



# *Economics II*

*(a Non-Economist's views)*

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# Microeconomics

- Where does it apply?
- What are its fundamentals?
- What are its components?
- What are its limits and shortcomings?
- Individual, selfish actors
- Markets, competition, information
- Supply, Demand, Price (latter signals behavior)
- Assumes efficient markets, no externalities, market-clearing prices, etc.

A firm (or individual, *rational* actor) usually deals with microeconomics

# What does a market need?

- Perfect information
- No barriers to entry
  - I.e., meaningful competition
  - What are examples (modes) of barriers to competition?
- No externalities
- Markets are meant to be efficient, not equitable

# Well Functioning Markets = Competitive

- Leads to efficiency
- So, why does an iPod Nano cost \$149 or \$199? (4 GB and 8 GB, respectively, 9/18/07)
  - What do you think it costs them to make these?
- Aren't companies/entities not supposed to earn super-normal profits?
  - Theory would say no earning profits beyond costs of capital
- Successful products need a large *ecosystem* around them
- Conversely, an individual product has its own lifecycle of costs and human impact

# Bill of Materials – iPod Nano

Direct materials cost estimate of the new iPod nanos (US\$)\*

Component	4GB	8GB
Flash memory	\$24.00	\$48.00
Display	\$10.60	\$10.60
Core video processor/microprocessor	\$8.60	\$8.60
Electro mechanicals	\$2.44	\$2.44
SDRAM	\$2.72	\$2.72
Mechanicals	\$2.33	\$2.33
Misc. components	\$2.25	\$2.25
battery	\$1.40	\$1.40
Power management IC	\$1.38	\$1.38
Video driver	\$0.85	\$0.85
CODEC	\$0.90	\$0.90
Mixed signal array / Touch wheel controller	\$0.65	\$0.65
Buck regulators	\$0.15	\$0.15
Utility flash memory	\$0.59	\$0.59
Subtotal	\$58.85	\$82.85

# Costs vs. Prices

- They are not the same!!
- Profit margins vary
  - Long-run and short-run marginal costs differ
    - Bill of materials (BOM) excludes R&D, software, etc.
    - BOM also excludes marketing and other soft costs
- Consider WiFi Phones
  - Isn't the BOM very low?
  - Why hasn't this become the norm yet?

# Some other issues with Economic metrics

- Information asymmetry and inaccuracy
- Non-monetary transactions
  - Black economy
- Models apply only at the margin (e.g., elasticity)
  - Under equilibrium conditions
  - Mean vs. median issues
- What am I spending money on?
  - Goods versus services (different accounting)
  - What is hardware vs. software
- Time spent on different activities
  - Himachal Pradesh (India) gives an interesting example
    - Schooling vs. gathering wood and water





# Profits – Good or Bad?

- Isn't this an inherent tension:
  - Profits vs. affordability?
  - Economies of scale or volume could allow both
- Profits are a necessary thing
  - Spur investment, growth, etc.
  - We'll study profits and economic sustainability/viability shortly

# Switching Gears...



# Project (Techno-economic) Evaluation

- If I'm an entrepreneur, how do I know a particular idea is worthwhile?
  - Cynical answer – doesn't matter, just need someone to fund me!
    - That is a venture capital worldview (think dot.coms)
    - Not true if we're taking out a loan
    - *What's the difference between debt (loans) and equity?*

# Project Valuation

- Is this worth it?
- What are my alternatives?
- Risk-return tradeoff
  - More risk, higher \*expected\* return
    - Bond ratings
  - Country risks
    - Currency exchange rates
    - Nationalization
    - Regulation
  - Large projects involve sophisticated financial instruments, such as options, derivatives, hedges, etc.

# Time Value of Money

## ■ Discount Rate

- Personal, Market, Societal
  - Borrowing  $\neq$  Lending rate
- Inflation (real vs. nominal)
- Opportunity Cost

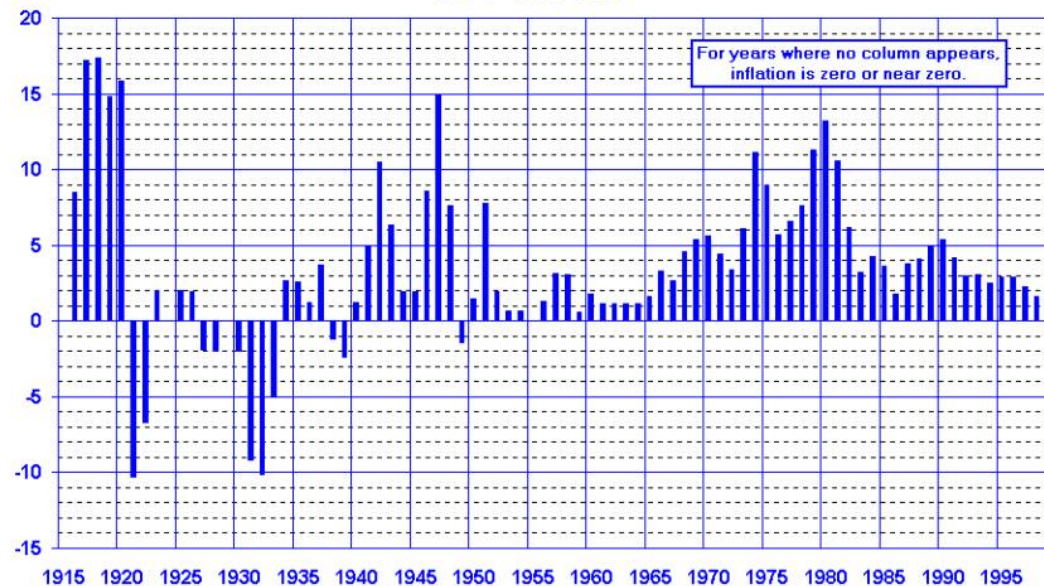
## ■ Cost of Capital

- Debt
- Equity (“riskier”)
  - In the absence of “distortions” (e.g., taxes), ratio shouldn’t matter – it is the project cash flows that matter

## ■ Inflation

- Consumer Prices Index (CPI), Wholesale Price Index (WPI), Prime

U.S. Annual Inflation Rate 1915 to 1999, in Percent

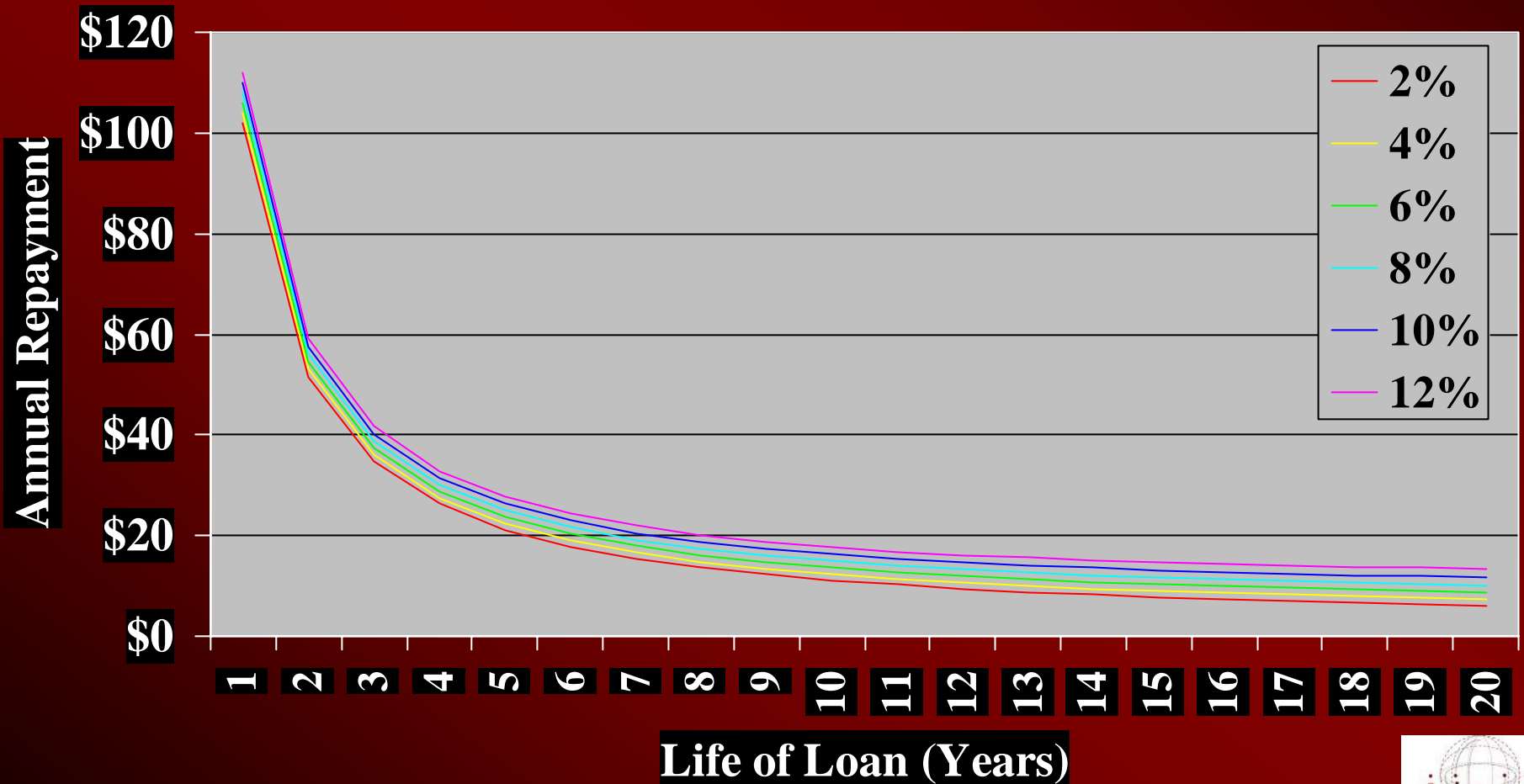


# Calculations – Project Valuation

- **Simplification**
  - Assume ‘r’ is the discount rate
  - ‘N’ is the number of periods (e.g., years)
    - $n = 0, 1, 2, \dots, N$  ( $n=0$  means now)
- **Time Value of Money**
  - $\text{Value}_{\text{final}} = \text{Value}_{\text{init}} \times (1 + r)^{\Delta n}$
  - Leads to compounding effects
- **Say I borrow \$100 @ 5% p.a.**
  - If I can earn \$6/yr from this, is that enough?

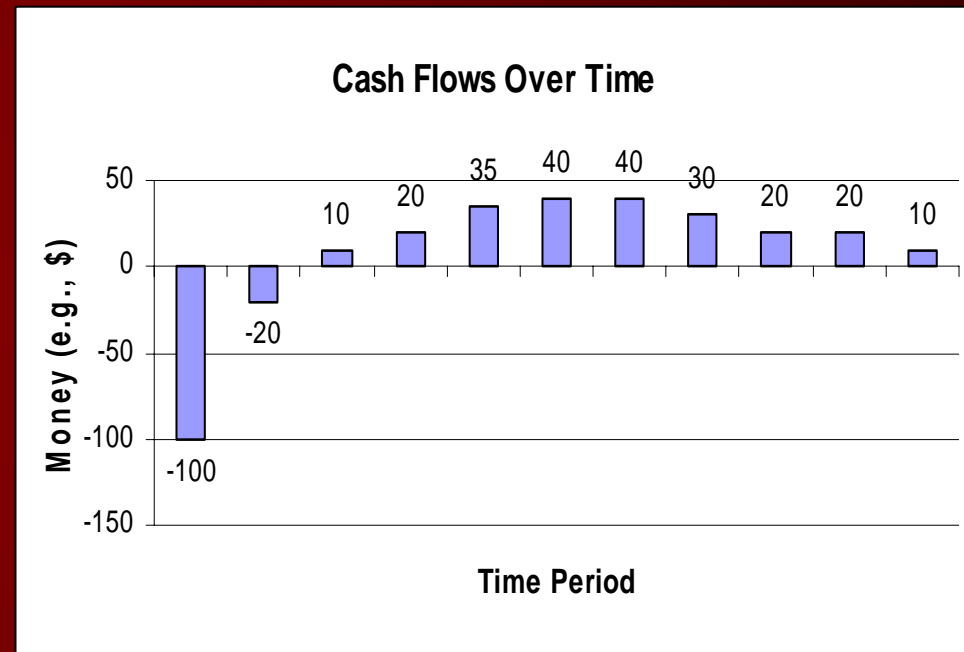
*What about principal repayment?*

# Repayment of \$100 Loan



# Project Cash Flows

- (Raw  $\Sigma = 105$  net)
- But: time value of money?
- *Net Present Value (NPV)*
  - Convert all future values to present values using chosen rate 'r'
  - Add them up
  - If  $NPV > 0$ , it is a worthwhile project
    - Answer depends on the discount rate





# Internal Rate of Return (IRR)

- Alternative technique to valuation
- Defined as that discount rate such that  $NPV = 0$ 
  - Previous example,  $IRR = 12.3\%$
  - Sounds simple
- Complexity
  - Shape of cash flows matters – only useful when cash flows are simple
  - Can have 2+ IRRs (!)
  - Best to choose the “appropriate” discount rate and perform NPV calculations