Option Valuation & Uncertainty

Agenda

- Investment Theory
  - Orthodox
- Options Approach
- Options Approach
- Definitions
- Applications
- Examples
- Summary & Conclusions

Dixit & Pindyck
*Investment under Uncertainty*, Chapter 1 & 2

Agenda

- Investment Characteristics
  - Irreversibility
  - Uncertainty
  - Timing

Agenda

- Investment: Olde Tyme View
  - Net Discounted Present Value
  - Jorgenson’s User cost of capital
  - Tobin's q:
Net Discounted Present Value

\[ \text{NDPV} = \sum \frac{CF_i}{(1 + r)^t}, \text{summed over } t = 1, n \]

Jorgenson:
- Value of increment in capital \((MP_k)\) versus equivalent per period unit cost, rental or "users" cost

Tobin's q:
- Capitalized value of marginal investment to purchase cost or replacement cost
- \(q > 1\), invest

Options features
- Time limited
- "Killed" or exercised terminates
Agenda

- Opportunity cost of option
  - Include in valuation
  - i.e. if the NDPV plus the option value > 0, invest

Agenda

- Irreversibility
- Waiting

Agenda

- Irreversibility
  Investments become sunk cost (irreversible) when:
  - Firm or Industry specific
  - Regulations/laws
  - Partially irreversible, "lemons" example

Agenda

- Irreversibility
- Waiting
  - Preempt investments preclude
  - Cost of delay
    - Competitive entry
    - Foregone revenues

Uncertainty
(examples)

- Regulation
- Competition
- Technologies
- Costs
- Market

Uncertainty
(examples)

- Regulation/Legislative
- Competition
  - Traditional: ATT/MFS/TPG
  - Incumbent's reaction(s)
  - Cable’s Strategies
  - Entry into exchange market
  - Broadband modems
Uncertainty (examples)

- Regulation/Legislative
- Competition
- Technologies
  - Wireless impact
  - WinStar
  - Wireless local loop
  - ISP/Packet supplanting circuit
  - Switched Network

Uncertainty (examples)

- Costs
- Spectrum costs
- Unbundled Network Elements
- Right of way
- Leases

Uncertainty (examples)

- Market
  - Product acceptance
  - Price and cross-elasticities
  - Size
  - Growth

Uncertainty (examples)

- Regulation/Legislative
  - Courts -- Suspension of FCC Orders
  - Regulation: Decisions on RBOC LD
  - Legislative: Re-regulation of Cable etc.

Summary & Conclusions

Agenda

- Investment Theory
  - Orthodox
  - Options Approach
- Options Approach
  - Definitions
  - Applications
  - Examples
- Uncertainty