

## Ec951 Lecture notes (instructor: David Reinstein)

Lecture set 6

Extensions and applications: CEO compensation and “the financial crisis”.

### I. Materials

Kevin Murphy, “Executive Compensation” in *Handbook of Labour Economics*, Volume 3 and references.

See also Milgrom and Roberts, Ch. 13 (and somewhat chapter15)

#### Additional readings:

- Bebchuk and Grinstein (2005). “The Growth of Executive Pay” *Oxford Review of Economic Policy*.
- Bebchuk and Fried (2004). *Pay without Performance: The Unfulfilled Promise of Executive Compensation*
- Buiter (2008) “Lessons from the North Atlantic financial crisis,” Paper prepared for presentation at the conference “The Role of Money Markets” jointly organised by Columbia Business School and the Federal Reserve Bank of New York on May 29-30, 2008
- Garen (1994): “Executive Compensation and Principal-Agent Theory.” *The Journal of Political Economy*.
- Frydman and Saks (2008), “Executive Compensation: a New View from a Long-Term Perspective.” NBER working paper.
- Murphy and Zabojnik (2004). “CEO Pay and Appointments: a Market-Based Explanation for Recent Trends.” *AEA Papers and Proceedings*.
- Shliefer and Vishny (1997), “A Survey of Corporate Governance.”
- Coles et al (2006), “Managerial incentives and risk-taking,” *Journal of Financial Economics* 79 (2006) 431–468.
- Gabaix and Landier (2008). “Why has CEO Pay Increased so Much?” *The Quarterly Journal of Economics*.
- The debate:
  - “Should Congress Put a Cap on Executive Pay?” by Robert H. Frank, *New York Times*, Jan 4, 2009 ...
  - ...versus “Supply, Demand, and Executive Pay” by Uwe E. Reinhardt, *New York Times*, Feb. 6, 2009 “Economix blog.”

### II. What is “the financial crisis”?

- Who or what “failed”? (David’s idea of it, at least)
  - “Very low risk-free long-term real interest rates and unprecedentedly low credit risk spreads of all kinds together with the ‘Great Moderation’ – low and stable inflation and stable global GDP growth – prompted an increasingly frantic ‘search for yield.’” In an atmosphere of deregulation, and “reduced incentives for collecting and disseminating information about counterparty risk” and massive “securitisation and off-balance sheet vehicles,” this led to financial institutions built on a house of cards (Buiter, 2008).
  - The housing market declined (interest rates, bubble popping, etc), fuelled by, and fuelling housing defaults ... but “it never declines”! [Mizen lux ppt.pdf](#) [update this]
  - Some “safe” assets became of little value, especially those tied to the housing market and sub-prime mortgages.

- Especially those “safe” assets (e.g., CDO’s, credit-default swaps) that had a small probability of a huge loss ... like borrowing a lot of money and betting it on the four favoured horses in a race
- Debts were backed up by other debts ... financial institutions and speculators had, in effect, sold “insurance” (e.g., credit-default swaps) they could not cover for the “hundred year flood.” Some of these “insurers” were themselves “insured,” but there was no one who could or would cover the losses.
- Top firms and banks had invested heavily in these now valueless assets. Their risk models had told them their position was safe. But these models were (often) based on limited past data, strong assumptions (e.g., normal distributions that ignored long tails), and (perhaps) underestimates of the covariance of returns.
- Because so many firms were going bankrupt, no one was willing to make new loans, because of adverse selection – many of the people seeking loans had a slim chance of paying them back. And potential lenders had little liquidity and were unsure of the value of their investments and bonds. Hence a “credit crunch.”

[*Practice question:* Give a simple description of the events leading up to the recent financial crisis. Explain how issues of moral hazard and adverse selection may have played a role?]

### ***Was it a failure of the system or just bad luck?***

- ***Was it a collective cognitive error:***
  - Failure to anticipate the “Black Swan”
  - Failure to anticipate strong correlations in “rare” events
  - Over-reliance on models with strong assumptions, mistaking the model for the real world
  - Not all of the “mistakes” could have been “corrected” by speculators; e.g., a bank that takes too many risks or is over-leveraged
- ***Or a systemic and structural problem?***
  - **Wrong incentives!**
  - Incentives not to think too hard (bonuses on volume of transactions, no reward for “chicken little”
  - Example: The “Value at Risk” approach to risk-management... monitored ‘how much was at risk 95% of the time’ ... incentive to push all risk into the “tails”

[*Practice question:* Discuss the potential problems with the “value at risk” approach to risk-management?]

### **III. Which individuals made the “wrong” financial decision?**

- Did companies/shareholders have the “right” incentives?
  - Did “too big to fail” distort this?
  - Debt versus equity holders
- Did managers and CEO’s have the “right” incentives?
- If not, why not?
  - Moral hazard
  - Hidden information
  - Incomplete contracting
  - Free-riding of boards? Of investors?
    - Small investors have little incentive (or ability) to take adequate scrutiny, but large investors (or creditors) may have the “wrong” incentives (for similar reasons that CEOs do, discussed below).
    - Takeovers as potential solution ... but these are expensive, so this allows a company to go off the rails “a little”
  - Managerial “capture” of boards of directors?
  - Can regulation help solve this?

- (*Consider recent reforms/proposals*) [update here]

#### IV. How “should” CEO’s and other managers be compensated?

##### A. Agency theory

There are hidden actions, but also hidden information. Executives are likely to know more than the shareholders about the firm and about which decisions are profitable, i.e., about which are “good” and “bad” risks. This is not a “unidimensional” model; the CEO’s have a rich action space, and they can make decisions that alter the profitability, term of profits, and volatility (both systematic and idiosyncratic) of the firm.

##### B. Need to motivate the “right” decisions (not just effort!)

- “We” want them to make decisions in the best interest of shareholders, i.e., to maximize the value of the firm, as manifested in the share price.
- “They” have incentives to shirk or, more likely to use their position for power, personal gain (leverage for future jobs, perquisites, favours to friends), and prestige.
  - “Event studies” (analysis of stock-price changes following an announcement) attempt to show evidence of decisions that the market views as unprofitable.
  - Jensen (1986): managers choose to reinvest windfall profits rather than return them to shareholders. Other evidence of bias towards expansion.
- Depending on the compensation scheme, their goals may differ from the investors (actually, they always will differ, but the scheme determines ‘in what way and how much’).

##### C. Risk and the CAPM (Capital Asset Pricing Model), etc.,

The CAPM predicts that shareholders should be *risk-neutral* with respect to idiosyncratic risk; these can be diversified away by making the shares a small component of a larger “market basket”. However, they will be *averse* to shocks that co-vary with “market risk” (basically shared by the whole economy, such as economic downturn, oil shocks, etc). Hence only the latter type of volatility should affect share prices.

**But** if CEO’s earnings were based on the same portfolio as the diversified investors (e.g., they are paid a fixed salary, and invest this in the “market basket”), the performance of the company’s shares are only a minor portion of this, and the CEO would not have an incentive to put in effort and make the “right” decisions to maximize share prices (they would pursue personal goals).

**On the other hand**, if the CEO is paid [here “pay” could be expanded to mean his lifetime pay/utility profile] based only on the future value of the firm’s shares, and he is not allowed to diversify, if the CEO is risk-averse over his pay, he will be *more cautious* than the shareholders would want. He may refrain from undertaking risky projects even when the project’s expected returns are large relative to their “systematic risk” (note that although *ex-ante* idiosyncratic risk does not hurt a stock’s share value, *ex-post* a loss *does*). This will be a problem even if the CEO is rewarded based on the performance of the firm *relative to the market* (in fact that is the type of risk you would *less* want to insure the pay against, as it is a risk that investors cannot diversify against).

Although it is argued that reputation concerns (future employment) make performance-compensation irrelevant, this depends on an “infinitely lived” executive. In fact, the CEO’s “career concerns” may make this caution even worse. (Or perhaps there will be an incentive to ‘go with the herd’ and do what other CEOs do).

The CEO can fairly easily be insulated from market risk by relative performance evaluation, although this is rarely done (a puzzle). But to induce the CEO to take the “right” risks, he must also be insulated somewhat from the idiosyncratic risks. But he must have some incentives to make profitable decisions; this requires a careful balance.

[*Practice question:* Explain why shareholders in a larger firm may have difficulty offering compensation plans that give the “correct” incentives to managers.]

### **But “break points” are dangerous!**

If there is any “flat” portion of his pay structure, where his pay will be the same no matter what how well the firm does, we “know” he will not have the right incentives, perhaps an incentive to take even “bad” risks. For example, if his pay is the same for any firm “loss,” if it seems likely the firm will suffer a loss the CEO will want to take “wild” risks because he has nothing to lose (except reputation). This is the classic “moral hazard” problem, and it can also be seen in light of the “equal compensation principle.”

#### **Equal Compensation Principle**

For all activities that cannot be monitored, marginal rate of return to time spent on each activity must be equal. Otherwise agent spends no time on activity with lower marginal rate of return. As a result, if there is an activity for which performance cannot be measured, incentive pay cannot be used for any other activity.

An extension is that, with multiple types of effort/action, the Informativeness Principle does not hold. We might prefer *not* to use information on some activity/measure in determining compensation if this measure can be manipulated or “overdone” relative to less observable measures. We might prefer to use outcome-based compensation, even if it involves more chance (hence a higher necessary risk premium).

**Coles et al, 2006:** “Controlling for [bunch of econometric stuff]... *we find that higher prior vega* [relation between expected CEO wealth and stock return volatility] implements riskier policy choices, including relatively more investment in research and development, less investment in property, plant, and equipment, greater focus on fewer lines of business, and higher leverage.”

[*Practice question:* discuss the relevance of the “equal compensation principle” to setting CEO pay schemes.]

#### **Garen (1994) model and findings**

Responding to Jensen and Murphy, who claim that the pay-performance sensitivities are too low (0.0038 median) to be consistent with principal-agent theory. “Full-alignment” requires a pay-performance slope of 1. But this ignores risk-aversion.

Garen models a CEO with constant absolute risk aversion (CARA) utility and a private portfolio in the market index and a risk-free asset. He chooses effort *and investments* to maximize expected utility. Stockholders set the slope of his compensation in firm revenue (linear) and they only care about rate of return and covariance (systemic) risk.

“The [J&M] model predicts that for CEO’s with larger amounts of financial wealth, covariance [non-idiosyncratic] risk reduces the amount of incentive pay and raises salaries.”

[*Tough practice question – why (intuitively); why only covariance risk and why does this hold for ‘wealthy’ CEO’s? For less wealthy CEO’s what type of risks matter?*]

He allows a (simplified) version of the CEO's *choice of investment projects*, with fairly ambiguous findings. But a riskier "investment opportunity set" increases potential distortion, reducing the optimal slope.

Empirical confirmation of these "comparative statics": "The firm's covariance with the market returns also reduces the pay-performance sensitivity when a proxy for the CEO's financial wealth is large"

"Basing the CEO's pay on the performance of the company relative to the market still provides ... incentives but removes covariance risk from the CEO." ... But firms tend not to do this.

#### D. Need for deferred compensation with "information lags"

"Reasonable measures of performance emerge only over a period of many years ... when the profitability of major investments and strategic changes becomes clearer."

... Some say that the firms' stock price can be "manipulated."

- Good deferred compensation: pay in stock that cannot be sold for many years.
  - If markets are "strong-form efficient" this deferring may not be so important (but empirical analyses tends to reject such efficiency conditions.)
- Possible commitment problems with deferring compensation. Once the behaviour has passed, we no longer care about motivating it, and the pay-setters may be convinced to be generous with (former) CEO's. And present CEO's may anticipate this.

[*Practice question*: What are the 'pros and cons' of deferred compensation for CEO's?]

#### E. Diminishing returns to income? After a certain level of income, does it really matter to me how much I earn?

A common popular argument. This would suggest that increasing the *unconditional* component of CEO pay makes incentives less powerful. But perhaps intrinsic motivation is what matters, i.e., "...the deep inner satisfaction that he is doing a tough job well." (Citation in Bebchuk and Fried). Of course most CEO's are not hyper-rich but merely super-rich (\$3-4 million average yearly compensation in the US ...) so this argument may only be applicable to the upper tail. And (as far as I know) there is little evidence for this argument anyways (people argue it is a game that CEO's are motivated to "win").

### V. How are CEO's (and other managers) compensated and what incentives does this bring

#### A. Pay-setting

- Firm's board of directors set pay, not the shareholders directly.
- "Compensation committee," often include outside directors, also includes CEO, but he leaves the room for the vote on his own pay.
- Compensation consultants hired, often by the CEO!

Has this process been "captured" by executives, insiders?

- "Fat-cats" theory: Bebchuk et al (2002) "Managerial Power and Rent Extraction in the Design of Executive Compensation"

- Outside directors often have ties to the CEO – nominated by him, get information from officers (including the CEO); compensation consulting is a big income source for directors
- Newman and Mozes (1997): CEO pay significantly higher and pay-performance relationship shallower when the compensation committee contains an “insider”
- So, it seems like the answer to the above equation is “yes,” but if so, why don’t shareholders revolt?
  - Note *amount* of pay a somewhat distinct issue from its incentive power (Milgrom and Roberts seem to ignore this)
- Murphy & Zabojnik argue that CEO pay is increasing while boards are becoming increasingly independent, *outside* hires get paid more than executives promoted from within the firm, and outside hiring is increasing. They claim that general (transferable) managerial skills have become more important and is well-remunerated, while firm-specific human capital is under-priced but declining in importance. [This is seen to be driving the increasing inequality since the mid-1980's at the “upper tail” in the US, UK, and Canada – see Piketty and Saez.]

## B. Base Salaries

- Determination, ..., relevant as multiplicative factor for other compensation
- Use of surveys and “ratcheting”
- Seem based on crude statistics, little adjustment for age, experience, education, performance

## C. Annual Bonus Plans

- Mainly *explicit*
- Measures, standards, and slope

## D. Performance Measures

- Various forms and combinations.
- Especially *earnings*; “almost all companies rely on some measure of accounting profits”
  - These pass the “line of sight” criteria
  - ... but they are inherently backward looking and short run, and can be manipulated

## E. Performance standards

- Surprisingly little evidence of the use of relative performance pay
- Targets and flat regions! [murphy typical incentive plan graph.pdf](#)
- Budget standards (measured against business plan or set goals; most common)
  - Incentive for CEO to “sandbag” the budget
- Prior-year standards (year-to-year growth or improvement)
  - Problem of ratchet effect
- Peer group standards (relative to a select group of peer companies)
  - Seem underused relative to theoretical predictions
- Timeless standards (rare) :
  - Avoid ratcheting problems
  - Hard to set the standard.
  - “Externally determined” standards lead to more variable bonuses
- (Cost of capital)

## F. Pay-Performance Structures

- 80/120: Most common payout method! No bonus until 80% of the target, bonus capped at 120% of the target.
- Modified sum-of-targets (similar); these two account for 70% of the sample.
- *Obvious problem*: flatness over a large region!
  - (...although Murphy suggests that sensitivity to stock price is mainly “explicit,” i.e., through options and equity held, rather than through bonus sensitivity...)
- Often convex or concave over the "incentive zone"
  - Incentive to “inventory” profits (e.g., through “discretionary accruals”) for later period or “borrow” them. [*Exercise question*: show that this is a problem, and explain this intuitively.]

## G. Stock options and other forms of compensation

- Executive stock options (with various expiries, vesting policies, rules) now the single largest component of CEO pay
  - these could be made more sophisticated but generally they are not: most expire in 10 years, have exercise prices equal to the "fair market value" on date of grant
- Options value (Black-Scholes *and* Merton) calculation: [blackscholesformula.pdf](#)
  - *Ceteris paribus*, increasing the (systematic) volatility of the share price increases the options' value!
- [options value from Murphy ExecutiveCompensation-2.pdf](#)
  - Looks not so bad, but the CEO can take risks to increase the stock-price volatility and shift this graph up!
- If stock price goes “low” and there is little volatility the incentives are nearly “flat”
- An expensive form of compensation; CEO's value them less than the market value (because of their restrictions and the fact that they are undiversified; evidence of this from “exchange” programs)
  - ...but they have favourable tax and accounting treatment!

## H. Changes over time and cross-country and cross-industry differences

- Overall compensation (in USA) has increased dramatically and consistently, particularly since 1980s (was fairly constant from 1940's-1970's, even decreasing relative to the average worker)
- Increase largely through *stock options* (also “stealth” earnings) [frydman and saks figures.pdf](#)
  - Not clear whether incentives have become more “high-powered” (Murphy says yes, Frydman and Saks disagree somewhat)
- Why more stock options?:
  - Ratcheting implications of fixed-share (rather than fixed value) grants in a rising market?
  - Increased executive acceptance by a cohort not familiar with downturns?
- Over 1993-2003, the top-5 managers compensation went from (about) 5% of total earnings to about 10% (Bebchuk and Grinstein). Increase largely via “grant-date” value of options.
- US CEO's paid more (but things may be converging) [CEOpaybycountryandsize.pdf](#), paid more in stock options; US premium limited to the CEO.
- Pay increases in firm size, but power of incentives decrease.
- Are increased agency problems a cost of company size?
  - Greater *percentage* ownership will discourage wasteful perquisites and vanity projects ...
  - ...but greater *total value* of shares owned (relative to CEO's other wealth) will make the risk-aversion problem worse
  - This is bad news as the former has been decreasing and the latter increasing in recent years (Murphy)

## VI. Do incentives improve performance?

“...although there is a plethora of evidence on dysfunctional consequences of poorly designed pay programs, there is surprisingly little direct evidence that higher pay-performance sensitivities lead to higher stock-price performance.”

Difficult to measure, as an efficient market would immediately incorporate all information on management pay-performance sensitivity. Also, there may be selection biases as such plans are often introduced as they "last resort" by troubled companies. *Event studies* show some positive evidence, but there may be a bias if options programs are adopted in anticipation of positive announcements. Leveraged buyouts offer some evidence of the positive effects of incentives.

## VII. Where to go from here: more/better regulation?

- Does the corporation always “know best”?
- Reform rules for corporate governance?
- Can regulation set incentives better than corporate governors?
- Costs and benefits of regulation
- Restrictions on financial markets (regulating *function* versus *labels*)
- Restrictions on firms that are known to be too big to fail

### Practice questions

It is often difficult for shareholders to motivate managers and CEO's to make the choices that maximize the value of a firm.

(a) Explain why paying a CEO with stock options (which are valuable only if the firm's share price is above a certain level) may lead a CEO to take imprudent risks (with the firm's assets).

(b) Discuss some methods that have been used (or proposed) to compensate CEO's. What are the strengths and weaknesses of these? How successful have these been (feel free to consider recent financial and economic crises)? Discuss this with reference to asymmetric information and (a CEO's) limited liability.

(c) Consider recent experimental and observational evidence on agent's non-financial motives (behavioral, psychological) to perform and make choices in certain ways. What implications do these findings have for the optimal compensation of CEO's?