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

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1 Recap: Asymmetric Information and Financing Frictions

- 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:
    \[
    \begin{align*}
    \text{good} & \implies \text{return } R \text{ w/prob. } p, & \text{else return } 0; \\
    \text{bad} & \implies \text{return } R \text{ w/pr. } q < p, & \text{else return } 0.
    \end{align*}
    \]

- Two cases:
  - only good project creditworthy: \( pR > I > qR \)
  - both projects creditworthy: \( pR > qR > I \)

- 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 \( \alpha^* \) 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 large 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: \[
  \begin{align*}
  &\text{work hard} \quad \Rightarrow \quad \text{return } R \text{ w/prob. } p_H, \\
  &\text{shirk} \quad \Rightarrow \quad \text{return } R \text{ w/pr. } p_L < p_H, \\
  &\text{else return } 0.
  \end{align*}
  \]

  - Private-benefit consequences: \[
  \begin{align*}
  &\text{work hard} \quad \Rightarrow \quad \text{priv. benefit } 0; \\
  &\text{shirk} \quad \Rightarrow \quad \text{priv. ben. } B > 0.
  \end{align*}
  \]

  - 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:**

  - **Project Financing (Risk Neutral Manager):**
  
    - Manager has project costing \( I \); has cash \( C < I \); has to borrow \( I - C \)
    - **Moral Hazard.**
    - **Verifiable Outcome:**
      
        - 0 = Failure
        - \( R = \text{Success} \)

  - **Prob. Success | Private Benefit**

    | Works hard | Private Benefit |
    |------------|-----------------|
    | \( p_H \)  | 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:

\[ p_H(R - R_m) \geq I - C \]

\[ \iff p_H(R - \frac{B}{p_H - p_L}) \geq I - C \]

- \( p_H(R - \frac{B}{p_H - p_L}) \), 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:

\[ p_H(R - \frac{B}{p_H - p_L}) \geq I - C \]

\[ \iff C \geq I - p_H(R - \frac{B}{p_H - p_L}) \]
- Call **threshold level** of cash (liquid assets) \( \overline{C} \):

\[
\overline{C} = I - p_H \left( R - \frac{B}{p_H - p_L} \right)
\]
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 based on the two Jensen papers.

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