Foundation

- Olde Tyme Investment View
  - Net Discounted Present Value
    - NDPV > 0, invest
    - Also called NPV or DPV or PV
    - \[ \text{NDPV} = \sum \frac{CF_i}{(1 + r)^t}, \text{summed over } t = 1, n \]
  - Traditional Investment

Asset Valuation

- Accounting Deprecation
- Economic Depreciation
- Sunk/Irreversible Costs

Forward-looking Costs

"... depreciation and theoretical selling price must be computed simultaneously ..." to determine correct valuation.

Harold Hotelling, 1925.

Agenda

- Asset Valuation
- Valuation Model
- Summary & Conclusions
Depreciation

- Accounting Depreciation
  - Arbitrary cost allocation (over time)
  - Industry/regulators determine
  - Not an economic cost
  - Not equal to economic depreciation

Asset Valuation

- Accounting depreciation
  - Used for prices/rates
  - Regulatory Compact
    - Payments cover costs
      - Investment plus return

Depreciation

- Accounting Depreciation
- Economic Depreciation
  - Determinates
    - Rental market
    - Secondhand markets
    - Profit generated
    - "Lemons" problem
    - Real options valuation

Depreciation

- Accounting Depreciation
- Economic Depreciation
- Sunk/Irreversible Costs
  - No rental or secondhand markets
  - Telecommunications systems

Depreciation

- Accounting Deprecation
- Economic Depreciation
  - "Decision-making"
  - "Reported"

Regulatory Shift

- Competition:
  - Constraints on future prices.
- Forward-looking cost:
  - Limits the future prices
Forward-looking Costs

- Profitable Price to invest in the asset in each period

Forward-looking Costs

- Profitable Price to invest in the asset in each period
- Expectation regarding value of the assets in the future.

Forward-looking Costs

- Price that would be profitable to investing in the asset in each period
- Expectation regarding values of the assets in the future.

Forward-looking Costs

- Asset Valuation
  - Price can only be determined if all costs -- including the depreciation-- are included

Model

- "One-hoss shay"/Light bulb
- Assumptions
  - Constant price
  - Constant output
  - Constant expenses
  - Certainty of life

Model

- Certainty of life
  - Not expected life
  - If 10 years versus 9 or 11 years with Pr(x) = 1/2
    - Income only 9 years or
    - An extra year of income
Definitions

- **Economic life:**
  - "L" equals expected life, then 1/L the probability of death.
- **Competitive risk:**
  - The risk that competition will take away market share.

Relevance to Cost Models

- **Problem 1:**
- **Problem 2:**
  - Constant capacity factor
  - If differential utilization
  - Early years higher cash flow
  - Later years lower cash flow
- **Problem 3:**
  - No deterioration of market share,
  - Nor declining market over time
  - Price decline ignored.

Relevance to cost models

- **Problem 1:**
- **Problem 2:**
- **Problem 3:**
- **Problem 4:**
  - Revenue from 3 year old equipment
    - Not to revenue generated by the current equipment
    - Revenue generated by one year old equipment is expected to generate two years hence

Summary

- Rental Value Determination
- Cost Models Inadequate
- Costs Understated
Rental Value Determination

Cost Models

Inadequate Specifications:

Costs Understated:

- No change in cost of asset
- No risk of underutilization
- Revenue requirement level
- Utilization rate level
- No real option valuation