Econ 234C – Corporate Finance
Lecture 4: Internal Investment (III) - Introduction to MH

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1 Recap: Asymmetric Information and Financing Frictioins

- Manager / entrepreneur has investment project costing I, no cash on hand $C = 0$, no (illiquid) assets $A = 0$.

- Project is of good quality or of bad quality:
  - Returns: $\begin{cases} \text{good} \implies & \text{return } R \text{ w/prob. } p, \\ & \text{else return 0;} \\ \text{bad} \implies & \text{return } R \text{ w/pr. } q < p, \\ & \text{else return 0.} \end{cases}$
  - Two cases: $\begin{cases} \text{only good project creditworthy:} & pR > I > qR \\ \text{both projects creditworthy} & pR > qR > I \end{cases}$

- Investors' prior on success probability: $m \equiv \alpha p + (1 - \alpha)q$.

- *Key assumption*: project quality = private information of entrepreneur.

- Result:

  - No lending (market breakdown) if $\alpha < \alpha^*$ where α^* is defined by $(\alpha^* p + (1 - \alpha^*)q)R = I$.

  - Cross-subsidization if $\alpha \geq \alpha^*$.

- May also explain the 'Pecking Order of Financing'

  - Internal financing $\succ$ risk-free debt $\succ$ risky debt $\succ$ equity.

  - Model interpretation: Managers prefer 'low-information intensity' financing to 'high-information intensity' financing.

2 Approach II: Moral Hazard and Financing Frictions

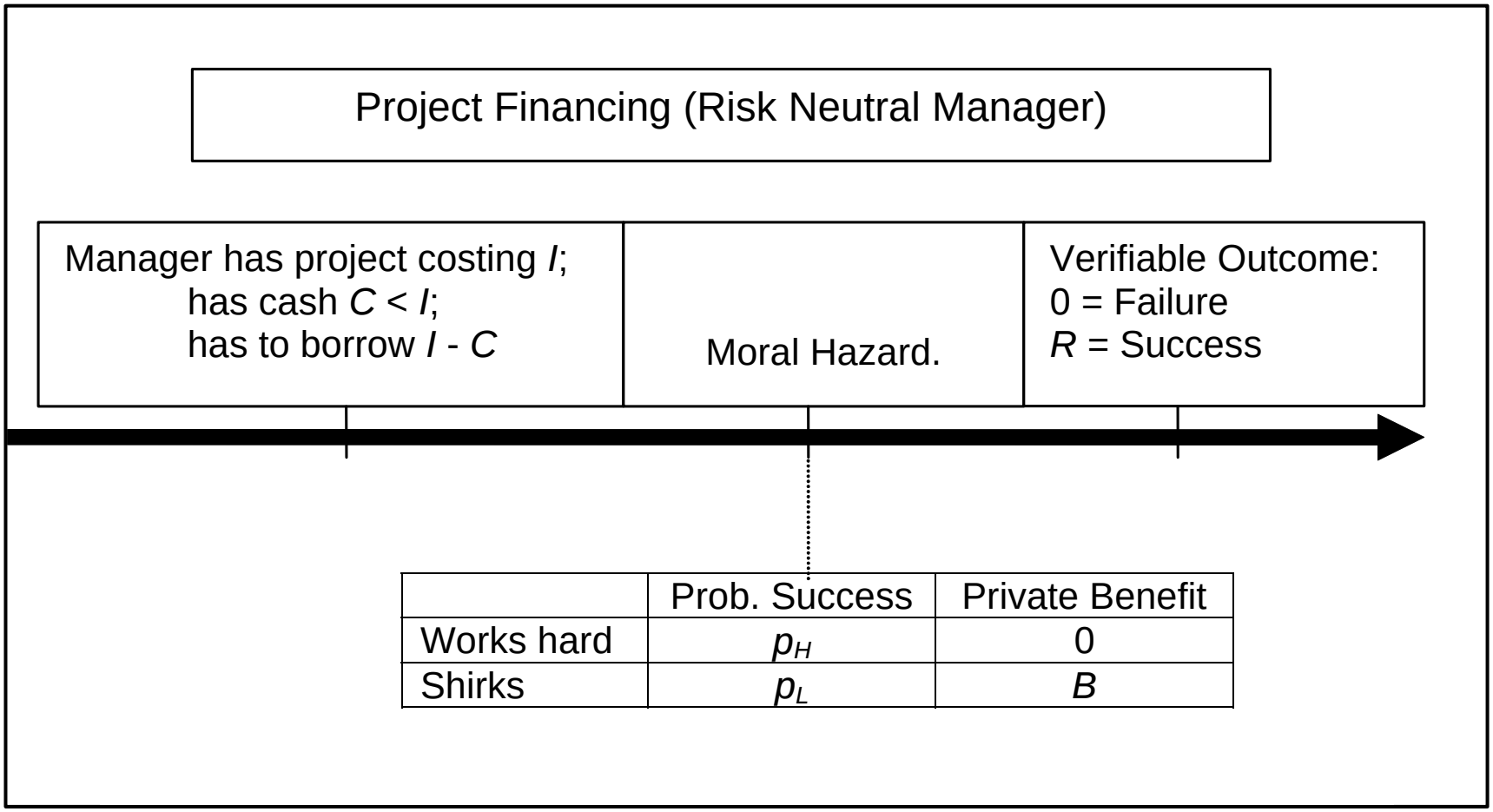
Managers' interests may differ from owners' interests because of

- Disutility / cost of effort (laziness)
- Private benefits (perks such as expensive offices)
- Utility from having a larg firm = "empire building"
- Entrenchment (managers want to keep their job and choose investments that make them indispensable)
- Risk-aversion (manager chooses projects with lower NPV but lower downside if that helps to prevent them from being fired)

- Simple investment setting: Manager (entrepreneur, borrower) has investment costing I, cash on hand $C < I$.

- Manager can work hard or shirk.
  - Return consequences: $\begin{cases} \text{work hard} \implies & \text{return } R \text{ w/prob. } p_H, \\ & \text{else return 0;} \\ \text{shirk} \implies & \text{return } R \text{ w/pr. } p_L < p_H, \\ & \text{else return 0.} \end{cases}$
  - Private-benefit consequences: $\begin{cases} \text{work hard} \implies \text{priv. benefit 0;} \\ \text{shirk} \implies \text{priv. ben. } B > 0. \end{cases}$
  - *Note:* You can interpret 'work hard' either as 'having a disutility of effort, which is saved when shirking' or as 'choosing the less glamorous project.'

- **Timeline**:



	Prob. Success	Private Benefit
Works hard	p_H	0
Shirks	p_L	B

- Manager and (potential) investors are risk-neutral. Limited liability.
- Rate of return normalized to $r = 0$.
- Competitive external capital markets (zero profit given $r = 0$).
- Contracting assumptions:
  - Success or failure of the investment verifiable.
  - Effort not observable, not verifiable.
- Contracting problem (simple and 'extreme' version considered here):
  - Project has positive NPV if manager behaves: $p_H R - I > 0$.
  - Project has negative NPV if manager misbehaves, even if we include the manager's private benefit: $p_L R - I + B < 0$.
  - Hence, investor and manager must find a way to offset shirking incentive; otherwise no contract, no financing, no project, no returns.

- Contract suggestion:
  - Pay R_m to the manager if success, 0 if failure.
  - Set R_m such that net payoff higher if working: $R_m(p_H - p_L) \geq B$. (*Note:* Weak inequality implies that manager works hard if indifferent.)
  - Minimum expected **agency rent** $R_m = \frac{B}{p_H - p_L}$.

- Knowing this, i.e., how much they need to pay the manager, do investors *want* to lend?
  - Don't want to lend if they anticipate that manager shirks.
  - Want to lend if they can motivate manager to work *and* still get back

their investment:

$$\begin{aligned} & p_H(R - R_m) \geq I - C \\ \iff \quad & p_H(R - \frac{B}{p_H - p_L}) \geq I - C \end{aligned}$$

- $p_H(R - \frac{B}{p_H - p_L})$, is the (expected) *pledgable income*.
- The lending condition says: pledgable income has to be greater than investor outlay.

- We can solve the lending condition for the 'minimum required cash' the manager needs to have at hand:

$$\begin{aligned} & p_H(R - \frac{B}{p_H - p_L}) \geq I - C \\ \iff \quad & C \geq I - p_H(R - \frac{B}{p_H - p_L}). \end{aligned}$$

– Call **threshold level** of cash (liquid assets) $\overline{C}$:

$$\overline{C} = I - p_H(R - \frac{B}{p_H - p_L})$$

Implications

1. Two types of determinants of credit rationing:
   - Low amount of cash on hand (low C).
   - High agency cost as measured by the size of the private benefit B relative to the likelihood ratio $\Delta p/p_H$, for a given NPV $p_H R$. (The **agency rent** is $p_H \frac{B}{p_H - p_L} = B/(\Delta p/p_H)$.)

2. Investment-cash flow sensitivity:
   - Holding constant the quality of the investment project and the private benefit, richer firms/managers are more likely to obtain financing and implement the project.

3 Readings for next class (and class after)

- Still basaed on the two Jensen papers.

- I will try to follow the set up of Tirole Chapter 3.