

Topics in Financial Economics: Lecture 3

Tianxi Wang

Economics Department, U of Essex

print pages 1, 7, 16, 22, 29, 37, 43, 47, 49, 60, 66, 74, 81

- Capital Structure based on Agency Costs

- Capital Structure based on Agency Costs
 - Conflict Interest between management, equity holders, and debt holders.

- Capital Structure based on Agency Costs
 - Conflict Interest between management, equity holders, and debt holders.
 - moral hazard (hidden action)

The Objectives

- Capital Structure based on Agency Costs
 - Conflict Interest between management, equity holders, and debt holders.
 - moral hazard (hidden action)
- The role of outside equity and the role of debt

The Objectives

- Capital Structure based on Agency Costs
 - Conflict Interest between management, equity holders, and debt holders.
 - moral hazard (hidden action)
- The role of outside equity and the role of debt
- The unique optimal capital structure

The Objectives

- Capital Structure based on Agency Costs
 - Conflict Interest between management, equity holders, and debt holders.
 - moral hazard (hidden action)
- The role of outside equity and the role of debt
- The unique optimal capital structure
- The theory is based on Jensen Meckling (1976).

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example
- Suppose I have a car. If it is not insured against theft, I either buy and install an alarm system or put some time (effort), say 1 hour, watching it.

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example
- Suppose I have a car. If it is not insured against theft, I either buy and install an alarm system or put some time (effort), say 1 hour, watching it.
- But if the car is fully insured, namely, if it is stolen, the insurer will buy me a new one. I do not want to install the expensive alarm system or putting time watching it. What should the insurer do?

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example
- Suppose I have a car. If it is not insured against theft, I either buy and install an alarm system or put some time (effort), say 1 hour, watching it.
- But if the car is fully insured, namely, if it is stolen, the insurer will buy me a new one. I do not want to install the expensive alarm system or putting time watching it. What should the insurer do?
- Suppose that the insurer can observe whether the alarm system is installed or not. Then it will require me to install it first before issuing me the insurance.

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example
- Suppose I have a car. If it is not insured against theft, I either buy and install an alarm system or put some time (effort), say 1 hour, watching it.
- But if the car is fully insured, namely, if it is stolen, the insurer will buy me a new one. I do not want to install the expensive alarm system or putting time watching it. What should the insurer do?
- Suppose that the insurer can observe whether the alarm system is installed or not. Then it will require me to install it first before issuing me the insurance.
- But it cannot observe how much time (effort) I put in watching the car. What happens?

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example
- Suppose I have a car. If it is not insured against theft, I either buy and install an alarm system or put some time (effort), say 1 hour, watching it.
- But if the car is fully insured, namely, if it is stolen, the insurer will buy me a new one. I do not want to install the expensive alarm system or putting time watching it. What should the insurer do?
- Suppose that the insurer can observe whether the alarm system is installed or not. Then it will require me to install it first before issuing me the insurance.
- But it cannot observe how much time (effort) I put in watching the car. What happens?
 - It will not give me the full insurance. e.g. 80%.

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example
- Suppose I have a car. If it is not insured against theft, I either buy and install an alarm system or put some time (effort), say 1 hour, watching it.
- But if the car is fully insured, namely, if it is stolen, the insurer will buy me a new one. I do not want to install the expensive alarm system or putting time watching it. What should the insurer do?
- Suppose that the insurer can observe whether the alarm system is installed or not. Then it will require me to install it first before issuing me the insurance.
- But it cannot observe how much time (effort) I put in watching the car. What happens?
 - It will not give me the full insurance. e.g. 80%.
 - Suppose the time I put watching the car is proportional to the loss.
Q(5cts): how much time do I put now?

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example
- Suppose I have a car. If it is not insured against theft, I either buy and install an alarm system or put some time (effort), say 1 hour, watching it.
- But if the car is fully insured, namely, if it is stolen, the insurer will buy me a new one. I do not want to install the expensive alarm system or putting time watching it. What should the insurer do?
- Suppose that the insurer can observe whether the alarm system is installed or not. Then it will require me to install it first before issuing me the insurance.
- But it cannot observe how much time (effort) I put in watching the car. What happens?
 - It will not give me the full insurance. e.g. 80%.
 - Suppose the time I put watching the car is proportional to the loss.
Q(5cts): how much time do I put now?
- There is a Moral Hazard Problem of some agent, if his action is unobservable in any way and affects the welfare of someone else (principal).

Moral Hazard: A General Introduction

- The term comes from the Insurance industry. It is not actually related to moral at all. An example
- Suppose I have a car. If it is not insured against theft, I either buy and install an alarm system or put some time (effort), say 1 hour, watching it.
- But if the car is fully insured, namely, if it is stolen, the insurer will buy me a new one. I do not want to install the expensive alarm system or putting time watching it. What should the insurer do?
- Suppose that the insurer can observe whether the alarm system is installed or not. Then it will require me to install it first before issuing me the insurance.
- But it cannot observe how much time (effort) I put in watching the car.

What happens?

- It will not give me the full insurance. e.g. 80%.
- Suppose the time I put watching the car is proportional to the loss.
Q(5cts): how much time do I put now?
- There is a Moral Hazard Problem of some agent, if his action is unobservable in any way and affects the welfare of someone else (principal).
- Instances of Moral hazard problems: salesman, students, doctors, teachers...

Jensen-Meckling (1976)-1: The Moral Hazard of The Manager

- 1 The manager exerts *unobservable* effort to further the firm's interests, at private costs.

Jensen-Meckling (1976)-1: The Moral Hazard of The Manager

- 1 The manager exerts *unobservable* effort to further the firm's interests, at private costs.
- 2 The manager may divert the firm's resources to perks (non-pecuniary benefits), the effects of which are *unobservable* to shareholders.

Jensen-Meckling (1976)-1: The Moral Hazard of The Manager

- 1 The manager exerts *unobservable* effort to further the firm's interests, at private costs.
- 2 The manager may divert the firm's resources to perks (non-pecuniary benefits), the effects of which are *unobservable* to shareholders.
- 3 The managers may devote the firm's resources to empire building, namely to some projects, of the which the profitability is unobservable to shareholders, but which gives them private benefits.

Jensen-Meckling (1976)-1: The Moral Hazard of The Manager

- 1 The manager exerts *unobservable* effort to further the firm's interests, at private costs.
 - 2 The manager may divert the firm's resources to perks (non-pecuniary benefits), the effects of which are *unobservable* to shareholders.
 - 3 The managers may devote the firm's resources to empire building, namely to some projects, of the which the profitability is unobservable to shareholders, but which gives them private benefits.
- Formally, we can model that the manager generates revenue $R(e)$ by exerting effort e for which he bears private costs $C(e)$; $R(\cdot)$ is concave and $C(\cdot)$ is convex. It fits case 1 well. How about the other two cases?

Jensen-Meckling (1976)-1: The Moral Hazard of The Manager

- 1 The manager exerts *unobservable* effort to further the firm's interests, at private costs.
 - 2 The manager may divert the firm's resources to perks (non-pecuniary benefits), the effects of which are *unobservable* to shareholders.
 - 3 The managers may devote the firm's resources to empire building, namely to some projects, of the which the profitability is unobservable to shareholders, but which gives them private benefits.
- Formally, we can model that the manager generates revenue $R(e)$ by exerting effort e for which he bears private costs $C(e)$; $R(\cdot)$ is concave and $C(\cdot)$ is convex. It fits case 1 well. How about the other two cases?
 - For case 2: e is the resources the manager gives up for perks and $C(e)$ is the costs of the given-up perks to him.

Jensen-Meckling (1976)-1: The Moral Hazard of The Manager

- 1 The manager exerts *unobservable* effort to further the firm's interests, at private costs.
 - 2 The manager may divert the firm's resources to perks (non-pecuniary benefits), the effects of which are *unobservable* to shareholders.
 - 3 The managers may devote the firm's resources to empire building, namely to some projects, of the which the profitability is unobservable to shareholders, but which gives them private benefits.
- Formally, we can model that the manager generates revenue $R(e)$ by exerting effort e for which he bears private costs $C(e)$; $R(\cdot)$ is concave and $C(\cdot)$ is convex. It fits case 1 well. How about the other two cases?
 - For case 2: e is the resources the manager gives up for perks and $C(e)$ is the costs of the given-up perks to him.
 - For case 3: e is the resources he gives up for empire building and $C(e)$ is the private benefits which he thereby gives up.

Jensen-Meckling (1976)-2: The Agency Cost of Outside Equity

- It is based on the conflict interest between the outside shareholders and the insider shareholders (namely the management team)

Jensen-Meckling (1976)-2: The Agency Cost of Outside Equity

- It is based on the conflict interest between the outside shareholders and the insider shareholders (namely the management team)
- Compare the two circumstances: One where there are no outside shareholders so that the manager owns all the shares; the other where he only owns a fraction of the shares.

Jensen-Meckling (1976)-2: The Agency Cost of Outside Equity

- It is based on the conflict interest between the outside shareholders and the insider shareholders (namely the management team)
- Compare the two circumstances: One where there are no outside shareholders so that the manager owns all the shares; the other where he only owns a fraction of the shares.
 - For case 1: the manager bears the whole disutility of exerting effort, but only gets α part of the benefit of the effort, so he shirks.

Jensen-Meckling (1976)-2: The Agency Cost of Outside Equity

- It is based on the conflict interest between the outside shareholders and the insider shareholders (namely the management team)
- Compare the two circumstances: One where there are no outside shareholders so that the manager owns all the shares; the other where he only owns a fraction of the shares.
 - For case 1: the manager bears the whole disutility of exerting effort, but only gets α part of the benefit of the effort, so he shirks.
 - For case 2: If he diverts one pound for the benefit of the firm (all the shareholders), he only gets α part of the benefit; but if he uses the pound for some perk, he gets the full benefit of the perk.

Jensen-Meckling (1976)-2: The Agency Cost of Outside Equity

- It is based on the conflict interest between the outside shareholders and the insider shareholders (namely the management team)
- Compare the two circumstances: One where there are no outside shareholders so that the manager owns all the shares; the other where he only owns a fraction of the shares.
 - For case 1: the manager bears the whole disutility of exerting effort, but only gets α part of the benefit of the effort, so he shirks.
 - For case 2: If he diverts one pound for the benefit of the firm (all the shareholders), he only gets α part of the benefit; but if he uses the pound for some perk, he gets the full benefit of the perk.
 - For case 3: If he devotes one pound to generate cash flows for the firm, he only gets α part of the cash flows; but if he uses the money to build the empire (and does not care so much about the cash flow), for example investing in estates in Dubai, he enjoys the full benefit.

Jensen-Meckling (1976)-2: The Agency Cost of Outside Equity

- It is based on the conflict interest between the outside shareholders and the insider shareholders (namely the management team)
- Compare the two circumstances: One where there are no outside shareholders so that the manager owns all the shares; the other where he only owns a fraction of the shares.
 - For case 1: the manager bears the whole disutility of exerting effort, but only gets α part of the benefit of the effort, so he shirks.
 - For case 2: If he diverts one pound for the benefit of the firm (all the shareholders), he only gets α part of the benefit; but if he uses the pound for some perk, he gets the full benefit of the perk.
 - For case 3: If he devotes one pound to generate cash flows for the firm, he only gets α part of the cash flows; but if he uses the money to build the empire (and does not care so much about the cash flow), for example investing in estates in Dubai, he enjoys the full benefit.
- The agency cost of equity is thus that the manager engages into moral hazard behavior, for instances, he shirks or diverts resources for perks or devote into empire building.

Jensen-Meckling (1976)-2: The Agency Cost of Outside Equity

- It is based on the conflict interest between the outside shareholders and the insider shareholders (namely the management team)
- Compare the two circumstances: One where there are no outside shareholders so that the manager owns all the shares; the other where he only owns a fraction of the shares.
 - For case 1: the manager bears the whole disutility of exerting effort, but only gets α part of the benefit of the effort, so he shirks.
 - For case 2: If he diverts one pound for the benefit of the firm (all the shareholders), he only gets α part of the benefit; but if he uses the pound for some perk, he gets the full benefit of the perk.
 - For case 3: If he devotes one pound to generate cash flows for the firm, he only gets α part of the cash flows; but if he uses the money to build the empire (and does not care so much about the cash flow), for example investing in estates in Dubai, he enjoys the full benefit.
- The agency cost of equity is thus that the manager engages into moral hazard behavior, for instances, he shirks or diverts resources for perks or devote into empire building.
- The bigger the fraction of outside shares, the more serious the problem.

Jensen-Meckling (1976)-3: A Small Model for the Agency Cost of Equity

- Denote his fraction by α .

Jensen-Meckling (1976)-3: A Small Model for the Agency Cost of Equity

- Denote his fraction by α .
 - For the former circumstance: he chooses $e^n = \arg \max R(e) - C(e)$

Jensen-Meckling (1976)-3: A Small Model for the Agency Cost of Equity

- Denote his fraction by α .
 - For the former circumstance: he chooses $e^n = \arg \max R(e) - C(e)$
 - For the latter circumstance: he chooses $e(\alpha) = \arg \max \alpha R(e) - C(e)$

Jensen-Meckling (1976)-3: A Small Model for the Agency Cost of Equity

- Denote his fraction by α .
 - For the former circumstance: he chooses $e^n = \arg \max R(e) - C(e)$
 - For the latter circumstance: he chooses $e(\alpha) = \arg \max \alpha R(e) - C(e)$
 - $e(\alpha)$ satisfies $\alpha R'(e) - C'(e) = 0 \Rightarrow e'(\alpha) = \frac{R'(e)}{-[\alpha R''(e) - C''(e)]} > 0$

Jensen-Meckling (1976)-3: A Small Model for the Agency Cost of Equity

- Denote his fraction by α .
 - For the former circumstance: he chooses $e^n = \arg \max R(e) - C(e)$
 - For the latter circumstance: he chooses $e(\alpha) = \arg \max \alpha R(e) - C(e)$
 - $e(\alpha)$ satisfies $\alpha R'(e) - C'(e) = 0 \Rightarrow e'(\alpha) = \frac{R'(e)}{-[\alpha R''(e) - C''(e)]} > 0$
 - $e(\alpha) < e^n = e(1)$ for $\alpha < 1$:

Jensen-Meckling (1976)-3: A Small Model for the Agency Cost of Equity

- Denote his fraction by α .
 - For the former circumstance: he chooses $e^n = \arg \max R(e) - C(e)$
 - For the latter circumstance: he chooses $e(\alpha) = \arg \max \alpha R(e) - C(e)$
 - $e(\alpha)$ satisfies $\alpha R'(e) - C'(e) = 0 \Rightarrow e'(\alpha) = \frac{R'(e)}{-[\alpha R''(e) - C''(e)]} > 0$
 - $e(\alpha) < e^n = e(1)$ for $\alpha < 1$:
 - By English: He shirks, diverts more resources to perks, and devotes more into empire building.

Jensen-Meckling (1976)-3: A Small Model for the Agency Cost of Equity

- Denote his fraction by α .
 - For the former circumstance: he chooses $e^n = \arg \max R(e) - C(e)$
 - For the latter circumstance: he chooses $e(\alpha) = \arg \max \alpha R(e) - C(e)$
 - $e(\alpha)$ satisfies $\alpha R'(e) - C'(e) = 0 \Rightarrow e'(\alpha) = \frac{R'(e)}{-[\alpha R''(e) - C''(e)]} > 0$
 - $e(\alpha) < e^n = e(1)$ for $\alpha < 1$:
 - By English: He shirks, diverts more resources to perks, and devotes more into empire building.
- The firm's value: $V(\alpha) = R(e(\alpha)) - C(e(\alpha))$ increases with α :
$$V'(\alpha) = [R'(e(\alpha)) - C'(e(\alpha))]e'(\alpha) =$$
$$[R'(e(\alpha)) - \alpha R'(e(\alpha))]e'(\alpha) = (1 - \alpha)R'(e(\alpha))e'(\alpha) > 0.$$

Jensen-Meckling (1976)-3: A Small Model for the Agency Cost of Equity

- Denote his fraction by α .
 - For the former circumstance: he chooses $e^n = \arg \max R(e) - C(e)$
 - For the latter circumstance: he chooses $e(\alpha) = \arg \max \alpha R(e) - C(e)$
 - $e(\alpha)$ satisfies $\alpha R'(e) - C'(e) = 0 \Rightarrow e'(\alpha) = \frac{R'(e)}{-[\alpha R''(e) - C''(e)]} > 0$
 - $e(\alpha) < e^n = e(1)$ for $\alpha < 1$:
 - By English: He shirks, diverts more resources to perks, and devotes more into empire building.
- The firm's value: $V(\alpha) = R(e(\alpha)) - C(e(\alpha))$ increases with α :
 $V'(\alpha) = [R'(e(\alpha)) - C'(e(\alpha))]e'(\alpha) =$
 $[R'(e(\alpha)) - \alpha R'(e(\alpha))]e'(\alpha) = (1 - \alpha)R'(e(\alpha))e'(\alpha) > 0.$
- By English: The smaller the fraction of inside shares, the more serious the moral hazard problem, and the smaller the firm's value.

Jensen-Meckling (1976)-4.1: The Agency Cost of Debt-1

- As the outside equity reduces the incentive of the manager to work for the firm, how about we turn to debt for finance?

Jensen-Meckling (1976)-4.1: The Agency Cost of Debt-1

- As the outside equity reduces the incentive of the manager to work for the firm, how about we turn to debt for finance?
- However, debt is also subject to agency cost. It is based on the conflict interest between shareholders and debt holders. An example: Suppose everyone is risk neutral. The manager chooses one of two projects, A or B, to invest. The NPV of the projects are as follows.

Jensen-Meckling (1976)-4.1: The Agency Cost of Debt-1

- As the outside equity reduces the incentive of the manager to work for the firm, how about we turn to debt for finance?
- However, debt is also subject to agency cost. It is based on the conflict interest between shareholders and debt holders. An example: Suppose everyone is risk neutral. The manager chooses one of two projects, A or B, to invest. The NPV of the projects are as follows.

project/state	Good (prob. 0.5)	Bad (prob. 0.5)
• A	\$100	\$0
B	\$60	\$60

Jensen-Meckling (1976)-4.1: The Agency Cost of Debt-1

- As the outside equity reduces the incentive of the manager to work for the firm, how about we turn to debt for finance?
- However, debt is also subject to agency cost. It is based on the conflict interest between shareholders and debt holders. An example: Suppose everyone is risk neutral. The manager chooses one of two projects, A or B, to invest. The NPV of the projects are as follows.

project/state	Good (prob. 0.5)	Bad (prob. 0.5)
A	\$100	\$0
B	\$60	\$60
- Suppose the manager is working in the interest of shareholders.

Jensen-Meckling (1976)-4.1: The Agency Cost of Debt-1

- As the outside equity reduces the incentive of the manager to work for the firm, how about we turn to debt for finance?
- However, debt is also subject to agency cost. It is based on the conflict interest between shareholders and debt holders. An example: Suppose everyone is risk neutral. The manager chooses one of two projects, A or B, to invest. The NPV of the projects are as follows.

project/state	Good (prob. 0.5)	Bad (prob. 0.5)
A	\$100	\$0
B	\$60	\$60
- Suppose the manager is working in the interest of shareholders.
- If there is no debt: $A \Rightarrow \$50$ in expectation; $B \Rightarrow \$60$. The manager chooses B.

Jensen-Meckling (1976)-4.1: The Agency Cost of Debt-1

- As the outside equity reduces the incentive of the manager to work for the firm, how about we turn to debt for finance?
- However, debt is also subject to agency cost. It is based on the conflict interest between shareholders and debt holders. An example: Suppose everyone is risk neutral. The manager chooses one of two projects, A or B, to invest. The NPV of the projects are as follows.

project/state	Good (prob. 0.5)	Bad (prob. 0.5)
A	\$100	\$0
B	\$60	\$60
- Suppose the manager is working in the interest of shareholders.
- If there is no debt: $A \Rightarrow \$50$ in expectation; $B \Rightarrow \$60$. The manager chooses B.
- If outstanding debt is of face value \$50 and the firm has no other resources than the project returns to service the debt:
 $A \Rightarrow 0.5 \times \$(100 - 50) + 0.5 \times 0 = \25 ; $B \Rightarrow \$60 - 50 = \10 . The manager chooses A, the inefficient project.

Jensen-Meckling (1976)-4.2: The Agency Cost of Debt-2

- project/state Good (prob. 0.5) Bad (prob. 0.5)
 - A \$100 \$0 } B is efficient,
 - B \$60 \$60
- but the manager chooses A.

Jensen-Meckling (1976)-4.2: The Agency Cost of Debt-2

- | project/state | Good (prob. 0.5) | Bad (prob. 0.5) | |
|---------------|------------------|-----------------|-------------------|
| • A | \$100 | \$0 | } B is efficient, |
| B | \$60 | \$60 | |
- but the manager chooses A.
- This is called *Risk Shifting Problem*: too heavy debt makes the firm picks the riskier but lower valued project, in order to shift the risk to debt holders.

Jensen-Meckling (1976)-4.2: The Agency Cost of Debt-2

project/state	Good (prob. 0.5)	Bad (prob. 0.5)	
• A	\$100	\$0	} B is efficient,
B	\$60	\$60	

but the manager chooses A.

- This is called *Risk Shifting Problem*: too heavy debt makes the firm picks the riskier but lower valued project, in order to shift the risk to debt holders.
- Intuition: If good luck, the equity holders gain, as the benefit flowing to debt holders is upper bounded by the face value; but if bad luck, the debt holders take the loss, as the equity holders are protected by the limited liability.

Jensen-Meckling (1976)-4.2: The Agency Cost of Debt-2

project/state	Good (prob. 0.5)	Bad (prob. 0.5)	
• A	\$100	\$0	} B is efficient,
B	\$60	\$60	

but the manager chooses A.

- This is called *Risk Shifting Problem*: too heavy debt makes the firm pick the riskier but lower valued project, in order to shift the risk to debt holders.
- Intuition: If good luck, the equity holders gain, as the benefit flowing to debt holders is upper bounded by the face value; but if bad luck, the debt holders take the loss, as the equity holders are protected by the limited liability.
- The higher the level of debt, the more serious the risk shifting problem. Q (10 cts): At which level of debt, the manager will still choose B?

Jensen-Meckling (1976)-5: A Unique Optimal Capital Structure

- Put the agency cost of outside equity and that of debt together.

Jensen-Meckling (1976)-5: A Unique Optimal Capital Structure

- Put the agency cost of outside equity and that of debt together.
- Put the debt/equity ratio in the horizontal axis and put the agency cost in the vertical axis, draw a diagram of the unique optimal capital structure.

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.
- In: Which regularities can it explain?

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.
- In: Which regularities can it explain?
 - Leverage increases with firm size and growth opportunities.

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.
- In: Which regularities can it explain?
 - Leverage increases with firm size and growth opportunities.
 - Leverage decreases with volatility. Ad expenditures? R&D expenditures? ...

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.
- In: Which regularities can it explain?
 - Leverage increases with firm size and growth opportunities.
 - Leverage decreases with volatility. Ad expenditures? R&D expenditures? ...
- Out: What does it not capture?

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.
- In: Which regularities can it explain?
 - Leverage increases with firm size and growth opportunities.
 - Leverage decreases with volatility. Ad expenditures? R&D expenditures? ...
- Out: What does it not capture?
 - The possibility of designing the optimal contract to incentivize the manager, rather than using the capital structure.

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.
- In: Which regularities can it explain?
 - Leverage increases with firm size and growth opportunities.
 - Leverage decreases with volatility. Ad expenditures? R&D expenditures? ...
- Out: What does it not capture?
 - The possibility of designing the optimal contract to incentivize the manager, rather than using the capital structure.
 - For the giant corporations, the tiny fraction of inside shares may not help much with the management's moral hazard. But this critic is unfair to a 76 paper. The effects of outside equity are still not clearly understood.

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.
- In: Which regularities can it explain?
 - Leverage increases with firm size and growth opportunities.
 - Leverage decreases with volatility. Ad expenditures? R&D expenditures? ...
- Out: What does it not capture?
 - The possibility of designing the optimal contract to incentivize the manager, rather than using the capital structure.
 - For the giant corporations, the tiny fraction of inside shares may not help much with the management's moral hazard. But this critic is unfair to a 76 paper. The effects of outside equity are still not clearly understood.
- Out: Which regularities can it not explain?

Jensen-Meckling (1976)-Critical Thinking

- In: What does it capture?
 - The manager's moral hazard is very relevant; so is the risk shifting problem
 - It connects corporate finance to corporate governance. A big direction.
- In: Which regularities can it explain?
 - Leverage increases with firm size and growth opportunities.
 - Leverage decreases with volatility. Ad expenditures? R&D expenditures? ...
- Out: What does it not capture?
 - The possibility of designing the optimal contract to incentivize the manager, rather than using the capital structure.
 - For the giant corporations, the tiny fraction of inside shares may not help much with the management's moral hazard. But this critic is unfair to a 76 paper. The effects of outside equity are still not clearly understood.
- Out: Which regularities can it not explain?
 - Regularities as to exchange offers and issuances; Leverage decreases with uniqueness of the product and the profitability. But again, this critic is unfair to them.

Other Agency Costs of Debt: Debt-Overhang

- It is discovered by Myers (1977) and based on again the debt-equity conflict interest.

Other Agency Costs of Debt: Debt-Overhang

- It is discovered by Myers (1977) and based on again the debt-equity conflict interest.
- The point is that too much debt induces the manager, who acts in the interest of equity, to give up profitable projects. Suppose he identifies a project that requires investment of \$10 and returns \$15.

Other Agency Costs of Debt: Debt-Overhang

- It is discovered by Myers (1977) and based on again the debt-equity conflict interest.
- The point is that too much debt induces the manager, who acts in the interest of equity, to give up profitable projects. Suppose he identifies a project that requires investment of \$10 and returns \$15.

	project R.	curr. asset R.	debt hanging	net to E
• good state (0.5)	\$15	\$20	-\$18	\$17
bad state (0.5)	\$15	0	-\$18	\$0

Other Agency Costs of Debt: Debt-Overhang

- It is discovered by Myers (1977) and based on again the debt-equity conflict interest.
- The point is that too much debt induces the manager, who acts in the interest of equity, to give up profitable projects. Suppose he identifies a project that requires investment of \$10 and returns \$15.

	project R.	curr. asset R.	debt hanging	net to E
• good state (0.5)	\$15	\$20	-\$18	\$17
bad state (0.5)	\$15	0	-\$18	\$0

- The NPV for the equity:

$$0.5 \times \$17 - \$10 = \$8.5 - \$10 = -\$1.5 < 0.$$

Other Agency Costs of Debt: Debt-Overhang

- It is discovered by Myers (1977) and based on again the debt-equity conflict interest.
- The point is that too much debt induces the manager, who acts in the interest of equity, to give up profitable projects. Suppose he identifies a project that requires investment of \$10 and returns \$15.

	project R.	curr. asset R.	debt hanging	net to E
● good state (0.5)	\$15	\$20	-\$18	\$17
bad state (0.5)	\$15	0	-\$18	\$0

- The NPV for the equity:
 $0.5 \times \$17 - \$10 = \$8.5 - \$10 = -\$1.5 < 0.$
- The NPV for the debt. Without the project, the debt is worth $0.5 \times \$18 = \9 ; with it, the debt is worth $0.5 \times \$18 + 0.5 \times \$15 = \$9 + \$7.5 = \$16.5.$

Other Agency Costs of Debt: Debt-Overhang

- It is discovered by Myers (1977) and based on again the debt-equity conflict interest.
- The point is that too much debt induces the manager, who acts in the interest of equity, to give up profitable projects. Suppose he identifies a project that requires investment of \$10 and returns \$15.

	project R.	curr. asset R.	debt hanging	net to E
● good state (0.5)	\$15	\$20	-\$18	\$17
bad state (0.5)	\$15	0	-\$18	\$0

- The NPV for the equity:
 $0.5 \times \$17 - \$10 = \$8.5 - \$10 = -\$1.5 < 0.$
- The NPV for the debt. Without the project, the debt is worth $0.5 \times \$18 = \9 ; with it, the debt is worth $0.5 \times \$18 + 0.5 \times \$15 = \$9 + \$7.5 = \$16.5.$
- $-\$1.5 + \$7.5 = \$5$, the social value of the project, or overall NPV.

Debt-Overhang and Market Freeze

- With risky debt, the manager is unwilling to build new assets that are profitable. On the other hand, with risky debt, some current asset may be worth more to the equity than is the overall NPV.

Debt-Overhang and Market Freeze

- With risky debt, the manager is unwilling to build new assets that are profitable. On the other hand, with risky debt, some current asset may be worth more to the equity than is the overall NPV.

	Other assets R.	sold asset R.	debt hanging	net to E
• G. S. (0.5)	\$15	\$20	-\$18	\$17
B. S. (0.5)	\$15	0	-\$18	\$0

Debt-Overhang and Market Freeze

- With risky debt, the manager is unwilling to build new assets that are profitable. On the other hand, with risky debt, some current asset may be worth more to the equity than is the overall NPV.

	Other assets R.	sold asset R.	debt hanging	net to E
• G. S. (0.5)	\$15	\$20	-\$18	\$17
• B. S. (0.5)	\$15	0	-\$18	\$0

- With the asset, the equity gains $0.5 \times \$17 = \8.5 .

Debt-Overhang and Market Freeze

- With risky debt, the manager is unwilling to build new assets that are profitable. On the other hand, with risky debt, some current asset may be worth more to the equity than is the overall NPV.

	Other assets R.	sold asset R.	debt hanging	net to E
• G. S. (0.5)	\$15	\$20	-\$18	\$17
• B. S. (0.5)	\$15	0	-\$18	\$0

- With the asset, the equity gains $0.5 \times \$17 = \8.5 .
- If the asset is sold today, the maximum price is $0.5 \times \$20 = \10 . But then the situation becomes:

Debt-Overhang and Market Freeze

- With risky debt, the manager is unwilling to build new assets that are profitable. On the other hand, with risky debt, some current asset may be worth more to the equity than is the overall NPV.

	Other assets R.	sold asset R.	debt hanging	net to E
• G. S. (0.5)	\$15	\$20	-\$18	\$17
B. S. (0.5)	\$15	0	-\$18	\$0

- With the asset, the equity gains $0.5 \times \$17 = \8.5 .
- If the asset is sold today, the maximum price is $0.5 \times \$20 = \10 . But then the situation becomes:

	Other assets R.	sold asset V.	debt hanging	net to E
• G.S (0.5)	\$15	\$10	-\$18	\$7
B. S (0.5)	\$15	\$10	-\$18	\$7

Debt-Overhang and Market Freeze

- With risky debt, the manager is unwilling to build new assets that are profitable. On the other hand, with risky debt, some current asset may be worth more to the equity than is the overall NPV.

	Other assets R.	sold asset R.	debt hanging	net to E
• G. S. (0.5)	\$15	\$20	-\$18	\$17
• B. S. (0.5)	\$15	0	-\$18	\$0

- With the asset, the equity gains $0.5 \times \$17 = \8.5 .
- If the asset is sold today, the maximum price is $0.5 \times \$20 = \10 . But then the situation becomes:

	Other assets R.	sold asset V.	debt hanging	net to E
• G.S (0.5)	\$15	\$10	-\$18	\$7
• B. S (0.5)	\$15	\$10	-\$18	\$7

- The equity now gets only \$7.

Debt-Overhang and Market Freeze

- With risky debt, the manager is unwilling to build new assets that are profitable. On the other hand, with risky debt, some current asset may be worth more to the equity than is the overall NPV.

	Other assets R.	sold asset R.	debt hanging	net to E
• G. S. (0.5)	\$15	\$20	-\$18	\$17
• B. S. (0.5)	\$15	0	-\$18	\$0

- With the asset, the equity gains $0.5 \times \$17 = \8.5 .
- If the asset is sold today, the maximum price is $0.5 \times \$20 = \10 . But then the situation becomes:

	Other assets R.	sold asset V.	debt hanging	net to E
• G.S (0.5)	\$15	\$10	-\$18	\$7
• B. S (0.5)	\$15	\$10	-\$18	\$7

- The equity now gets only \$7.
- The manager is not willing to sell the asset even at the maximum price which the market is willing to accept. So we face market freeze. Q (10 cts): what is the lowest price the manager is willing to sell the asset?

Debt-Overhang and Market Freeze

- With risky debt, the manager is unwilling to build new assets that are profitable. On the other hand, with risky debt, some current asset may be worth more to the equity than is the overall NPV.

	Other assets R.	sold asset R.	debt hanging	net to E
• G. S. (0.5)	\$15	\$20	-\$18	\$17
• B. S. (0.5)	\$15	0	-\$18	\$0

- With the asset, the equity gains $0.5 \times \$17 = \8.5 .
- If the asset is sold today, the maximum price is $0.5 \times \$20 = \10 . But then the situation becomes:

	Other assets R.	sold asset V.	debt hanging	net to E
• G.S (0.5)	\$15	\$10	-\$18	\$7
• B. S (0.5)	\$15	\$10	-\$18	\$7

- The equity now gets only \$7.
- The manager is not willing to sell the asset even at the maximum price which the market is willing to accept. So we face market freeze. Q (10 cts): what is the lowest price the manager is willing to sell the asset?
- To explain 2008 market freeze in Asset Backed Securities? Could the market freeze be explained by re-evaluation of the risk involved?

How to Deal With Debt-Overhang or Risk-Shifting

- Debt Covenants.

How to Deal With Debt-Overhang or Risk-Shifting

- Debt Covenants.
 - To control risk taking (for risk-shifting problem)

How to Deal With Debt-Overhang or Risk-Shifting

- Debt Covenants.
 - To control risk taking (for risk-shifting problem)
 - Force to sell assets

How to Deal With Debt-Overhang or Risk-Shifting

- Debt Covenants.
 - To control risk taking (for risk-shifting problem)
 - Force to sell assets
 - Restrict future borrowing

How to Deal With Debt-Overhang or Risk-Shifting

- Debt Covenants.
 - To control risk taking (for risk-shifting problem)
 - Force to sell assets
 - Restrict future borrowing
 - Restrict dividend payments

How to Deal With Debt-Overhang or Risk-Shifting

- Debt Covenants.
 - To control risk taking (for risk-shifting problem)
 - Force to sell assets
 - Restrict future borrowing
 - Restrict dividend payments
- Debt Renegotiation: Renegotiate down the face value of debt. Q (10 credits): In the example as to investment above, how low of the face value are the debt holders willing to accept?

How to Deal With Debt-Overhang or Risk-Shifting

- Debt Covenants.
 - To control risk taking (for risk-shifting problem)
 - Force to sell assets
 - Restrict future borrowing
 - Restrict dividend payments
- Debt Renegotiation: Renegotiate down the face value of debt. Q (10 credits): In the example as to investment above, how low of the face value are the debt holders willing to accept?
- Convertible debt.