# Lecture 4
# Saving and Capital Formation

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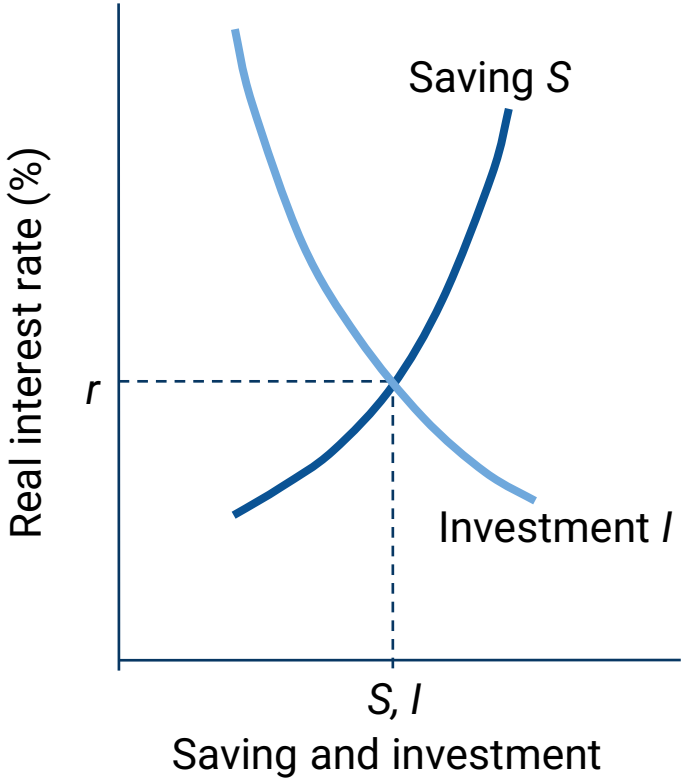
# Lecture Outline




- Saving
- Investment
- Demand and Supply of Savings

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# Saving

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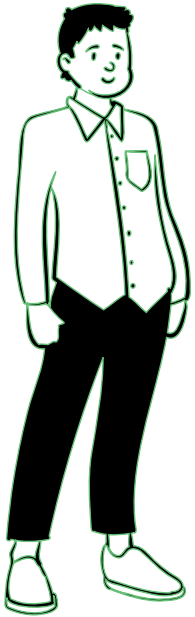
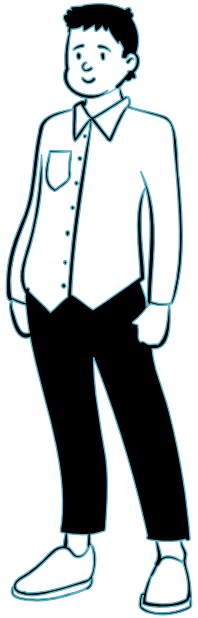
# Saving and Wealth



Tom



Tim

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# Saving and Wealth

Tom

Who is wealthier at 60?

Tim

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# Saving and Wealth

Tom

Change in wealth
=
Saving
+
Capital gains
-
Capital losses

Tim

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# Saving and Wealth

- **Saving** is current income minus spending on current needs
  - The **saving rate** is saving divided by income
  - **Flow:** quantity measured per unit of time
    - Tim is saving $200 per month
- **Wealth** (or net worth) is the value of assets minus liabilities
  - **Assets** are anything of value that one owns
  - **Liabilities** are the debts one owes
  - **Stock**: quantity measured at a point in time
    - Tim has a net worth of $1.5 mil at age 60
- The flow of saving causes the stock of wealth to change
  - Every dollar a person saves adds to his wealth

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# Capital Gains and Losses

- Wealth changes when the value of your assets change
- **Capital gains** increase the value of existing assets
- **Capital losses** decrease the value of existing assets
- Change in wealth =

  Saving + Capital gains – Capital losses

# Why do People Save?

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# Three Reasons for Household Saving

1. **Life-cycle saving** is to meet long-term objectives
   - Retirement
   - Purchase a home
   - Children’s university education
2. **Precautionary saving** is for protection against setbacks
   - Loss of job
   - Medical emergency
3. **Bequest saving** is to leave an inheritance

# Saving and the Real Interest Rate

- Real interest rate ($r$) is nominal interest rate ($i$) minus rate of inflation ($\pi$)
- Real interest rate is the “reward” for saving
  - More willing to save if reward is higher
  - Positive effect on saving
- However, higher interest rate reduces the amount people need to save to reach their specific goal; *target savers*
  - The higher the real interest rate, the faster one’s saving will grow
  - Negative effect on saving
- Empirical evidence shows that **higher real rates increase saving** modestly

# Household Saving in China

- Chinese households save about 25% of disposable income, a very high rate
  - This is new: was only 10% until late 1980s
  - Before reforms, less ability and less need for precautionary saving
- Life-cycle and precautionary motives are important
  - Wealth has come recently to China; young people richer than older people; saving of young outweighs dissaving of old
  - Limited social safety net
  - Little opportunity for individuals to borrow, saving are necessary for large purchases

# Household Saving in Singapore

- Personal saving rate
  - 22% in 2011
  - 29%  in 2019
  - 41% in 2020
- Between 2011 and 2019:
  - Rising wages
  - Aging population, saving for retirement
- Sharp increase in 2020
  - Decline in consumption
    - Economic uncertainty
    - Opportunities to spend constrained by travel and safe distancing restrictions
  - Increase in personal disposable income (1.3%) as a result of Government fiscal measures such as Jobs Support Scheme and Care and Support cash payments

# Household Saving in the U.S.

- Household saving rate has always been low by international standards; between 6 and 8 percent in the recent years
- Saving rate may be depressed by
  - Social Security, Medicare, and other government programs for the elderly
  - Mortgages with small or no down payment
  - Confidence in a prosperous future
  - Increasing value of stocks and growing home values
  - Demonstration effects: imitation of consumption patterns of other people

# National Saving and Its Components

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# Measuring National Saving

- Recall GDP is both total income in an economy and total expenditure on the economy's output of goods and services

  $$Y = C + I + G + NX$$

- For simplicity, assume a closed economy
  - No international trade, NX = 0
    - $Y = C + I + G$
  - No international borrowing and lending

# Measuring National Saving

- National saving (S) is *current income* less *spending on current needs*
  - Current income is GDP or Y
  - Spending on current needs
    - Most consumption and government spending is for current needs; for simplicity, all of C and all of G are assumed to be for current needs
    - Investment spending (I) is *excluded*

$$S = Y - C - G$$

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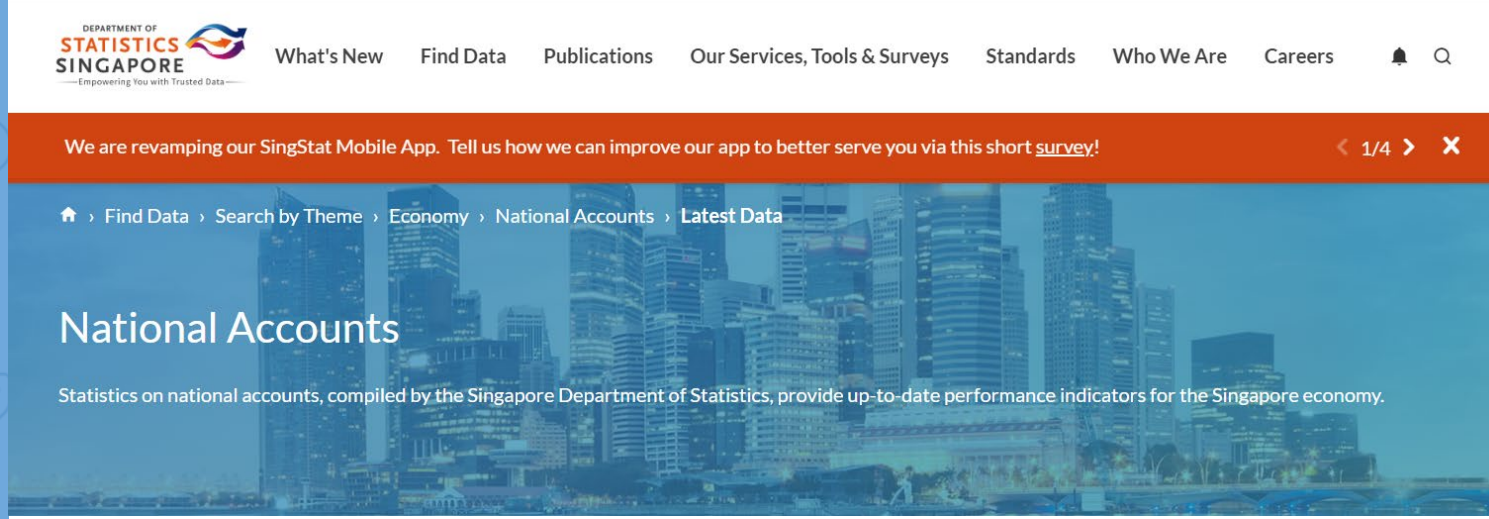
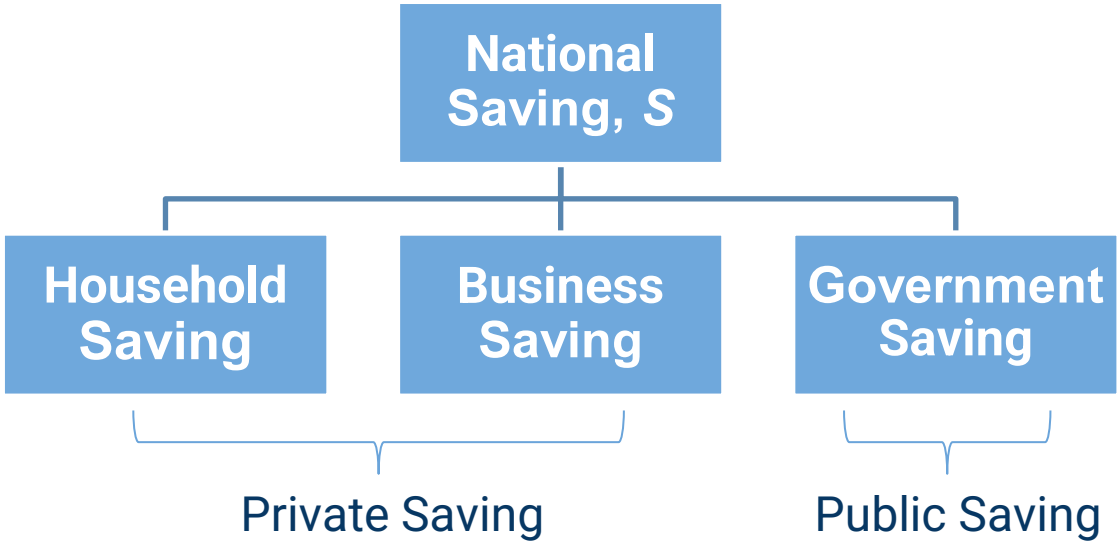
# Singapore's Gross Domestic Saving in 2021 ($ mil)




| | |
|---|---|
| Gross Domestic Product | 533,351.9 |
| Private & Govt Consumption Expenditure | 226,782.9 |
| Statistical Discrepancy | -9,425.3 |
| Gross Domestic Saving | 297,143.7 |

# Components of National Saving



# Private Saving

- **Private saving**: household saving plus business saving
- Private sector's total income is *Y*
- Private sector *pays* taxes to the government, and *receives* transfer payment and interest payment (for government bond holders) from the government
- ***Net Taxes, T*** = Taxes – Transfers – Govt interest payments
- ***Y-T*** is **after-tax income** (or *disposable income*)

# Private Saving

- Private saving is after-tax income less consumption

$$S_{PRIVATE} = Y - T - C$$

- Private saving is done by households and businesses
  - Household saving or personal saving is done by families and individuals
  - Business saving makes up the majority of private saving in the U.S.
  - Business saving = Revenues – Operating costs – Dividends to shareholders

# Public Saving

- Public saving is the amount of
  - Government income (net taxes, *T*) *minus*
  - Government spending on current needs (*G*)

$$S_{PUBLIC} = T - G$$

- Net taxes (*T*) minus government spending (*G*) is also Government budget balance
  - T = G: **balanced budget**
  - T > G: **Govt budget surplus**
    - Budget surplus is public saving
  - T < G: **Govt budget deficit**
    - Budget deficit is public dissaving

## Summary

- Assuming a closed economy

(1) $Y = C + I + G$

(2) $S = Y - C - G$

From (1) $I = Y - C - G$

$\rightarrow$ $S = I$

- Saving equals investment in a closed economy
- National saving ($S$) is private saving plus public saving

$$S = S_{PRIVATE} + S_{PUBLIC}$$
$$= (Y - T - C) + (T - G)$$

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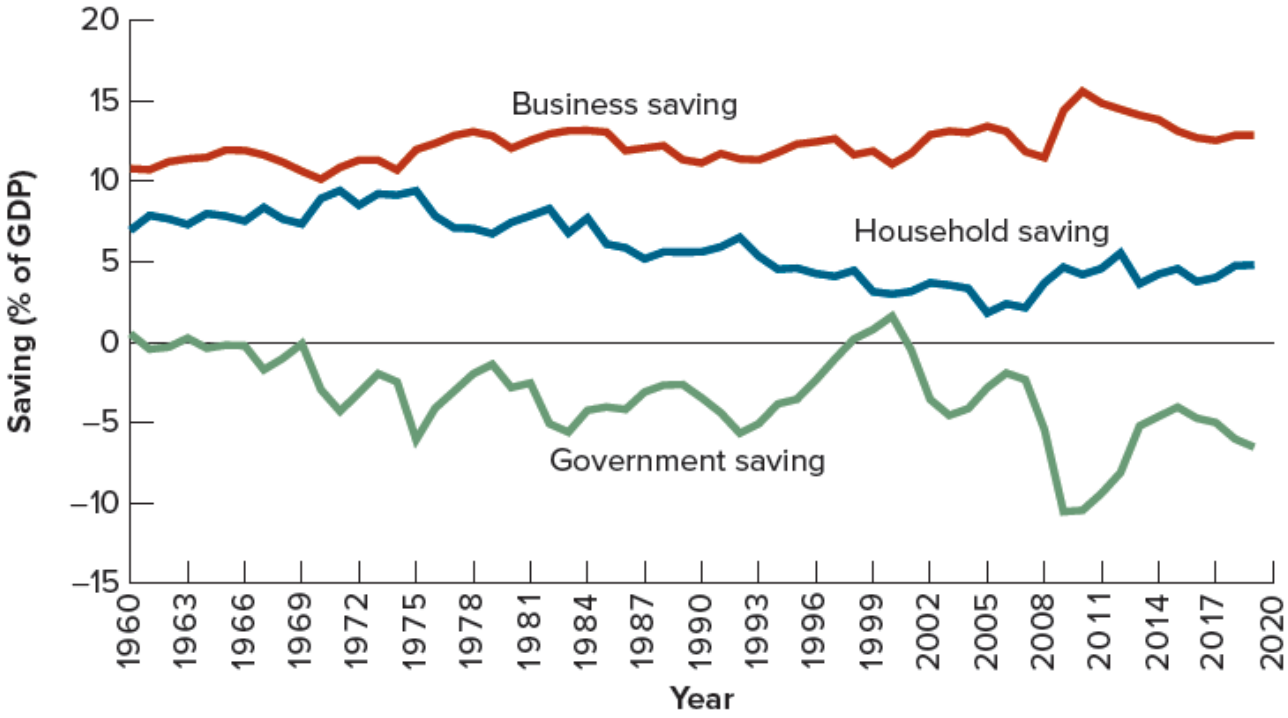
# Three Components of National Saving, 1960-2019



# Investment (a.k.a. Capital Formation)

# Investment and Capital Formation

- National saving provides funds needed for investment
- **Investment is the creation of new capital goods and housing**
- Firms buy new capital to increase profits
  - Cost-Benefit Principle
  - Cost is the cost of using the machine or other capital
  - Benefit is the value of the marginal product of the capital

# Lauren and the Lawn Mower

- Lauren's lawn care business plan
  - Cost of lawn mower = $4,000
    - Interest on loan = 6%
    - Assume the mower can be resold for $4,000
- Net revenue = $6,000 per summer
  - Taxes = 20%
  - Lauren could earn $4,400 per summer after tax working elsewhere
- *Cost-Benefit Principle* indicates whether Lauren should start the business

# Lauren and the Lawn Mower

- Business plan analysis

| | |
|---|---|
| Net revenue | $6,000 |
| Less taxes (20%) | $1,200 |
| Less opportunity cost | $4,400 |
| Equals VMP of lawnmower | $ 400 |
| Less interest (6%) | $ 240 |
| Equals net benefit | $ 160 |

Financial benefit of buying the mower

Financial cost of buying the mower

- Lauren should start the business

# Cost and Benefit of Investment Decision

- Two important costs
  - Price of the capital goods
  - Real interest rates
    - Opportunity cost of capital investment
- Benefit is the value of the marginal product of the capital
  - Net of operating and maintenance expenses and taxes
  - Technical innovation increases benefits
  - Lower taxes increase benefits
  - Higher price of the output increases benefits

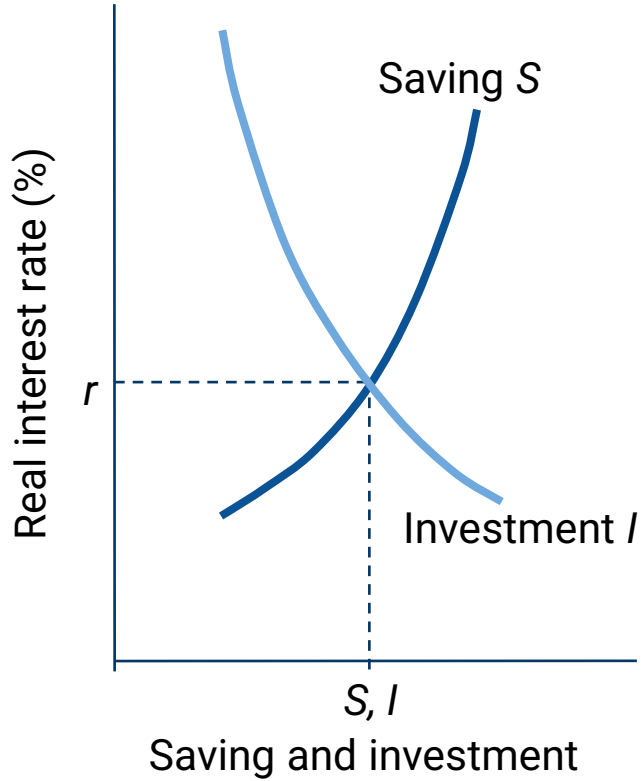
# Demand and Supply of Savings

# Financial Market (Market for Savings)

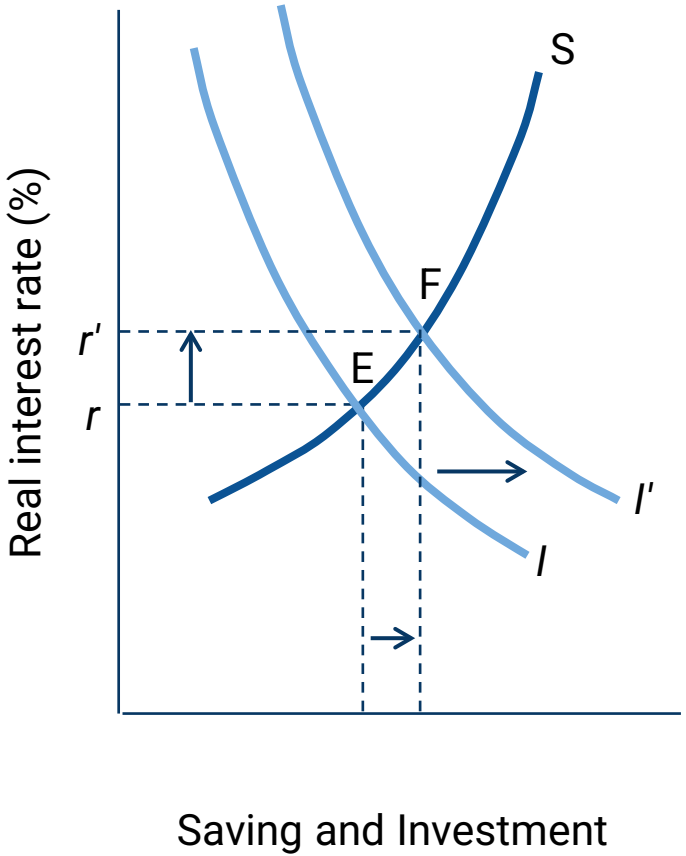
- **Supply** of savings (*S*) is the amount of savings that would occur at each possible real interest rate (*r*)
  - Savings are supplied by households, firms, and the government
  - The quantity supplied increases as *r* increases
- **Demand** for savings (or investment (*I*)) is the amount of savings borrowed at each possible real interest rate
  - Savings are demanded by borrowers wishing to invest in new capital goods
  - Demand for savings = demand for investment
  - The quantity demanded is inversely related to *r*

# Financial Market

- In the absence of international borrowing or lending, supply of and demand for national saving must equal
- Equilibrium interest rate equates quantity of saving with quantity of investment funds demanded
- Changes in factors other than real interest rates will shift the savings or investment curves

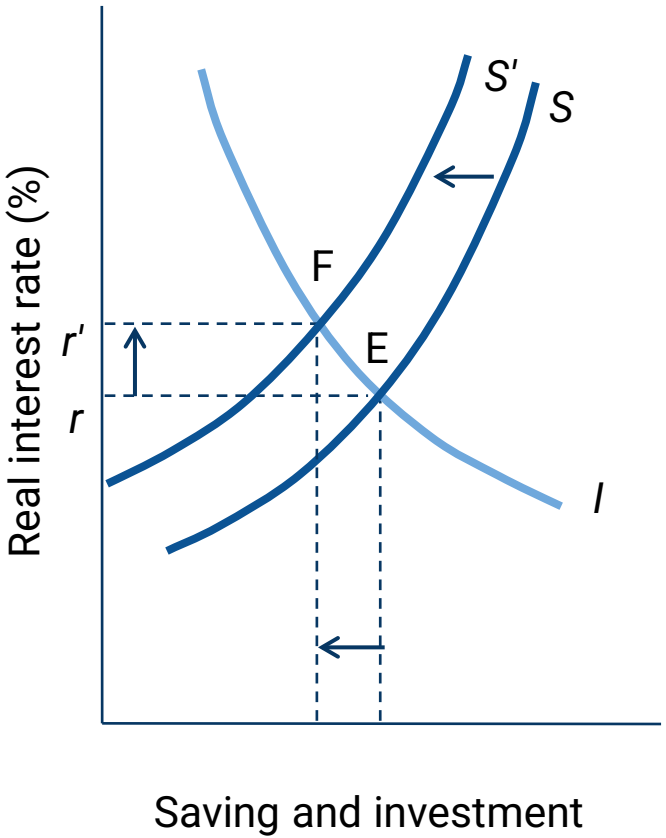


# Technological Improvement




- New technology raises marginal productivity of capital
  - Increases the demand for investment funds
  - Movement up the savings supply curve
  - Higher interest rate
  - Higher level of savings and investment

# Government Budget Deficit Increases




- Government budget deficit increases
  - Reduces national saving
  - Movement up the investment curve
  - Higher interest rate
  - Lower level of savings and investment
- Private investment is *crowded out*

# Increase National Saving

- At national level, higher saving rates lead to greater investment in new capital goods and thus a higher standard of living
- At individual or family level, high saving rate promotes accumulation of wealth and achievement of economic security
- To increase national saving/investment
  - Reduce government deficit
    - Politically difficult
  - Reduce taxes on investment income

# THANKS!

**Any questions?**

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