Executive Compensation and Risk Taking

Patrick Bolton   Columbia University

Hamid Mehran   Federal Reserve Bank of NY

Joel Shapiro   Said Business School, Oxford

Incentives and Risk Taking

Modern agency theory of executive pay
Holmstrom and Tirole (1993) :

Stock-based compensation aligns CEO and shareholders' **long-term objectives**:

- Stock price an unbiased estimate of fundamentals

- Induces managers to focus on long-run value

- Performance measure that cannot be manipulated easily

Incentives and Risk Taking

Caveats:

- No leverage

- No endogenous choice of risk or volatility of earnings

- (No Stock-options, Complete markets $\Leftrightarrow$ Risk-neutral investors, No speculative bubbles)

Does this make sense?

- The average non-financial firm in the U.S. has nearly 60% equity and 40% debt

- For financial institutions, at least 90% of the balance sheet is debt; for investment banks it is closer to 95%

Our Paper

- In a simple model, we establish the socially optimal level of risk-taking and show:

  – with standard compensation packages, CEOs will increase risk

  – ability to lever the firm amplifies risk-taking

- Shareholders incentives to rein in risk-taking depend on:

  – observability of risk choice,

  – verifiability of incentive contract,

  – deposit insurance,

  – investors' misperceptions of risk

Our Paper

- **We propose:**

- Tying CEO compensation to a measure of default risk (**CDS spread**)

$$Compensation = \bar{w} + s_E P_E + s_D(\bar{P} - P_{CDS})$$

- **Empirical evidence**: using a SEC regulation on increasing compensation transparency in 2007, we show that the market (CDS spread) believes tying compensation to debt-like compensation (deferred compensation and pension) leads to lower risk

Incentives and Risk Taking

Bolton, Scheinkman and Xiong (2006) :

- Differences of opinion + short-sales constraints => *speculative bubbles*

- Endogenous choice of volatility

- **Short-termist incentives**: play into the bubble & feed the speculative option value with volatility

Bolton, Scheinkman and Xiong (2004) :

Earnings manipulation that destroys long-run fundamental value to drive up short-term stock performance

(see also Peng and Roell, 2008a,b,c)

Rewarding **beta** & CEO compensation in Practice

- CEOs are awarded **_at-the-money_ options**

- No **_indexing_** of performance relative to a market benchmark

- No correction for **beta =>**

- **Stellar stock performance may simply be a reflection of a high "beta loading"**

- This is particularly problematic if CEO can vest his stock-options before the **boom** is over

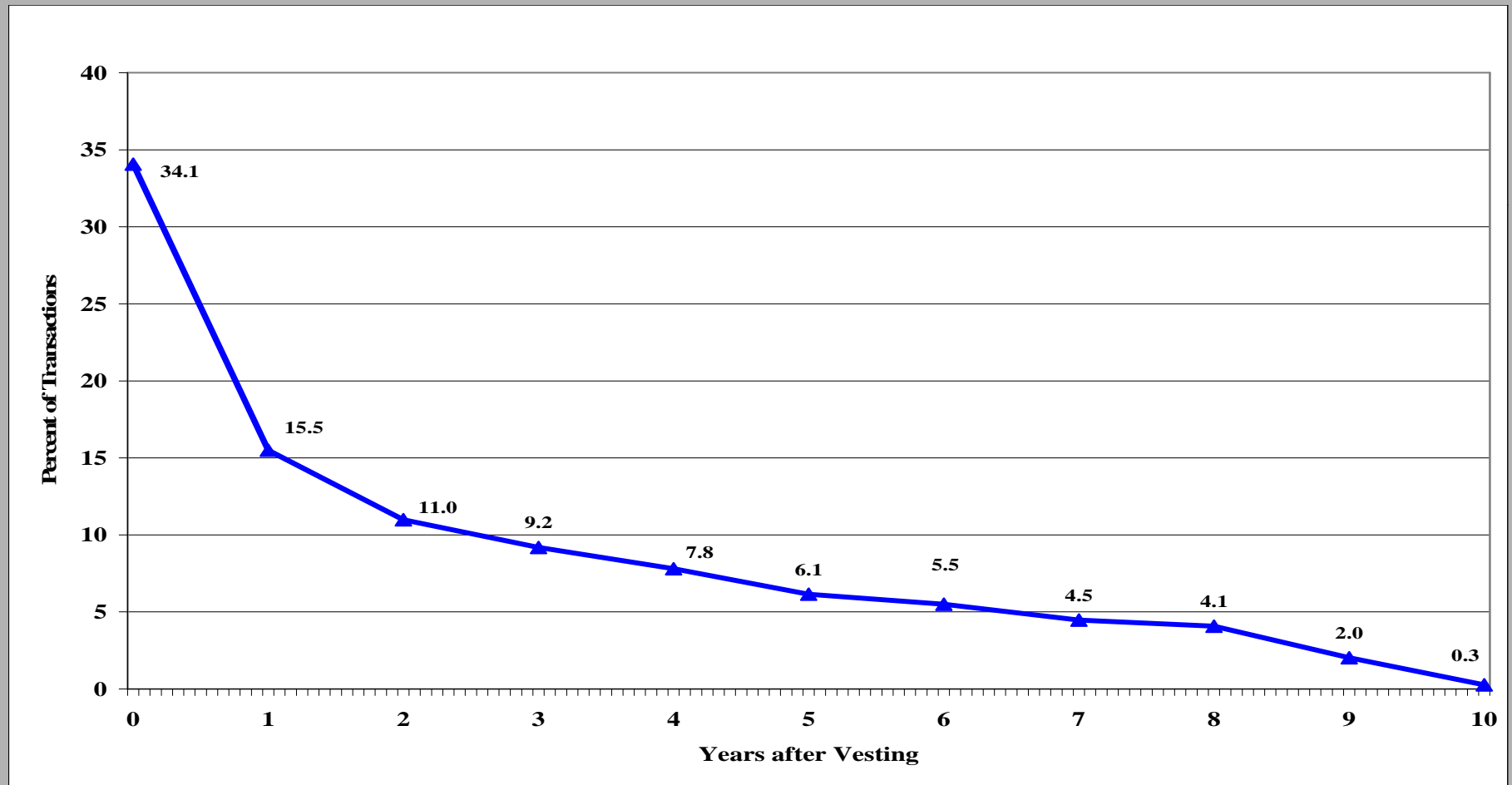# Stock option grants are characterized by **short vesting**

Chart 4: Option Vesting of all Options Granted- Commercial Banks (1996-2007)

Vesting Schedule	Percentage
0	19.9%
1	25.8%
2	18.2%
3	18.2%
4	10.5%
5	5.7%
More than 5 years	1.7%
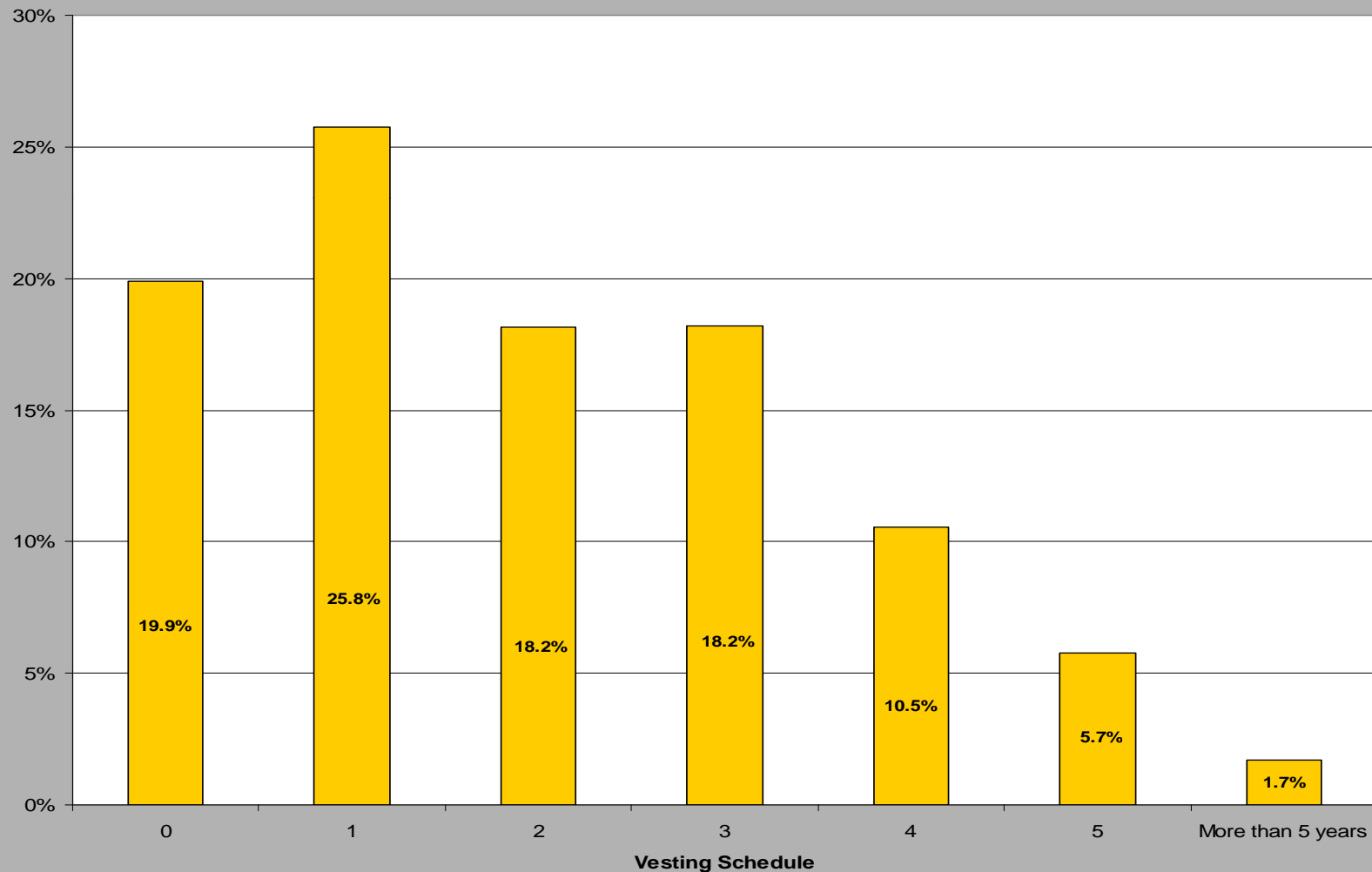
Source: Thomson Reuters Insiders

Large portion of options exercised shortly after they vest

Chart 5: Time Until Exercise - Commercial Bank Vested in the Money Options (7,254 Transactions)

Fahlenbrach and Stulz (2009)

- Investigate **insider trading** of bank CEOs in 2007-2008

- Estimate $-loss of CEOs on their stock holdings

- On average, CEOs lost **$28.7M** on shares not sold

- Median loss **$5.1M**

- ¾ of CEOs did not sell any shares

Fahlenbrach and Stulz (2009)

MAIN CONCLUSIONS:

- No evidence that CEO incentive misalignment caused worse performance

- Banks where CEOs had better incentives performed significantly worse than other banks

- **Possible explanation: CEOs with better incentives took greater risks**

Bebchuk, Cohen and Spamann (2009)

- Looks at executive compensation at **Bear Stearns** and **Lehman Brothers** from 2000 to 2008

- Top executive teams at Bear Stearns and Lehman Brothers obtained between **$1.4 billion** and **$1 billion** respectively from cash bonuses and equity sales.

Bebchuk, Cohen and Spamann (2009)

MAIN CONCLUSIONS:

- Performance-based compensation at Bear Stearns and Lehman did not result in an **alignment** of executives' interests with long-term shareholder value

- The opportunity to cash out large amounts of shares and options tilted executives incentives towards short-term stock prices

Cheng, Hong and Scheinkman (2009)

- **Does CEO compensation lead to excess risk-taking?**

- **Panel** of finance cos. from 1992 to 2008

- **Residual compensation:** regress total compensation on **firm size** and **sub-industry classification**

- **Two sub-periods:** 1992-2000 and 2000-2008

- Regression is for sub-sub-periods 1992-94 & 98-2000

- Log (average compensation) against log (market cap.) & sub-industry dummies (Primary dealers, Insurers)

Cheng, Hong and Scheinkman (2009)

- Sub-periods 95-2000 & 2001-08 are used to compute **risk-measures (beta, return volatility, tail cumulative return performance)**

- **Regress these risk-measures on lagged residual compensation**

- **RESULTS:**

1. Residual pay in the two cross sections is **highly correlated** (0.61)

2. Firms with **high residual compensation: Bear Stearns, Lehman, Citicorp., Countrywide, AIG**

Cheng, Hong and Scheinkman (2009)

MAIN CONCLUSIONS:

- Important heterogeneity in risk-taking

- Correlated with compensation

- **"Say on Pay"** may not be effective

Using debt in compensation

- Bebchuk and Spamann (2010)
- Edmans and Liu (2010)

The Model

- Investing an amount I, the bank can get a risky return:
  - a **high** return $x+\Delta$ with probability q
  - a **medium** return x with probability 1-2q
  - and a **low** return of $x-\delta$ with probability q.
- The CEO can choose **q** at a cost to the bank of $c(q)=(1/2)\alpha q^2$
- The bank raises fund through deposits and subordinated debt.
- For amount I, it promises a return of **I(1+R)**.
- Outside option of safe return of $\mathbf{1+r_s}$

Timing

1. Incumbent equity holders hire a manager under a linear incentive contract (w, s_E, s_D), where w is base pay, s_E is shares of equity, and s_D the loading on a credit default swap (CDS) of the bank.
2. The manager chooses the bank's risk q
3. The bank raises I to fund the asset from bondholders or depositors, with a promised return of $I(1+R)$
4. The equity of the firm is priced at P_E and the CDS spread on the firm is priced at P_D.
5. The returns on the asset are realized. Depositors and bondholders get paid first. If there are returns left over, the equity holders get the residual value.

Results

- CEO w/ equity contract chooses *observable* risk:

a debt-financed bank will be more conservative than an "all equity bank" ($q^o < q^{FB}$) due to default cost

- CEO with equity contract chooses *unobservable risk* (debtholders have rational expectations):

$$q > q^o$$

The bank's shareholders are worse off with the riskier unobservable choice.

Results 2

- CEO with contract based on equity and CDS price chooses unobservable risk:

$$q=q^o$$

given (i) CDSs traded by informed traders as in Holmstrom and Tirole (1993)

(ii) optimally chosen weighting s_D

- The optimal s_D is :
  - increasing in the return on the safe investment, marginal return on a unit increase of risk
  - decreasing in the default recovery amount and the cost of raising risk

Optimal *versus* Equilibrium CDS-based compensation

- Would shareholders use CDS prices to influence a CEO's choice?

  - **Renegotiation**: shareholders may have incentives to undo contract once bonds have been issued (commitment problem)

  - **Deposit Insurance**

  - **Naive Bondholders**

- Risk is increasing in leverage, and the incentive in the model is to maximize leverage

Evidence

- We look at the effect of the first ever disclosure of bank executives' debt-like compensation (deferred compensation and pension) on the CDS spread

- In Spring 2007, SEC required more compensation details on proxy statements for all listed companies

- We focus on 27 banks, whose proxies came out in December 2007

- Measure of change of CDS spread: Cumulated Abnormal Spread Return (day of announcement+day reported on)

Table 1: Summary Statistics of CEO Compensation Disclosed in Proxy Statements for the 27 banks with CDS spreads

Variable	Mean	Median	Standard Deviation
Total Wealth ($MM)[2]	287.26	95.24	83.937
Value of Stock Holdings ($MM)	230.81	39.87	83.714
Value of Option Holdings ($MM)	35.13	21.59	30.83
PV of Deferred Comp ($MM)	10.70	4.82	17.71
PV of Pension Balance ($MM)	10.61	6.14	11.77
Deferred Comp / Total Wealth (%)	7	6	8
Pension / Total Wealth (%)	11	11	10
Deferred Comp + Pensions / Equity (%)	26	29	22
Deferred Comp / Equity (%)	10	7	12
Pension / Equity (%)	16	14	14

Cross-section Regression of Cumulative CDS Abnormal Spread Changes on Newly Disclosed Debt-like CEO Compensation

Event: first-time disclosure (SEC Proxy Statement filing) of CEO pensions and deferred compensation, starting after December, 2006.

Dependant Variable: Cumulative CDS Abnormal Spread Changes (CASC) over event day 0 and 1

	M1	M2	M3	M4
Constant	0.016*	0.016	0.011	0.021**
	(1.83)	(1.69)	(1.16)	(2.49)
CEO Debt/Equity Ratio	-0.055**			
	(2.77)			
CEO (Deferred Comp)/Equity Ratio		-0.058		
		(1.36)		
CEO Pension/Equity Ratio		-0.052		
		(1.14)		
High CEO Debt/Equity Ratio			-0.021*	
			(1.9)	
High CEO (Deferred Comp)/Equity Ratio				-0.026*
				(1.84)
High CEO Pension/Equity Ratio				-0.018
				(1.34)
R-squared	13%	13%	11%	33%

Robust t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Economic Magnitude

- With an average spread of 24.28 bp of the sample CDS contracts, the coefficient on "High CEO (Deferred Comp)/Equity Ratio" (-0.026) implies that moving from below to above the median (Deferred Comp)/Equity ratio is associated with a reduction of 0.63 bp in the cumulative abnormal CDS market reaction

Conclusion

- Risk taking increases when it is less observable and there is more leverage

- Shareholders may not have the incentive to correct for risk taking due to: renegotiation, deposit insurance, and naive bondholders

- Basing compensation on CDS spreads can decrease risk taking

- Empirical evidence seems to suggest this will work