National Income

Savings
and Investment
Circular Flow of Income

• In a VERY simple economy
  – Labor is a *factor input* used to produce *goods*
  – Labor receives *income* of wages
• Wages then exchanged for goods
Measures of Economic Activity

1. Labor services sold for wages ("supply side“)
2. Goods sold for revenue ("demand side“)

Note that Total Income (received by the workers) must equal Total Spending
Generality

• Basic logic of circular flow does not change with addition of:
  – Financial Markets (the future), assets, money, bonds, ...
  – Government taxing/spending, ...
  – International Exchange (trade) of goods, services, capital ...
Gross Domestic Product

• GDP ("output") is defined as the value of all final goods and services produced within the country at current prices
  – GDP a flow measure (usually annual)
  – Output is valued at market prices (something priced at zero is not included)
  – Only final goods and services count, so that value-added is measured
  – Inflation makes nominal GDP uninteresting over long periods of time

• Real GDP is real value of all goods and services, accounting for inflation
Many Issues with National Accounts

• *Leisure* is ignored but valuable
• Income *distribution* relevant
• *Non-Market Services* (those not priced) are ignored but important
• *Environmental Degradation*
• *Underground Economy* generates value
• *Statistical Problems*
  – mis-measurement is rife (e.g., CPI “quality bias”)
  – 2 important examples: a) rising quality; b) new goods
Modeling Income: “Supply” Side

• Standard microeconomics
• Output produced from *input factors labor* and *capital*, given at point in time
• Factors combined with *production function* which maps inputs to output via (short-run) fixed technology
  
  – \( Y = F(K, L) \)
  
  – GDP (\( Y \)) produced from capital (\( K \)) and labor (\( L \)) using existing technology \( F(.) \)
An Important Assumption

• *Constant Returns to Scale (CRS)*
  – Doubling inputs doubles output
  – Replication

• Usually assume competitive input markets and profit maximization
  – With CRS, economic profits are zero
An Important Fact

• The “Cobb-Douglas” Production Function works (surprisingly) well *empirically*:

\[ Y = AK^\alpha L^{1-\alpha} \]

– where \( \alpha \approx .25/\ .33 \) empirically
– \( \alpha \) is capital’s share of income (\( rK/Y \))
– \( (1-\alpha) \) is labor’s share of income (\( wL/Y \))
– A represents technology

• Empirical (rather than theoretical) finding
  – Can \( \alpha \) be treated as constant?
Demand (Expenditure) Side

The “National Income Accounting Identity”

\[ Y \equiv C + I + G + (X-M) \]
Consumption (C)

• Consumption is undertaken by households
  – Approximately 60% of aggregate spending on average
1. Mostly Services (in Rich Countries)
2. Goods
  – Durables
  – Non-Durables
  – Important in Developing Countries
Investment (I)

- Physical Investment in Capital is undertaken by firms
  - Slightly more than 20% of aggregate spending on average
1. Depreciation
2. Structures
   - Residential
   - Non-residential
3. Machinery and Equipment
4. Research and Development (new)
5. Change in Inventories
Direct Government Spending (G)

• Government directly purchases goods and services (for “public consumption”)
  – Slightly less than 20% aggregate spending on average
  – Different levels of government
  – Major components:
    1. Healthcare
    2. Education
    3. Military
    4. Infrastructure, ...
Indirect Government Spending

Who Receives *Transfers*?
1. Old
2. Unemployed
3. Poor
4. Agriculture
5. Bond-holders (Holders of National Debt), ...

• Note: indirect spending often larger than direct government spending
Net Exports (NX)

• *Net Exports* = exports (X) minus imports (M)

• That is, our *sales to* foreigners, less our

  *purchases from* foreigners

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Modeling Aggregate Spending

• Assume:
  – Consumption a function of (disposable) income with slope, \( c \equiv \text{Marginal Propensity to Consume (MPC)} \) so that \( C = cY \)
    • Note: no effect of interest rates on consumption, and hence no interest effect on savings
      – Theoretically ambiguous, empirically weak
  – Investment a function of the (real) interest rate, Present Value
  – Direct Government Purchases and Net Exports are both exogenous, latter zero
Equilibrium: Formal Stuff

• Combine Demand and Supply Models
  – Supply side: \( Y = F(K,L) \)
  – Demand side: \( Y = C + I + G + (X-M) \)
    • But \( C = c(Y); I = I(r); G \text{ fixed}; (X-M) = 0 \)
• Factor supplies and output fixed in the short run: \( Y = c(Y) + I(r) + G \)
  – Alternatively, \( Y = C + I + G \)
    \[ \Rightarrow Y - C - G = I \]
    \[ \Rightarrow (Y - C - G) = I \]
    \[ \Rightarrow \text{National Savings} = \text{Investment} \]
Equilibrium

- \( S = Y - C - G = I(r) \)
What Happens when G Rises?

• *Increase in Direct Government Spending* (e.g., war financed by deficit)
  – Savings (S) and hence Investment (I) contract
  – Interest rate (r) rises, endogenously

\[ S = Y - C(Y) - G \]
Technological Innovation

• *Increase in Investment Schedule* (shifts up)
  - Interest rate \( r \) increases endogenously
  - No change in Savings or Investment

\[ S = Y - C(Y) - G \]

\[ I'(r) \]

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Key Takeaways

• Circular Flow of Income
• Production Function
  — \( Y = F(K,L) \)
• National Income Accounting Identity
  — \( Y = C + I + G + (X - M) \)
• In a *closed* economy, investment and savings interact to determine the interest rate