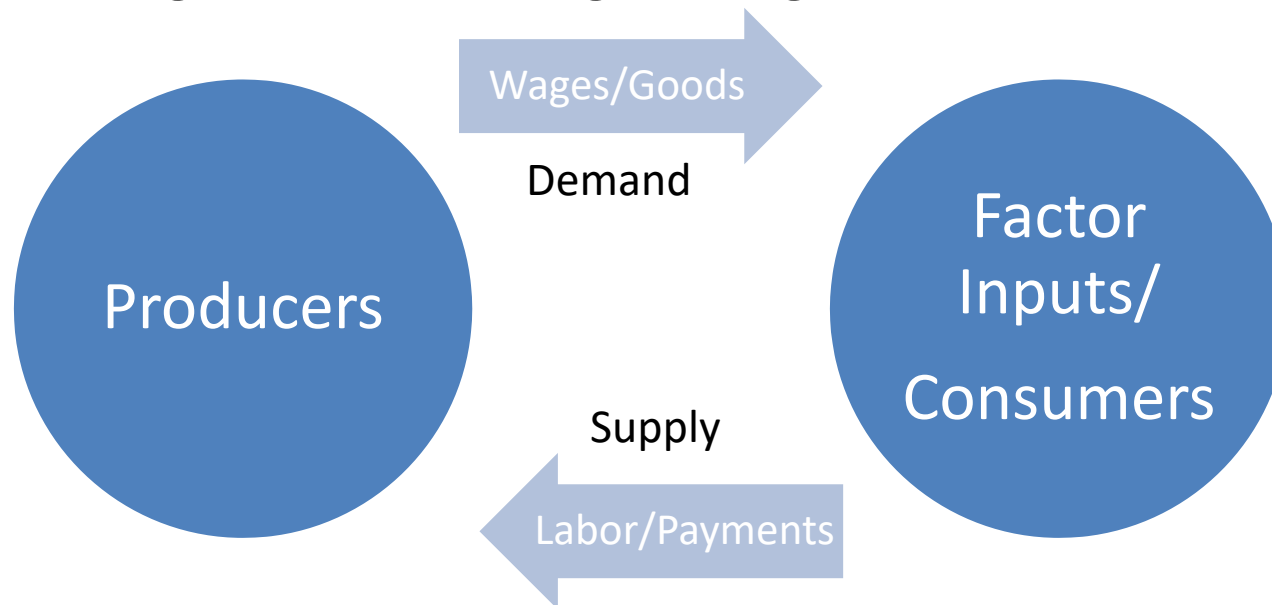


# National Income

## 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  $F(\cdot)$

# 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

# Modeling Aggregate Spending

- Assume:
  - *Consumption* a function of (disposable) income with slope,  $c \equiv$  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

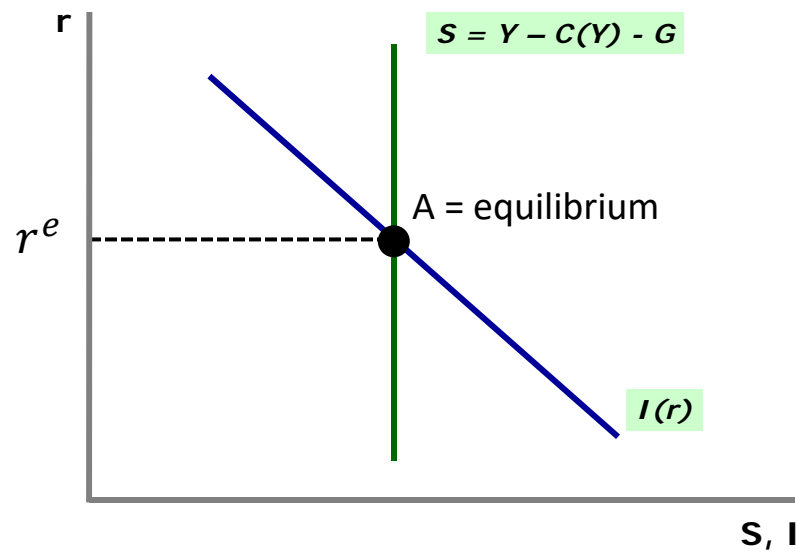


# Equilibrium: Formal Stuff

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

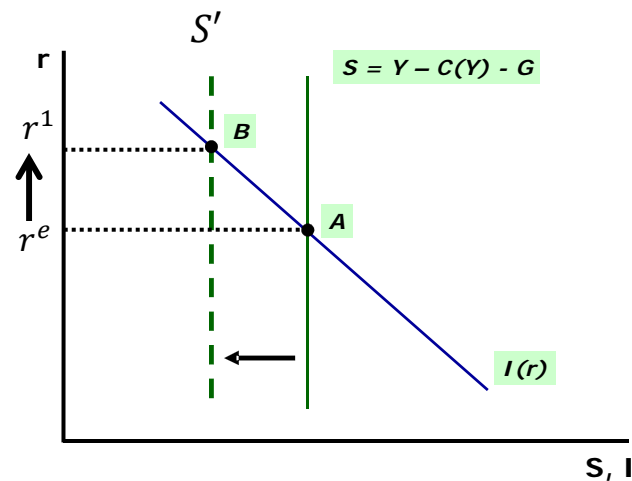
# Equilibrium

- $S = Y - C - G = I(r)$



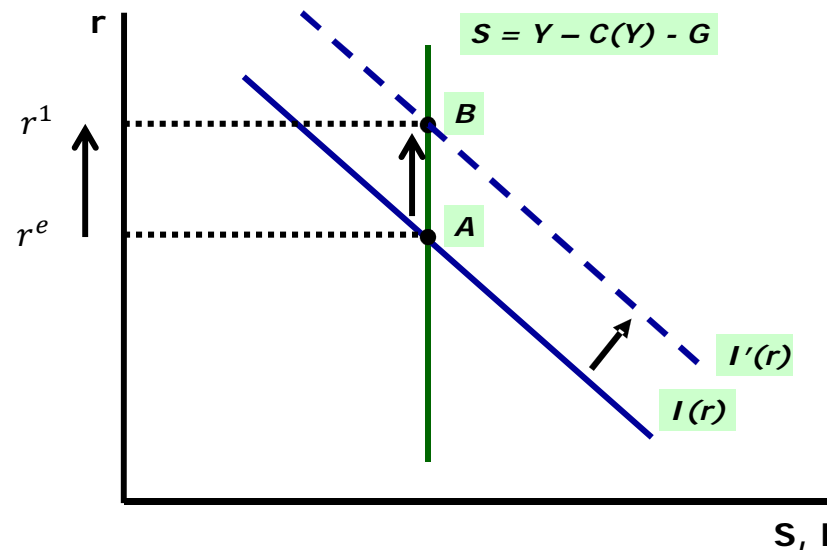
# What Happens when G Rises?

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



# Technological Innovation

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



# 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