Why Do CEO Compensation Schemes Feature Convexity? Evidence from a Natural Experiment

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abstract

We provide causal evidence of CEO compensation schemes featuring convexity to provide risk-taking incentives. Specifically, we leverage the Federal Trademark Dilution Act signed in 1996 which granted additional legal protection to selected trademarks against dilution. We argue that this made risky product-market expansion more appealing to shareholders of firms with protected trademarks because product differentiation is guaranteed. We show that firms significantly increase the convexity of CEO compensation in response to exogenous increases in investment opportunities. And this increase in convexity is more pronounced for firms whose brands are well recognized, products are more substitutable, and CEOs have more career concerns.

Motivation and Research Questions

- During the course of 1990s, the convexity of the median S&P1500 CEO's compensation package increased by nearly 10-fold!
- Explanation 1: Convexity provides risk-related incentives.
  - Risk-averse managers will forgo some risky but profitable investment opportunities (Holmstrom, 1999; Gormley and Matsa, 2016);
  - Convex payment acts as a remedy to this risk-related agency conflict (namely, ``playing-it-safe'') by providing an insurance for the downside risk and leave the upside potential unchanged (Lambert, 1986; Holmstrom and Costa, 1986; Hirshleifer and Suh, 1992).
- Explanation 2: Options are cheaper tools to provide risk-related incentives.
  - Prior to 2006, firms are allowed to expense option compensation using the realized value;
  - Option is used to replace stock to increase pay-performance sensitivity (Core et al., 2003; Hayes et al., 2012; Shue and Townsend, 2017);
  - Convexity is purely a by-product.
- This paper studies the incentiving-risk-taking motive of designing CEO compensation to be convex.
- Question: How do boards adjust the convexity of CEO compensation in response to known changes in subsequent investment opportunities?

Identification strategy: The Federal Trademark Dilution Act

- On January 16, 1996, The Federal Trademark Dilution Act (FTDA) was signed into law for the first time granted federal protection to U.S. famous trademarks against dilution.
- What is dilution?
  - Unlike infringement (Similar trademarks confuse the customers about the source of products.)
  - Dilution is more related to product proximity.
    - Logic: Because the peer's product are similar to mine, the next time when my customer see my product, it is very likely that my peer's trademark also jumps into her mind.
    - Example: *Nabisco, Inc., v. PF Brands, Ltd. (1999)*
- ``The FTDA ...depriving competitors of a sufficient range of alternative choices, thereby hindering their ability to compete...'' (Rierson, 2012)
- Regulation-granted product differentiation and the subsequent monopoly rents will make protected firms' product market expansions more profitable.
- I argue that this regulatory change
  - increased the profitability of risky product market expansions;
  - Firm's investment opportunity set included many new expansion opportunities;
  - These new expansion opportunities are risky enough which require additional incentives.
- Which firms?
  - The FTDA neglected to define the term ``famous'';
  - A plausibly famous trademark is the one being registered in 1974 or earlier and still active on January 16, 1996. (Heath and Mace, 2020)
- Specification:

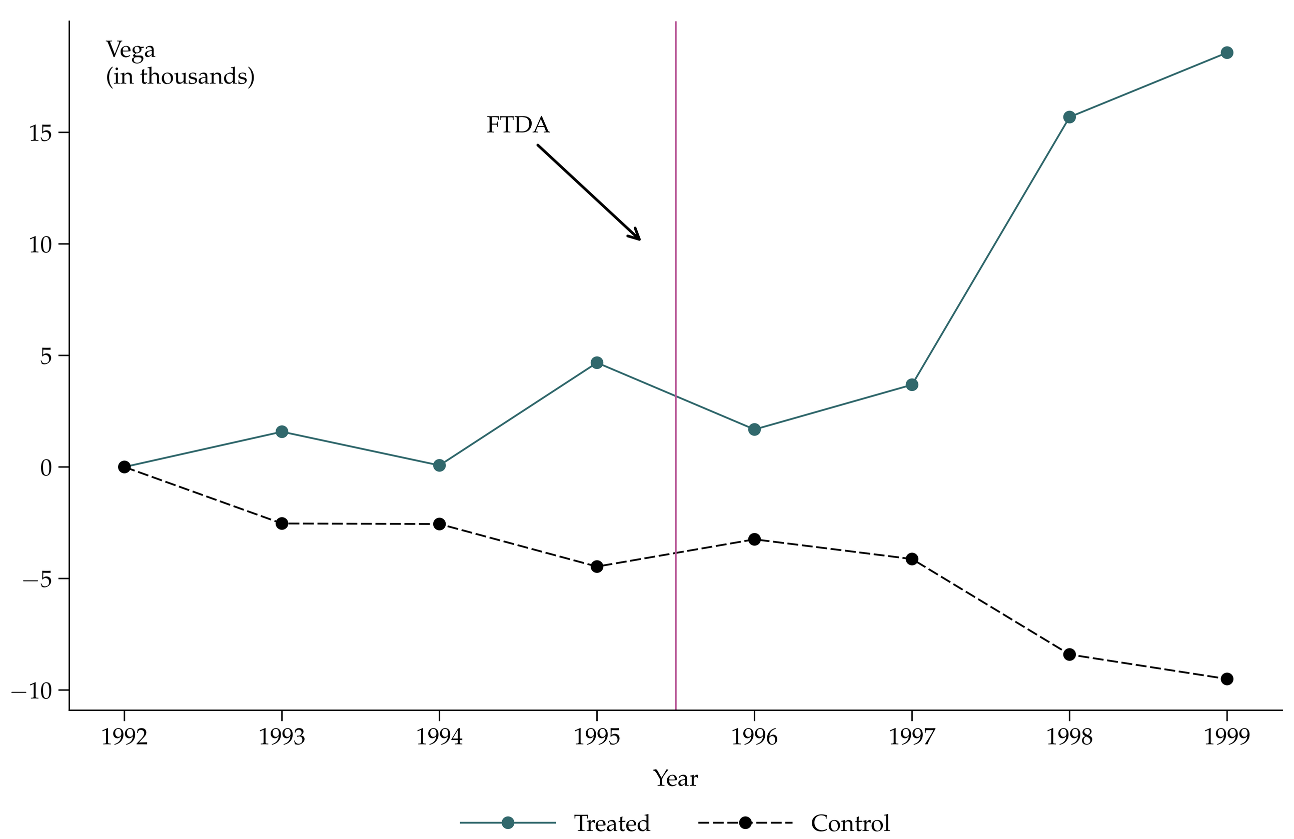
$$Y_{it} = \beta \text{FamousTM1995}_i \times \text{PostFTDA}_t + F_i + \lambda_{jt} + \gamma X_{it} + \epsilon_{it} \tag{1}$$

Empirical Results: Risk-taking Incentive

	Dependent variable: Vega (thousands)		
	(1)	(2)	(3)
FamousTM1995$_i$ × PostFTDA$_t$	18.44*** (4.48)	20.50*** (5.06)	23.35*** (5.42)
Controls	No	No	Yes
Year FEs	Yes	No	No
Firm FEs	Yes	Yes	Yes
NAICS4 × Year FEs	No	Yes	Yes
Adjusted R^2	0.64	0.67	0.68
Observations	9,868	9,458	8,691

- Economically signicant: 23% of treated firms' average pretreament Vega, which is $79,000.
- Boards increase the convexity of CEO compensation in response to the profitable expansion opportunities.

Parallel Trend



- There is one-year lag of the treatment effects.
- Explanation: More than 85% firms in ExecuComp with a 1996 fiscal year have a fiscal year start date in 1995, and equity grants are typically decided at the beginning of the fiscal year (Lie 2005).

Test Alternative Explanations: Accounting Benefit

	Dependent variable: Delta		
	(1)	(2)	(3)
FamousTM1995$_i$ × PostFTDA$_t$	−43.47 (56.89)	44.25 (60.83)	75.17 (68.53)
Controls	No	No	Yes
Year FEs	Yes	No	No
Firm FEs	Yes	Yes	Yes
NAICS4 × Year FEs	No	Yes	Yes
Adjusted R^2	0.79	0.81	0.83
Observations	9,318	8,902	8,198

- If options are used to providing pay-performace sensitivity, and the increase in Vega is purely a by-product, we expect to see Delta increases signicantly.

Heterogenous Response

We conduct cross-sectional tests that make use of variation in several characteristics of firms to shed light on the mechanisms underlying our main findings. Specifically, we examine whether the effect of the FTDA regulation on CEO vega varies with industry-level measures of brand recognition, product distinction and CEO's career concern.

	Variable used to form subsamples: Industry ad/sale		
	High (1)	Medium (2)	Low (3)
FamousTM1995$_i$ × PostFTDA$_t$	25.28*** (9.76)	14.26* (8.08)	18.34* (9.56)
Firm FEs	Yes	Yes	Yes
NAICS4 × Year FEs	Yes	Yes	Yes
Adjusted R^2	0.65	0.64	0.83
Observations	2,604	2,470	2,563

- When the brand is well-recognized by customers, then the expansions are more profitable due to brand awareness and brand loyalty.
- For firms operating in higher advertisement spending industries, the treatment effects is larger in magnitude.

Within sample: High industry ad/sale	Variable used to form subsamples: Industry price-cost margin		
	High (1)	Medium (2)	Low (3)
FamousTM1995$_i$ × PostFTDA$_t$	17.44 (16.41)	25.66* (14.05)	30.19** (12.35)
Firm FEs	Yes	Yes	Yes
NAICS4 × Year FEs	Yes	Yes	Yes
Adjusted R^2	0.63	0.56	0.66
Observations	1,346	1,247	1,272

- After controlling for ad spendings, the remaining product distinction comes from other factors such as product quality, and innovation, which are positively correlated with shareholders' ``enjoy-the-quiet-life'' motives.
- For firms operating in higher product distinction industries, the treatment effects is lower in magnitude.

	Variable used to form subsamples: CEO age	
	Young (1)	Old (2)
FamousTM1995$_i$ × PostFTDA$_t$	30.13*** (8.05)	18.92** (7.90)
Firm FEs	Yes	Yes
NAICS4 × Year FEs	Yes	Yes
Adjusted R^2	0.69	0.65
Observations	3,633	3,716

- If the the performace of risky investments provide a signal of managers' talent, the risk-averse managers with longer careers will be more reluctant to adopt risky but profitable investments, and therefore receiving more convex payment.

Conclusion

- Boards discreetly adjust the convexity of managers compensation in response to the variations in firms' investment opportunity set.
- One of the sources of risk-related agency conflicts is managers' career concerns.