LABOR AS A QUASI-FIXED COST:
Human Capital Investment

Points that will be covered

- Introduction to the investment framework
- Application of investment framework to individual decision to invest in oneself
- Application of investment framework to firm’s decision to invest in employees

INVESTMENT FRAMEWORK

- **DEFINITION OF INVESTMENT:**
  Decision for *forego present income for expected future gain*

- **TIME COST OF MONEY:**
  - Money received now is worth more than same $ amount received later
  - Debts paid now cost more than debts paid later
EVALUATING AN INVESTMENT: Benefit Cost Analysis

**DECISION RULE:**
Invest if total benefits > total costs, or
\[ B/C \geq 1 \]

3 BROAD TYPES OF HUMAN CAPITAL INVESTMENT BY INDIVIDUALS

- Skill Acquisition
  - Education *
  - On-the-job Training *
- Mobility
- Health

FACTORS AFFECTING EDUCATION INVESTMENT DECISION

**EXPECTED BENEFITS**
- Increased Earnings
- Psychic Benefits

**COSTS**
- Direct Monetary Costs of Education/Training
- Opportunity Costs (Foregone earnings)
- Psychic Costs
Benefits in More Detail: Psychic Benefits

- Non-money benefits accrued from investment
- Education examples:
  - Prestige from degree
  - Making new friends
  - Joy of learning

Benefits in More Detail: Increased Earnings

- Nominal net earnings increase
- Time period to enjoy benefits
- Present-orientedness
  - How individuals weight future events
  - Present-oriented --> Low weight to future events
    - Want $ now

Difficulty with calculating B/C over different time periods

- Value of benefits depends (in part) on when they are received
- Tool for Calculating Time Cost of Money
  - Present Value
    → Incorporates time cost of money
    → Takes into account that investment costs not always incurred over same period that benefits received
Basis for the time cost of money

- Uncertainty re: whether able to consume and/or receive benefits
- Interest: Could make alternative investment and get a return
- Inflation
- Personal Preference (individual only)

CALCULATING THE PRESENT VALUE OF BENEFITS

- Purpose: Express value of benefits spread over future in terms of what they are worth today
- \[ PV = \sum_{t=1}^{T} \frac{B_t}{(1+r)^t} \]
  - \( r \) is yearly interest rate (or discount rate)
  - \( T \) is number of years into future can expect benefits
  - \( B_t \) is net benefit level you expect in year \( t \)

ANOTHER WAY TO EXPRESS PV

- \[ PV = \frac{B_1}{1+r} + \frac{B_2}{(1+r)^2} + \left(\frac{B_3}{(1+r)^3}\right) + \ldots + \left(\frac{B_T}{(1+r)^T}\right) \]
Example of Arithmetic of PV Calculation

- PV = \( B_1/(1+r) + B_2/(1+r)^2 + \ldots + B_t/(1+r)^t \)

The example:
- T = 3 (i.e., 3 periods starting next year)
- \( B_1 = B_2 = B_3 = $100 \)
- \( r = 0.05 \)

Value today of these 3 years of future benefits:
\[ PV = (100/1.05) + (100/1.05^2) + (100/1.05^3) \]
\[ = 95.24 + 90.70 + 86.38 \]

Says you would be equally willing to take $272.32 today or $100 per year for three years.

PV FORMULA & FACTORS AFFECTING INVESTMENT DECISION

- \( r \), the interest rate or discount rate:
- Larger \( r \), lower present value of future benefits

Factors that affect \( r \):
- Inflation
- Real interest rates
- Likelihood of receiving benefits
- Personal preferences and circumstances
  - More present oriented, higher \( r \)

PV & FORMULA, CONT.

- \( T \), time period over which can collect benefits
  - Age (Older you are, smaller \( T \) will be)
  - Time can expect to stay in field for which you are training

- \( B \), Benefits
  - Gains from educational investment
  - Earnings Differentials
  - Invest if PV(Benefits) \( \geq \) Costs
TRUE NATURE OF EDUCATION AS AN INVESTMENT

- Human Capital Theory: Schooling increases productivity
- Signaling Hypothesis: Schooling signals unobservable productivity
- Credentialling Hypothesis: Education as rationing
- Issue to consider: Self-selection

POST-SCHOOLING HUMAN CAPITAL INVESTMENTS

"Typical" Earnings Schedule

- Earnings rise quickly early in career
- Then flatten out later in career
- Earnings rise quickly early in career

Time

Earnings
“FIXED” COSTS ASSOCIATED WITH LABOR

- 3 Common Kinds
  - Hiring
  - Training (i.e., Human Capital)
  - Some forms of non-wage compensation
- All 3: Represent some form of Investment by firm in its workforce

BASIC FRAMEWORK

- Foregone present productivity during learning period with expectation of greater future productivity
- Multi-Period Framework
  - Costs & Benefits occur in different periods
  - Benefits will be spread over several periods

ISSUE OF WHO PAYS AND WHO RECEIVES BENEFITS

- EMPLOYER PAYS:
  - Employer chooses to accept lower productivity during learning period
- WORKER PAYS:
  - Worker receives lower wages and/or pays cost of training out-of-pocket
PRESENT-VALUE APPLICATION: Benefits and Costs

- Benefits = PV of labor over all periods
  - $PV_B = MP_0 + MP_1/(1+r)$

- Costs = direct & indirect labor costs
  - $PV_C = W_o + D + W_1/(1+r)$

PRESENT-VALUE APPLICATION: Efficiency Condition

- Efficiency Condition:
  - $MP_0 + MP_1/(1+r) \geq W_o + D + W_1/(1+r)$, or
  - $B/C \geq 1$

Note: 1) Timing matters 2) Firms adjust wages to cover costs

Two Kinds of Training

- GENERAL TRAINING

- FIRM-SPECIFIC TRAINING
GENERAL TRAINING

- Def.: Increases one’s productivity to many employers equally: Portable

2 PERIOD MODEL: NO TRAINING
- Wages = Wo (Market wage)
  - Wage level does not change over two periods
- Productivity = MPo
  - Productivity does not change over two periods

Base Case: No Training

\[ W_o = MP_o \]

Period 1 Period 2

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GENERAL TRAINING, CONT.

- Version 2: Firm provides training in Period O
  - In Period O:
    - Worker less productive than if no training, \( MP = MP'_o < MP_o \)
    - Wage rate = market rate, \( W_o = MP_o \)
    - Cost of training in Period O = Out of pocket
direct costs + reduced productivity
    \[ C = D + (MP'_o - MP_o) \]
**General Training Case 2: Firm provides training**

\[ W_o = MP_o \]

**Period 1**

**Period 2**

**MP_1**

**W_o**

**W_o**

**MP_o**

**General Training, Cont**

- Training \( \Rightarrow \) Increase in productivity to \( MP_1 \)
- **THE PROBLEM:** For firm to maintain efficiency condition: worker must accept lower wage to reimburse firm for training costs, \( W_{1e} < W_1 = MP_1 \)
- But, since training is portable, worker can get \( W_1 \) elsewhere

**Specific Training**

- **Def.:** Increases productivity only at firm where training occurred
- **2 Period Model**
  - Entry Period: Same as general training
  - Post-training Period: Productivity increases from training, \( MP_1 > MP_0 \) in training firm but \( MP_o = MP_0 \) in other firms
  - Post-training period: \( W_o < W^* < W_1 \), (more than mkt. wage, less than \( MP_1 \))
Specific Training: Firm provides training

\[
\begin{align*}
W_i &\quad MP_1 \\
W^* &\quad W_0 < W^* < W_i \\
W_e &\quad MP_e \\
\end{align*}
\]

Period 1  Period 2

SPECIFIC TRAINING: IMPLICATIONS

- **Earnings & Lifetime productivity**: Wages increase with seniority because of training over lifetime but decelerating because of growing cost of foregone productivity.
- **Shared Cost of training as basis for long-term employment relation**: Turnover costly to both parties.
  - Firm view: Turnover truncates time to recover investment.
  - Worker view: Wage advantage drops with turnover.