ReturnVolatility}+\beta 14\text{ROA} +\beta 15\text{AbnormalReturn}+\beta 16\text{InstOwn} +\beta 17\text{NAnalyst} +\beta 18\text{Debt}+\beta 19\text{R\&D} +\beta 20\text{M\&A3m}+\beta 21\text{SEO3m}+\beta 22\text{TB3m} +\beta 23\text{Trend}+\varepsilon.(1)$$

t-stat significant=1%

Table 5. The Relation Between Investor Sentiment and *VestingPeriod*/*VestingDuration*

	(1)				(2)			
	VestingPeriod				*VestingDuration*			
Variable	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	*t*-stat
Sentiment	−10.917***	−5.89	−6.998***	−5.17	−5.931***	−5.88	−3.749***	−4.68
SFAS 123(R)	−2.341	−1.48	−1.273	−1.08	−1.019	−1.23	−0.430	−0.64
PConstrained	5.537***	5.52	2.205***	3.14	3.914***	5.97	1.312***	2.73
AbnormalCash	−0.644	−0.92	0.616	1.45	−0.009	−0.02	0.675**	2.24
CFO	−1.204**	−2.34	−0.301	−0.93	−0.593*	−1.79	−0.242	−1.08
Chair	−1.216**	−2.16	−0.643	−1.60	−0.536	−1.37	−0.467	−1.68
CEOPower	−0.560	−0.98	0.015	0.04	−0.543	−1.50	−0.179	−0.76
ShareOwned	0.375***	4.36	0.031	0.38	0.261***	4.66	0.014	0.26
RetirementAged	−1.604**	−2.30	−0.489	−0.99	−1.077**	−2.39	−0.329	−1.01
NewCEO	−0.060	−0.09	0.733	1.49	−0.230	−0.50	0.374	1.08
LogAssets	−0.549**	−2.20	1.592***	2.86	−0.076	−0.48	0.921***	2.75
BM	−1.552*	−1.87	−0.491	−0.60	−0.632	−1.27	−0.394	−0.79
ReturnVolatility	−3.432**	−2.02	−1.138	−1.05	−2.658**	−2.51	−0.058	−0.08
ROA	3.001	1.11	−2.016	−1.19	3.705**	2.23	−0.682	−0.64
AbnormalReturn	−0.781	−1.33	−0.046	−0.15	−0.590	−1.61	0.040	0.20
InstOwn	0.288	0.33	1.909*	1.78	−0.078	−0.14	1.462**	2.09
NAnalyst	0.035	0.63	−0.017	−0.49	0.005	0.15	−0.016	−0.68
Debt	−1.131	−0.68	−0.318	−0.20	0.427	0.39	−0.134	−0.12
R&D	−0.034	0.00	−10.435	−1.52	−13.041**	−2.52	−5.523	−1.32
M&A3m	0.981**	2.07	0.034	0.15	0.683**	2.02	0.111	0.68
SEO3m	2.731	0.47	5.077	1.04	−0.775	−0.20	1.815	0.57
TB3m	−0.785	−0.63	0.328	0.56	−0.617	−0.95	0.072	0.23
Trend	15.661***	6.76	9.811***	4.79	7.162***	5.75	5.102***	4.24
Industry FE	Yes		No		Yes		No	
Firm FE	No		Yes		No		Yes	
Observations	18,038		18,038		18,038		18,038	
Adjusted R^2	0.124		0.593		0.079		0.557	

Data and Empirical Results (Multivariate Analyses-- Sentiment and VP and VD)

Pr(Early =1)

=_x0001_ δ0 + δ1Sentiment + δ2SFAS 123(R)
+ δ3 PConstrained+ δ4AbnormalCash
+ δ5CFO+ δ6Chair + δ7CEOPower
+ δ8 ShareOwned+ δ9RetirementAged
+ δ10NewCEO + δ11LogAssets + δ12BM
+ δ13ReturnVolatility + δ14ROA
+ δ15AbnormalReturn + δ16InstOwn + δ17NAnalyst + δ18Debt + δ19R&D + δ20M&A3m + δ21SEO3m
+ δ22TB3m + δ23Trend + ε. (2)

Table 6. The Relation between Investor Sentiment and Early Vesting

t-stat significant=1%

	(1)				(2)			
	%Early				Prob (*Early=1*)			
Variable	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	Wald-χ^2	Estimate	Wald-χ^2
Sentiment	0.190***	5.45	0.139***	5.15	1.435***	96.12	1.752***	63.67
SFAS 123(R)	0.034	1.19	0.013	0.57	0.411***	20.56	0.378	7.38
PConstrained	–0.097***	–4.86	–0.038***	–2.66	–1.180***	92.33	–0.665***	9.95
AbnormalCash	0.000	0.02	–0.018**	–2.01	0.038	0.42	–0.219*	3.83
CFO	0.016*	1.79	0.002	0.38	0.114	2.15	–0.007	0.00
Chair	0.010	0.91	0.011	1.34	0.058	1.08	0.170	2.37
CEOPower	0.009	0.90	–0.001	–0.13	–0.015	0.11	–0.020	0.06
ShareOwned	–0.005***	–3.50	–0.001	–0.71	–0.037***	19.53	0.023	0.96
RetirementAged	0.042	3.15	0.010	0.99	0.411***	36.51	0.087	0.52
NewCEO	0.001	0.08	–0.016	–1.59	–0.014	0.02	–0.264*	2.80
LogAssets	0.001	0.14	–0.026**	–2.33	–0.010	0.25	–0.480***	22.15
BM	0.015	0.93	0.010	0.66	0.199***	6.65	–0.051	0.10
ReturnVolatility	0.034	1.17	0.003	0.13	0.015	0.01	0.105	0.17
ROA	–0.056	–1.21	0.023	0.74	0.137	0.19	0.539	0.84
AbnormalReturn	0.008	0.73	–0.002	–0.29	0.078	1.84	0.025	0.08
InstOwn	–0.012	–0.70	–0.051**	–2.35	–0.210***	8.19	–0.366	2.27
NAnalyst	0.000	0.26	0.001	1.36	0.006*	3.84	0.015**	4.16
Debt	–0.015	–0.50	0.026	0.84	–0.176	1.27	0.336	0.61
R&D	0.127	0.91	0.267**	2.20	0.695	1.25	3.645*	2.90
M&A3m	–0.009	–1.21	–0.003	–0.60	–0.061	1.41	0.023	0.09
SEO3m	0.062	0.58	–0.039	–0.41	0.575	0.63	–0.680	0.40
TB3m	0.009	0.51	–0.025	–1.38	0.003	0.00	–0.545***	11.46
Trend	–0.305***	–7.29	–0.230***	–5.82	–3.545***	437.66	–3.760***	154.78
Industry FE	Yes		No		Yes		No	
Firm FE	No		Yes		No		Yes	
Observations	18,038		18,038		18,038		18,038	
Adjusted R^2	0.111		0.552					
Pseudo R^2					0.112		0.237	

Data and Empirical Results(Insider Reaction)

Table 7. Insider Trading by Directors, CEOs & CFOs, and All Insiders Across Different Sentiment Periods

t-stat significant=1%

Sentiment	*N*	*Net Insider Purchase Ratio*		
		Directors	CEO & CFO	All Insiders
Low	28	0.481	0.458	0.489
Middle	28	0.398	0.325	0.370
High	28	0.314	0.275	0.299
Low – High	84	0.167***	0.183***	0.190***
		(4.41)	(3.05)	(4.74)

Corporate insiders understand investor sentiment and **avoid** purchasing stocks when they are overvalue

Data and Empirical Results(Insider Reaction)

Table 8. Changes in Vesting Terms across Different Sentiment Periods (N = 12,979)

↓≥12m

non→all early

Sentiment Rank	*Large Decline in VestingDuration*	*Change to Early*
Low	0.056	0.029
2	0.053	0.031
3	0.075	0.043
4	0.087	0.053
High	0.110	0.084
High – Low	0.054***	0.055***
	(5.53)	(6.43)

%

Some firms act even before investor sentiment reaches the highest level→Table 9 : regression analysis(change in duration & change in sentiment)

Data and Empirical Results(Insider Reaction)

Corporate boards alter vesting terms when they observe optimistic investor sentiment.

Table 9. Regression of Yearly Changes in Vesting Duration on Yearly Changes in Investor Sentiment

t-stat significant=1%

	(1)			
	Change in VestingDuration			
Variable	Estimate	*t*-stat	Estimate	*t*-stat
ChangeSentiment	−1.577***	−3.05	−1.535***	−2.85
SFAS 123(R)	−0.134	−0.33	−0.189	−0.46
PConstrained	−0.462	−1.26	−0.450	−0.90
AbnormalCash	0.018	0.10	0.296	0.99
CFO	−0.036	−0.29	−0.213	−1.10
Chair	0.144	0.97	−0.046	−0.19
CEOPower	−0.043	−0.33	−0.154	−0.79
ShareOwned	−0.036	−1.41	−0.051	−1.12
RetirementAged	0.008	0.05	−0.072	−0.29
LogAssets	−0.055	−1.10	−0.002	−0.01
BM	0.192	0.83	0.247	0.60
ReturnVolatility	0.036	0.09	−0.191	−0.37
ROA	1.536*	1.79	2.123*	1.80
AbnormalReturn	0.160	0.79	0.188	0.75
InstOwn	−0.020	−0.13	−0.122	−0.21
NAnalyst	0.002	0.22	0.001	0.05
Debt	0.525	1.29	1.679*	1.82
R&D	−0.644	−0.51	−4.153	−0.92
M&A3m	0.094	0.72	0.035	0.22
SEO3m	1.595	0.58	1.061	0.32
TB3m	−0.508	−1.42	−0.675	−1.61
Trend	−0.928	−1.42	−1.413*	−1.69
Industry FE	Yes		No	
Firm FE	No		Yes	
Observations	12,979		12,979	
Adjusted R^2	0.010		0.099	

Data and Empirical Results (Short-Term-Oriented Shareholders)

t-stat significant=1%

Expect the negative relation to be stronger among firms with more short-term-oriented shareholders

↓

Short-term-oriented shareholders directly benefit from stock overvaluation and are more willing to grant options with shorter vesting terms during high-sentiment periods.

Table 10. The Impact of Institution Class on the Relation Between Investor Sentiment and Vesting Terms: *VestingPeriod* and *VestingDuration*

	VestingPeriod				*VestingDuration*			
	Low		High		Low		High	
	Transient		*Transient*		*Transient*		*Transient*	
Variable	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	*t*-stat
Sentiment	−3.487*	−1.81	−10.293***	−5.02	−1.327	−1.09	−5.895***	−4.51
SFAS 123(R)	1.734	0.85	−9.034***	−4.92	0.883	0.69	−4.230***	−3.49
PConstrained	0.457	0.37	3.669**	2.21	0.120	0.15	2.238*	1.90
AbnormalCash	1.297	1.62	1.371	1.15	1.287	2.25*	1.282	1.63
CFO	−0.085	−0.14	−1.068	−1.37	−0.284	−0.77	−0.649	−1.26
Chair	−0.385	−0.64	−0.557	−0.65	−0.487	−1.33	−0.651	−1.06
CEOPower	−0.480	−0.81	−0.408	−0.45	−0.512	−1.17	−0.493	−0.80
ShareOwned	0.131	1.52	0.065	0.33	0.024	0.42	0.101	0.65
RetirementAged	−1.165	−1.58	1.011	0.82	−0.431	−0.95	0.593	0.76
NewCEO	−0.495	−0.43	1.354	1.48	−0.317	−0.37	0.791	1.12
LogAssets	2.540	1.55	0.491	0.49	1.854	1.99**	0.199	0.31
BM	−2.249	−0.95	1.285	0.76	−1.370	−1.08	0.547	0.50
ReturnVolatility	−1.347	−0.68	5.901***	2.62	0.716	0.53	2.725*	1.87
ROA	−2.570	−0.63	0.411	0.10	−1.240	−0.47	−0.148	−0.05
AbnormalReturn	−1.981**	−2.38	1.120*	1.94	−1.313	−2.65***	0.763*	1.90
InstOwn	−1.020	−0.42	−1.021	−0.42	−0.516	−0.35	−1.638	−0.99
NAnalyst	0.027	0.31	0.035	0.40	0.031	0.59	−0.002	−0.03
Debt	−5.451*	−1.69	2.286	0.65	−4.172	−2.11**	0.693	0.29
R&D	−4.296	−0.37	−21.027	−1.25	−6.467	−0.99	−5.892	−0.59
M&A3m	−0.580	−1.13	0.317	0.52	−0.427	−1.08	0.225	0.51
SEO3m	8.613	0.72	5.126	0.52	0.903	0.13	2.630	0.41
TB3m	0.256	0.53	0.507	0.50	0.223	0.72	0.233	0.46
Trend	4.540	1.55	27.739***	7.86	2.811	1.61	13.379***	5.21
Firm FE	Yes		Yes		Yes		Yes	
Observations	4,321		4,322		4,321		4,322	
Adjusted R^2	0.705		0.685		0.706		0.644	

Data and Empirical Results (Short-Term-Oriented Shareholders)

Expect the negative relation to be stronger among firms with more short-term-oriented shareholders

↓

Short-term-oriented shareholders directly benefit from stock overvaluation and are more willing to grant options with shorter vesting terms during high-sentiment periods.

Table 11. The Impact of Institution Class on the Relation Between Investor Sentiment and Vesting Terms: *%Early* and Prob(*Early=1*)

t-stat significant=1%

	%Early				Prob(*Early=1*)			
	Low transient		High transient		Low transient		High transient	
Variable	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	Wald-χ^2	Estimate	Wald-χ^2
Sentiment	0.059	1.54	0.243***	5.77	1.332**	5.55	2.076***	13.09
SFAS 123(R)	−0.020	−0.52	0.165***	4.19	0.075	0.05	1.525***	11.02
PConstrained	−0.014	−0.64	−0.071*	−1.97	−0.448	0.68	−0.882*	3.16
AbnormalCash	−0.028	−1.54	−0.042*	−1.96	−0.586*	3.18	−0.462*	3.70
CFO	0.006	0.49	0.013	0.86	0.037	0.02	0.363	1.23
Chair	0.020*	1.80	0.018	0.99	0.257	0.73	0.301	1.51
CEOPower	0.009	0.62	0.007	0.34	0.210	0.80	−0.004	0.00
ShareOwned	−0.001	−0.77	−0.004	−0.96	−0.099	1.40	−0.079	2.27
RetirementAged	0.004	0.29	−0.025	−1.06	0.230	0.44	0.047	0.03
NewCEO	0.007	0.34	−0.026	−1.18	−0.059	0.02	−0.564*	2.99
LogAssets	−0.051*	−1.68	−0.010	−0.48	−1.214***	12.88	−0.490*	3.39
BM	0.059	1.43	−0.020	−0.61	0.660*	3.10	−0.718	2.65
ReturnVolatility	0.010	0.25	−0.100**	−2.26	1.315*	3.55	−1.849***	9.31
ROA	0.022	0.24	−0.100	−1.33	2.028	1.92	−0.601	0.18
AbnormalReturn	0.042***	2.72	−0.022**	−2.06	0.950***	12.28	−0.317*	3.72
InstOwn	0.011	0.22	0.001	0.02	0.517	0.57	0.250	0.13
NAnalyst	−0.001	−0.32	0.001	0.51	0.015	0.38	0.013	0.42
Debt	0.112*	1.69	−0.036	−0.54	0.916	0.62	−0.305	0.10
R&D	0.113	0.62	0.418	1.58	1.380	0.06	0.852	0.03
M&A3m	0.023*	1.75	−0.020	−1.58	0.613***	7.32	−0.055	0.12
SEO3m	0.033	0.15	−0.018	−0.10	−0.782	0.09	−1.887	0.62
TB3m	−0.010	−1.26	−0.049	−1.59	−0.162	0.04	−4.565	0.65
Trend	−0.133**	−2.45	−0.509***	−6.89	−3.061***	15.41	−6.606***	43.51
Firm FE	Yes		Yes		Yes		Yes	
Observations	4,321		4,322		4,321		4,322	
Adjusted R^2	0.682		0.671					
Pseudo R^2					0.172		0.303	

Data and Empirical Results (Advantage of Overvaluation-Induced Low Cost of Capital by Engaging in More Long-Term Investments) firm investing activities

A high level of long-term investments can be indicative of the involvement of share- holders in offering stock options with short vesting terms when investor sentiment is high.

LM&A or ChangeCAPEX

$= \gamma_0 + \gamma_1$ LVestingDuration + γ_2Sentiment

+ γ_3LVestingDuration*Sentiment + Controls + ε. (3)

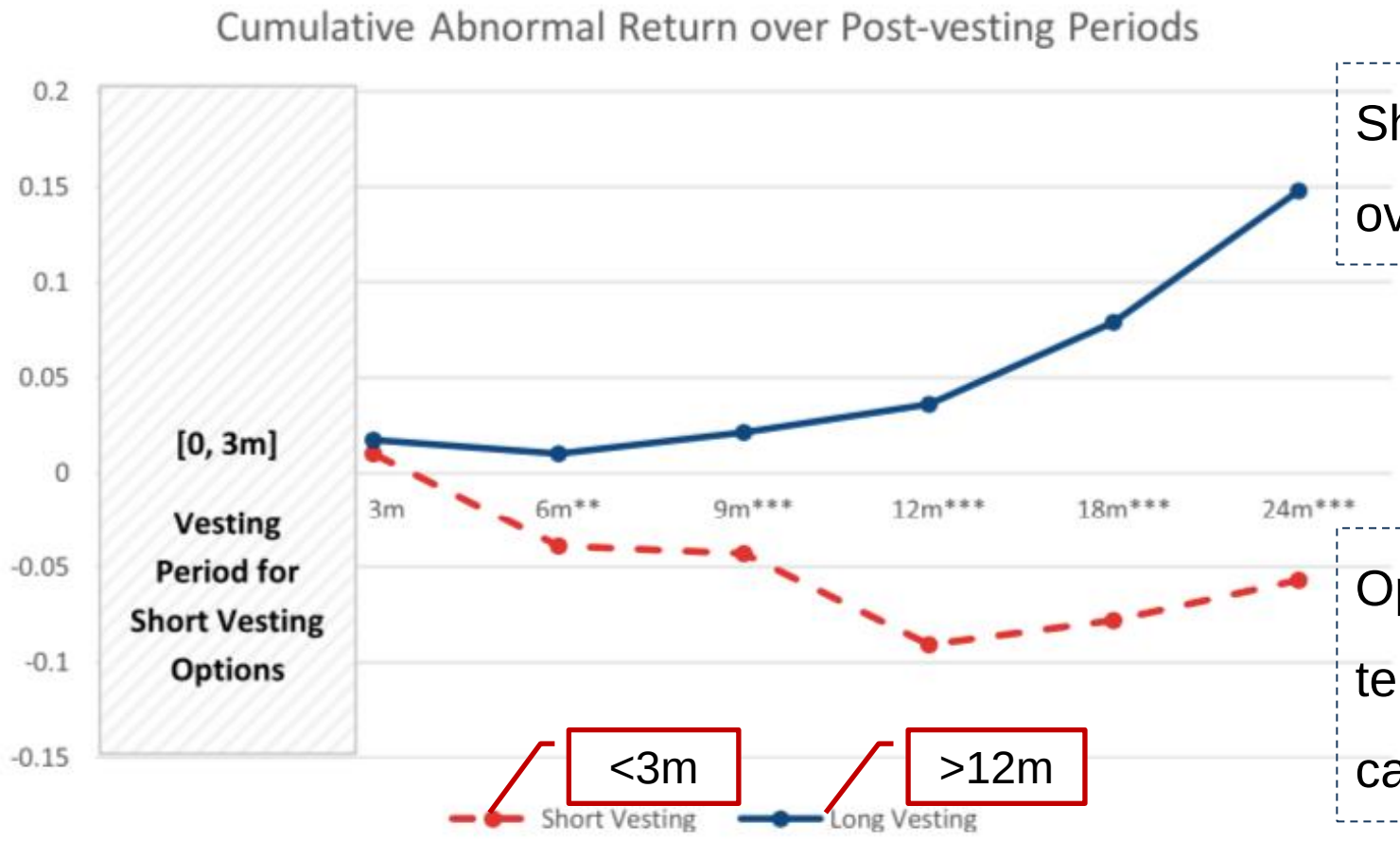
t-stat significant=1%

Table 12. Future M&A Activity and Changes in CAPEX

	(1)		(2)	
	Log of number of M&As in the next 12 months		Change in CAPEX in the next fiscal year	
Variable	Estimate	*t*-stat	Estimate	*t*-stat
LVestingDuration	0.055***	3.10	0.002	1.54
Sentiment	0.190**	2.32	0.014*	1.80
LVestingDuration × Sentiment	−0.076***	−3.17	−0.004*	−1.76
SFAS 123(R)	0.043**	2.02	0.001	0.41
ROA	0.217***	2.93	−0.009**	−2.59
AReturn	0.052***	3.64	0.012***	14.42
ReturnVolatility	−0.355***	−9.80	−0.015***	−6.60
InstOnw	0.085***	3.65	0.000	−0.36
NAnalyst	0.007***	6.10	−0.000***	−2.99
LogAssets	0.037***	5.20	0.000	0.89
BT	−0.043**	−2.29	0.001	1.46
Debt	−0.109**	−2.38	0.002	0.76
RD	−0.050	−0.26	−0.003	−0.41
TB3m	−0.021	−0.73	0.000	−0.26
Trend	−0.320***	−7.55	0.005	1.50
Industry FE	Yes		Yes	
Observations	18,038		14,502	
Adjusted R^2	0.124		0.052	

Data and Empirical Results
(Short Vesting Terms & Overvaluation in High-Sentiment Periods)

Figure 2. (Color online) Comparison of Cumulative Abnormal Returns for Short vs. Long Vesting Options During the Periods Subsequent to the Grant Date



Short vesting terms maintain overvaluation during vesting periods

Options with very short vesting terms do not appear to be part of cash com- pensation or bonuses.

Data and Empirical Results (Early Exersice)

during (-90,exersice date) reciveing non-early-vesting grants

Table 13. Stock Option Early Exercise and Investor Sentiment

	Full			*Early=0*			*Early=1*		
Sentiment rank	*N*	Mean	Median	*N*	Mean	Median	*N*	Mean	Median
Low	1,316	56.11	58.00	1,062	55.18	57.00	254	60.00	65.62
2	1,348	51.02	48.00	1,012	50.88	48.00	336	51.45	47.65
3	1,324	44.67	40.00	909	46.54	42.00	415	40.59	35.00
4	1,321	45.41	36.00	789	49.75	42.65	532	38.97	29.22
High	1,085	31.06	19.00	361	33.61	24.15	724	29.79	17.38
High-Low		−25.05	−39.00		−21.57	−32.85		−30.21	−48.24
		(−17.74)	(−17.12)		(−10.17)	(−10.04)		(−12.26)	(−10.77)

Additional evidence that managers are aware of their firms' stock overvaluation

Exersice Period= exercise date -vested date

Additional Analyses and Robustness Tests (Performance-Based Vesting)

It is possible that the observed shorter vesting terms during periods of high sentiment are due to the performance-based vesting grants.

Not driven by performance-based vesting

Table 14. The Relation Between Investor Sentiment and Vesting Period/Duration—Excluding Performance-Based Options

	(1)		(2)		(3)		(4)	
	VestingPeriod		*VestingDuration*		*%Early*		Prob(*Early=1*)	
Variable	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	Wald-χ
Sentiment	−5.468***	−3.23	−3.039***	−2.76	0.134***	3.49	2.180***	13.19
SFAS 123(R)	0.053	0.04	−0.094	−0.10	0.025	0.82	0.598	1.82
PConstrained	2.006	1.64	0.889	1.01	−0.046*	−1.77	−1.066**	4.20
AbnormalCash	0.568	0.89	0.412	0.92	−0.011	−0.92	−0.108	0.24
Chair	−0.887	−1.27	−0.525	−1.05	0.009	0.64	0.183	0.58
CEOPower	−0.317	−0.72	−0.443	−1.54	0.007	0.78	0.014	0.01
ShareOwned	0.071	0.40	0.042	0.34	−0.001	−0.45	−0.003	0.00
RetirementAged	0.102	0.15	0.109	0.23	−0.003	−0.19	−0.067	0.08
NewCEO	1.312**	2.32	0.870**	2.06	−0.023**	−2.01	−0.902***	7.10
LogAssets	0.948	1.28	0.236	0.51	−0.012	−0.85	−0.138	0.37
BM	1.175	1.05	0.791	1.07	−0.022	−1.02	−0.846**	4.34
ReturnVolatility	−3.409	−2.33	−1.102	−1.10	0.028	1.00	0.798	2.04
ROA	0.506	0.19	−0.299	−0.15	0.052	0.94	0.869	0.36
AbnormalReturn	0.082	0.17	0.037	0.12	−0.001	−0.14	0.063	0.10
InstOwn	0.195	0.14	0.540	0.57	−0.019	−0.64	−0.117	0.05
NAnalyst	−0.066	−1.54	−0.050*	−1.75	0.002**	2.65	0.043***	7.71
Debt	0.341	0.15	−0.059	−0.04	0.048	1.02	0.836	0.71
R&D	0.001	1.62	0.000	0.71	0.000	−1.70	−0.001***	10.09
M&A3m	−0.034	−0.10	0.182	0.77	−0.002	−0.27	0.198	2.13
SEO3m	6.261	0.84	5.441	1.13	−0.213	−1.59	−1.793	0.66
TB3m	0.238	0.95	0.204	1.26	−0.011*	−1.94	−0.172*	3.75
Trend	7.329**	2.30	5.079**	2.34	−0.269***	−3.50	−5.589***	26.43
Firm FE	Yes		Yes		Yes		Yes	
Observations	5,683		5,683		5,683		5,683	
Adjusted R^2	0.646		0.604		0.599			
Pseudo R^2							0.219	

Additional Analyses and Robustness Tests(Consistent Sample &Aggregate Level)

The different composition of the sample firms that have different contract terms varying systematically across different sentiment periods.

Not driven by the differences in the sample composition across different periods.

Firm-level and executive-level variables become insignificant in the aggregate-level analyses.

Table 15. The Relation between Investor Sentiment and Vesting Terms (Restricted Sample)

	(1)		(2)		(3)		(4)	
	VestingPeriod		*VestingDuration*		*%Early*		Prob(*Early=1*)	
Variable	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	*t*-stat	Estimate	Wald-χ
Sentiment	–7.410***	–4.19	–3.498***	–3.20	0.144***	4.31	1.749***	22.46
SFAS 123(R)	–2.774**	–2.16	–1.310*	–1.86	0.042*	1.72	0.669***	10.80
PConstrained	2.457*	1.79	1.033	1.09	–0.042	–1.40	–0.695*	3.20
AbnormalCash	1.032	1.66	0.876**	2.10	–0.025**	–2.17	–0.365**	4.03
Chair	–0.082	–0.12	–0.029	–0.06	–0.006	–0.41	–0.137	0.63
CEOPower	0.162	0.32	–0.101	–0.30	–0.001	–0.12	–0.042	0.10
ShareOwned	–0.031	–0.20	–0.020	–0.19	0.001	0.23	0.011	0.11
RetirementAged	0.386	0.55	0.197	0.42	–0.004	–0.26	0.115	0.43
NewCEO	1.302**	2.15	1.000**	2.56	–0.027**	–2.29	–0.638***	6.69
LogAssets	1.807**	2.63	1.033**	2.37	–0.025*	–1.80	–0.533***	9.86
BM	–1.177	–1.19	–0.899	–1.38	0.015	0.75	–0.370	1.65
ReturnVolatility	0.099	0.06	1.122	0.99	–0.017	–0.53	–0.481	1.28
ROA	–1.786	–0.62	–1.321	–0.66	0.031	0.59	–0.228	0.05
AbnormalReturn	–0.068	–0.13	–0.011	–0.03	–0.003	–0.27	–0.120	0.67
InstOwn	2.487	1.54	2.132**	1.97	–0.077**	–2.30	–0.715	2.67
NAnalyst	–0.031	–0.69	–0.037	–1.24	0.001	1.57	0.009	0.51
Debt	0.604	0.26	–0.272	–0.17	0.012	0.24	0.127	0.03
R&D	–6.395	–0.58	–4.674	–0.67	0.213	1.11	–1.794	0.23
M&A3m	–0.351	–1.02	–0.126	–0.46	0.000	0.06	0.089	0.46
SEO3m	0.696	0.09	0.768	0.15	–0.003	–0.02	1.189	0.38
TB3m	0.753	1.59	0.316	0.98	–0.041*	–1.83	–1.280	11.84
Trend	11.621***	4.81	6.294***	4.36	–0.254***	–5.34	–4.505***	89.60
Firm FE	Yes		Yes		Yes		Yes	
Observations	6,200		6,200		6,200		6,200	
Adjusted R^2	0.516		0.479		0.484			
Pseudo R^2							0.329	

THANKS！