11-18 Class 15 Risk and the firm (one project)

Theory of the firm transactions costs

1. Incomplete contracts
who should own?
Leverage buyouts
2. The CEO as shareholder's agent
Controlling incentives debt vs equity
Application : leverage in US firms
3. The problem of control in large firms
Who chooses the incentives
Application CEO compensation

Perfect Markets

- Markets are perfect is equivalent to no transactions costs
- In this case who initially owns the assets does not matter to the value of output. (Coase theorem)
  - individuals will trade so that the assets end up in the hands that make them most productive
- That still leaves room for finance
  - because if talented individuals have finite wealth they will want to issue claims on those assets.
  - But is very simple finance.

Complete Contracts

- With complete contracts (and perfect markets) who owns the assets (claims on the future income of these assets) does not matter.
- Because we can write contracts to give the right individuals control over the assets and reward them so that they make the right decisions.
  - Whether X owns the asset or rents the asset does not matter.
  - How much of the firm the CEO owns does not matter.
  - Suppose we start with a given distribution of ownership and we perceive that some party is taking an action that is not profit maximizing, we just write a contract to get him or her to change behavior.

Perfection

- In perfect economies, initial endowments do not matter
- We trade to an efficient outcome whereby the individuals in control of assets (by owning or renting them) maximize asset returns
- Notice that this could involve a single firm that owns everything, or a perfectly egalitarian situation where every one owns a tiny bit of capital

Transactions' costs

- From the Coase theorem to Coase's theory of the Firm.
- Imagine a world where everyone is an entrepreneur. An actor would buy all her inputs, rent the required capital, and sell her output.
  - Thus every productive action is surrounded by a market.
  - The actor has to face the market: Determine the quality of the inputs she buys. The buyer of her output has to determine the quality of her output. She will also face price uncertainty.
- She could merge with her input producer and create a firm.
  - She would then specify quality and she would have pushed market uncertainty back to the inputs of her input producer
- She could merge with the buyer of her output
  - only face the market further down the production chain.
- Coase's pt: the size of the firm is dictated by transactions costs. Between any two steps in the value chain you can put a market or an administrative procedure
- If administrative procedure is more efficient then the market than these two steps will be integrated. If not there will be a market.

Incomplete contracts

- Since Coase
- More specificity as to transactions costs:
- Incomplete contracts:
  - there are some states of the world for which we specify the actions of the parties of the contract and there are some where we do not.
  - There are some things that cannot be contracted—because they are not observable to third parties or because the parties do not want to make them observable.
- In this case who owns matter because it is the owner who decides what happens.
  - Income claims matter but control claims also matter.
  - Finance (solvency) decides who has control.

Example: High End textiles

- Weaving firm and spinning firms (two key steps in the production process).
- Output is very time sensitive (supply fashion goods) depends on very tight specification of thread quality.
- Thread quality reflect input choices on raw materials and how the spinning machines are made to work. This spinning factory has to be configured to fabric specification. This is a sunk costs (when you change threat output, you reconfigure)
- Demand for fabric is uncertain,
- how hard the weaver works to anticipate fashion changes, how hard the spinner works at cutting spinning costs are not contractible.

Three ownership structures

1. The weaver and the spinner are separate.
   - The weaver and the spinner are worried about hold up (that the other side will be strategic and force a renegotiation to increase their own gains).
   - Neither invests very much (the weaver to discover what is really in demand, the spinner to reduce costs of producing the thread).
2. The weaver buys the spinner out
   - In this case there is no hold up problem.
   - The spinner's expertise is lost (he is no longer an owner)
3. The spinner buys the weaver out
   - In this case there is no hold up problem,
   - The weaver's expertise is lost (he is no longer an owner)

Absent finance all three configurations will happen but almost always 2 or 3 will prevail CF (Hart 1995 and Cai EJ 2003).

Solving these problems through finance

- If there should be a single owner, there are multiple ways of doing so.
- An all equity deal (see Comcast) with a dominant owner.
  - Advantages 1 player decides who does what so no fear of hold up, 2 incentives on non contractible investment are positive for both sides (because they each own roughly half the firm.
  - Disadvantage, at margin you have a distortion.
  - Who buys whom: if everything is symmetric then it does not matter
  - If not the party that is more important than the other should own (because decision rights matter and because giving that person more of the equity is good).
- One party buys the other firm with debt.
  - Advantages (1) owner decides who does what so no fear of hold up, (2) Owner has no distortion at margin
  - Seller makes no effort

Incomplete contracts

- In this example finance matters because it allows us to reconfigure the firms to achieve efficiency gains.
- This is not Modigliani Miller because the firms' combines output is dependent on financial structure. (MM is about how market value changes relative to fixed fundamental payoffs)
- The same is true of value addititivity. You buy all the equity to both firms and solve the control problem. So you are changing fundamental payoffs.

Example Leverage buy outs

- Late 1970s liberalization of bond markets allow issuers to sell junk (not investment grade) bonds.
- Used in a variety of settings.
- One that matters is the Leveraged Buy Out market.
- In theory entrepreneur identifies an underperforming firm, has business plan to turn it around.
- Makes a tender offer for the stock that is based on borrowing nearly all the total expense of buying the stock.
- Takes a firm with low leverage and turns it into a firm with very high leverage.

Leverage buy out

- Recall that equity is a call option on the value of the firm at a strike price equal to paying off all of the debt (B).
- The owners of the firm before the LBO have such an option but it is always in the money because debt is low. So fear of bankruptcy is low (B_o is small)
- The owners of the firm after the LBO have an option at a much higher strike price B_H
  - So they have to generate higher profits to be in the money.
  - If they fail the firm becomes bankrupt and control passes to creditors
  - The higher the Leverage of the LBO the stronger the incentives

Making the LBO work

- To get to profits about B_h management can
  1. Find assets that would fetch a higher price on the market than their present value in the firm
  2. implement cost savings
  3. Increase sales
  4. Innovate
- Last one is rare and most of the gains come from the first two (LBO firms have specialize expertise, they are not turn around specialists)
- Other source of profits is interest rate declines, because bonds are callable. (the firm has a call option on the bonds at par)

LBO and finance

- In the LBO, financial structure matters
- Consider an equity deal (new management buys 51%)
  - If the business plan fails then the payoffs are the same π_o-b_o as before the LBO and new management gets $0.51(\pi_o$-$b_o)$
  - If the deal succeeds profits are higher and the new management gets $0.51(\pi_h$-$b_o)$
  - Incentive value of success $0.51(\pi_h$-$\pi_o)$
- With LBO
  - If the business plan fails then the payoffs to the new owners are 0.
  - If the deal succeeds they get the gains $(\pi_h$-$b_h)$
  - Incentives stronger under LBO if $(\pi_h$-$b_h)>0.51(\pi_h$-$\pi_o)$

Example Dell

- Was for while the largest seller of PC in the world
- Then in the past few years has missed its targets.
- In July 2013 has about 7 billion dollars in debt and 10 billion dollars in equity.
- Then about a year ago founder Michael Dell and an investment firm propose a LBO to take the company private, will buy out the company for 24.9Billion dollars in cash and issue bonds for about 20 billion dollars moving to a very high degree of leverage. (13% to 90%)
- The idea is that the company that was once the largest seller of PC needs change
  - hard choices
  - it will take a bit of time…
- If they succeed they will make a fortune. If not..

Angel investors

- Like LBO investors they look for firms that are in distress.
- But Angels are different
  - Usually because of a strategic error in the past or because management lacks a particular expertise
  - Not because management is lazy
- They make money by providing capital at a time when the firm faces difficulty but they are not in conflict with current management.
  - Also provide some practical assistance
- Can make investment either as equity or as debt.
  - Never own a majority of the firm
  - They expect to exit after the turnaround

Whole Foods

- Firm expands rapidly, Buys out Wild Oats. Essentially caught in an expansion mode when..The financial crisis hits and shoppers go back to Safeway.
- Shares fall 80% from 10-2007 to 10-2008
- Leonard Green & partners invests 425 million in preferred stock with guaranteed 8% dividend.
- Two members of LG take board seat
- Then over the next few years sell the shares. When fully exited (11-2012) net gain 1.7 billion
  - Source NY times 11-9-2013

The CEO as an Agent

- Shareholders do not manage the firm they
  - Delegate to management to the board of directors who appoints the executive officers (CEO…)
  - They can vote out the board of directors but most often they cannot fire the Executive officers directly.
- Management has (temporary) control
  - But it does not own the firm.
  - So it faces incentive problems: it has to work to make the company profitable, but if it gets a wage it does not care about outcomes

Changing Management Payoffs

- Two solutions Leverage and option
- 1) leverage the firm and pay the manager a premium (to compensate for added risk and expected effort)
  - Now the salary of the individual become dependent on the firm's profits
  - If the firm goes bankrupt management is fired
- The down side is that the shareholders have to bear more risk

2) stock options

- Reduce the wage component of management
  - increase management's contingent payments.
  - To do so provide part of the compensation as stock option. Block of option has a new strike price which is supposed to be at current price
  - So management benefits when the stock price rises and loose when the stock goes down
- How much?
- Tim Cook (CEO of Apple) 100 million dollars of options.

Problem

- Option are coarse
  - Each beneficiaries benefits when the market goes up whether or not they made a contribution to the firm.
  - So it makes sense as team compensation more than as individual incentive
- Problem of control
- Management generally decides when to issue options and the backdating scandals are evidence that financial incentives can back fire
- Management also decides how many options different people get.

The problem of control in large firms

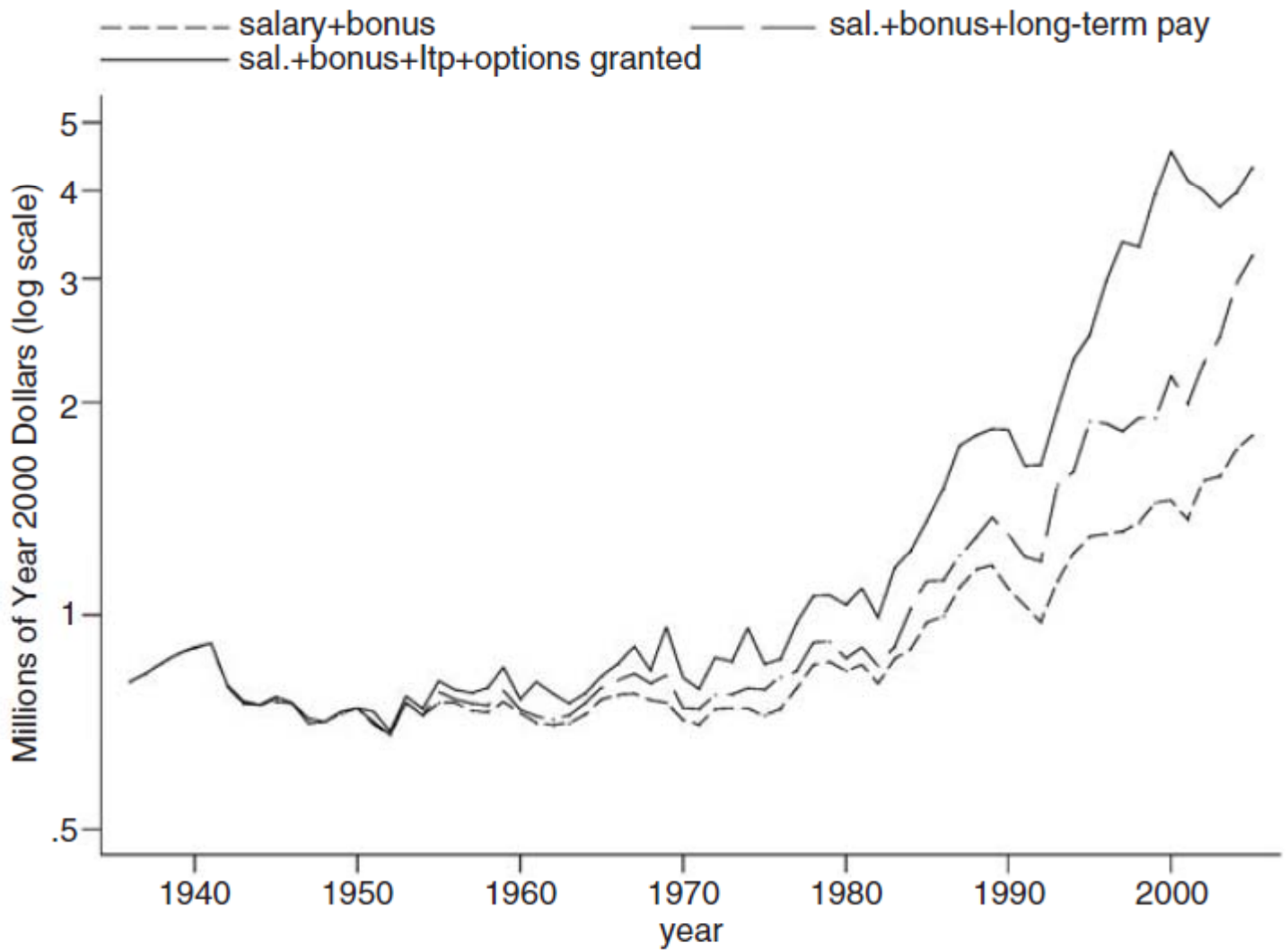
- Ideally firms work to maximize shareholder value
- Management is the agent of the shareholder
- In practice management is in control
- Current board and current CEO chose new board members and as long as firms are reasonably profitable, shareholder votes are pro-forma
- Problem is that management does not want to maximize profit. It wants to maximize its return (value of option….likelihood of business, likelihood of remaining in job)

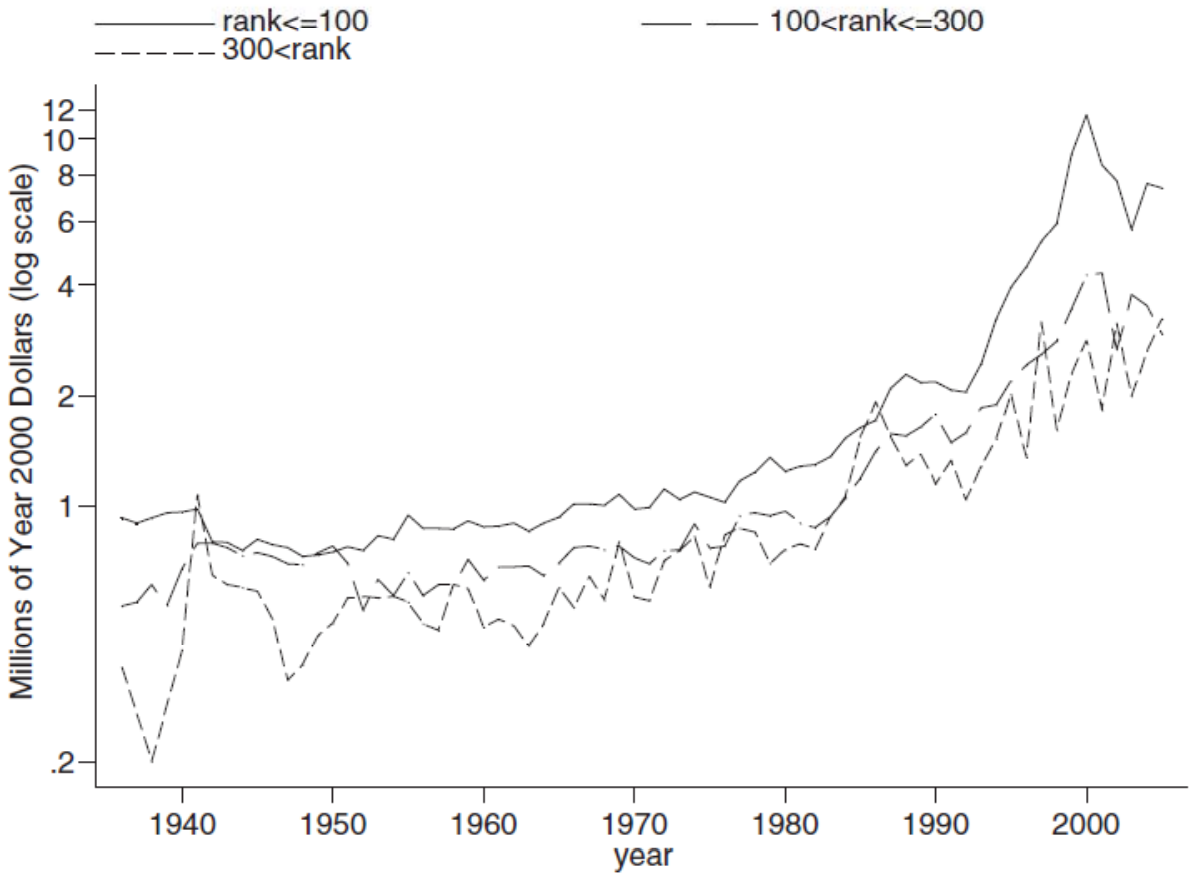
Management in control

- Pay for performance solve some of this but
- Can induce either not enough risk taking
  - Management does not care enough about the up side return
  - Because management is risk averse
- Can be too much risk taking
  - Management does not care enough about the down side
  - Lots of option that are not in the money (S<K)
- This is hard to fine tune

Management in control

- Also induces issues about the level of compensation.
- Management's private incentives are not to minimize compensation
- Look at some figures and tables From
- **Carola Frydman and Raven Saks. Executive Compensation: A New View from a Long-Term Perspective, 1936-2005 . (RevFinStudies 2010)**


salary+bonus
sal.+bonus+long-term pay
sal.+bonus+ltp+options granted
Millions of Year 2000 Dollars (log scale)
5
4
3
2
1
.5
1940
1950
1960
1970
1980
1990
2000
year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Millions of Year 2000 Dollars (log scale)
12
10
8
6
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1940
1950
1960
1970
1980
1990
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year

Table 6
Ex ante changes in the value of executives' stock and stock option holdings (year 2000 dollars)

	Option holdings		Stock holdings		Stock + option holdings	
	For $1,000 change in firm market value (Jensen–Murphy) (1)	For a 1% increase in firm's rate of return (equity at stake) (2)	For $1,000 change in firm market value (Jensen–Murphy) (3)	For a 1% increase in firm's rate of return (equity at stake) (4)	For $1,000 change in firm market value (Jensen–Murphy) (5)	For a 1% increase in firm's rate of return (equity at stake) (6)
1936–1940	0	0	1.35	18,401	1.35	18,670
1941–1949	0	0	0.39	6,530	0.40	6,814
1950-1959	0	0	0.31	9,392	0.45	13,975
1960–1969	0.11	7,913	0.35	20,531	0.68	38,978
1970–1979	0.12	6,303	0.22	11,766	0.47	21,743
1980–1989	0.24	13,056	0.17	12,735	0.55	34,679
1990–1999	0.41	57,975	0.29	36,273	0.95	120,342
2000–2005	0.65	127,195	0.27	49,729	1.08	227,881

From Finance to Finance

- Problem?
- Well you might say that the US economy has become more competitive as we have tied compensation more to performance
- But we do this much more than anywhere else in the world (roughly compensation is twice as high in the US than elsewhere).
- Can the market correct these inefficiencies?

Class 16
From control to strategy

- **1. Dealing with the market**
  - **Should firm hedge?**
  - **Why portfolios of projects**
- **2. Dealing with Government**
  - **Taxes and Debt Vs equity and retained earnings**
  - **Regulation and project selection**
- **3. Sunk cost and firm specific capital**
  - **Bankruptcy**
  - **Liquidation vs reorganization**