Macroeconomic Principles

Summary

Key Ideas

- Micro vs Macro
- Long Run vs Short Run
- Rational decisions are made at the margin
- Scarcity vs Choice
- Confronting trade-offs: Opportunity costs
- Adam Smith's Invisible Hand = Desirable Outcome
- Great Depression / Market Failures / J.M. Keynes
- Soviet Collapse / Collective Dysfunction
- Conclusion? Invisible Hand, Not Infallible Hand

Microeconomic Fundamentals

- Absolute advantage vs Comparative advantage
- Gains from trade: Opportunity cost
- Demand and supply analysis
  - Downward sloping demand curve
  - Upward sloping supply curve
  - Movement along the curve vs shifts of the curve
- Goods
  - Substitutes: IBM bonds vs Microsoft bonds
  - Complements: Pizza and coke
  - Public goods: Non-rivalry and non-excludable (e.g. police)

Macro Variables

- GDP
  - GDP vs GNP vs NI
  - GDP = C + I + G + NX
  - Final expenditure = Factor Income = Value Added
  - Nominal vs Real
  - Flow vs Stock
- Inflation

$$\pi = \Delta P_t / P_{t-1} \qquad \text{where } \Delta P_t = P_t - P_{t-1}$$

- Unemployment rate

$$U = \#\text{ of Jobless} / \#\text{ in Labor Force}$$

GDP

- Quarterly: 3-month flow multiplied by 4 to annualize it
- S.A.: Seasonally adjusted
- Annualized growth rate = $[(Q4/Q3)^4 - 1] \times 100$
- GDP components
  - Consumption 70%
  - Investment 15%
  - Government 18% (Exclude transfers)
  - Net exports -3% (EX = 14%, IM = 17%)

Inflation

- CPI: A basket of goods
  - Food = 13%
  - Energy = 8%
  - Core CPI = 79%
    - Core goods = 20%, Services exc. Energy = 35%, OER = 24%
- Use of price indexes
  - Separate output changes vs price changes
- Avoid hyperinflation or deflation

Unemployment

	Feb-00	Oct-17
U3 unemployment	4.1%	4.1%
U6 Unemployment	7.2%	7.9%
25-54 LFPR	84.4%	81.6%
Hourly Earnings YOY	4.10%	2.30%

Some Key Phrases

- Malthusian dilemma
- Schumpeter: Creative destruction
- Keynes: Financial system flaws and the need for intervention
- Solow growth model
- Potential output
- Natural rate or NAIRU
- Real equilibrium interest rate

Labor Productivity

- Labor productivity:

$$\%\Delta Y / \%\Delta \text{ Hours}$$

- Labor productivity is a function of:
  - Capital deepening (more machines)
  - Labor education (smarter workforce)
  - Technological change (smarter machines)

Growth Rates and the Power of Compounding

- How long does it take to double the flow of output?

- A rough rule for growth rates

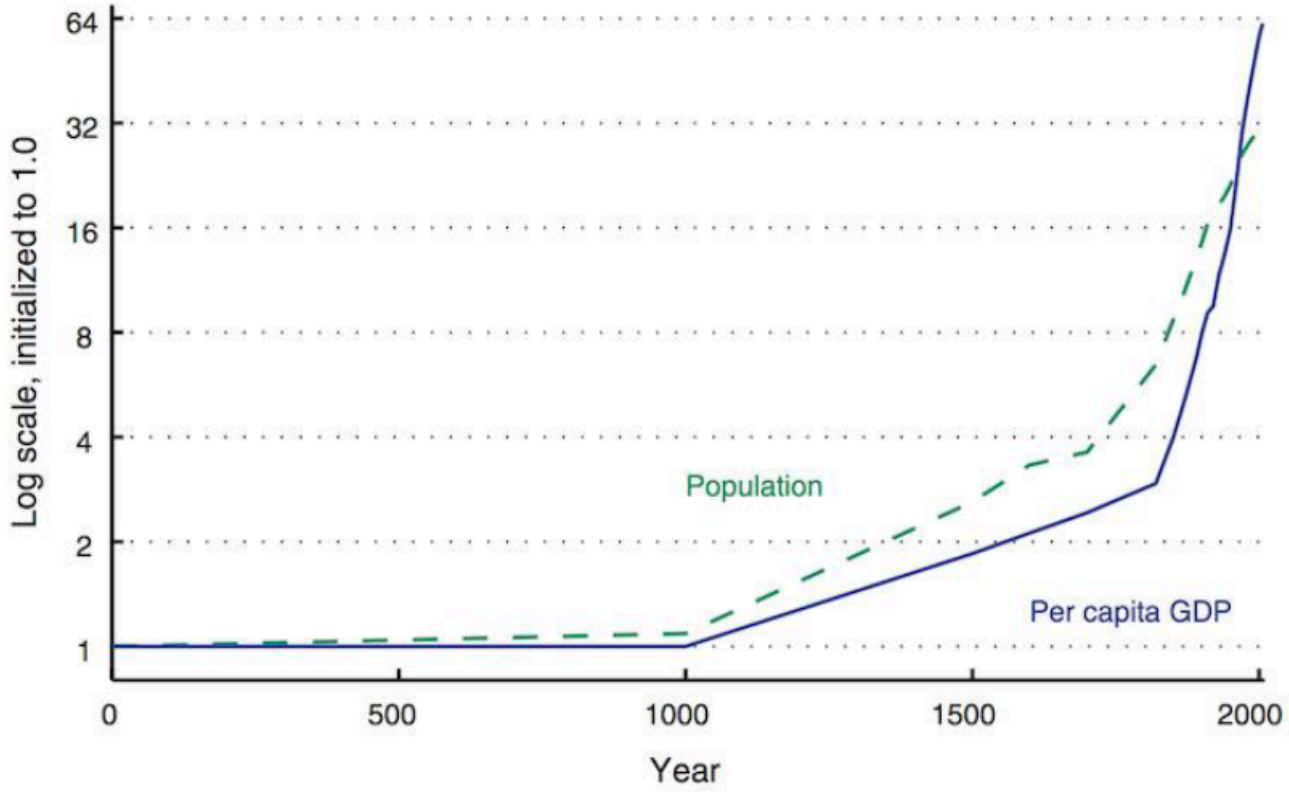
  Divide the growth rate into 70

• **2%** growth	70/2 = **35 years**	$(1.02)^{35} = 2$
• **3.5%** growth	70/3.5 = **20 years**	$(1.035)^{20} = 1.99$
• **5%** growth	70/5 = **14 years**	$(1.05)^{14} = 1.98$

Slow Growth

- Here to stay or just a pause?
- Robert Gordon sees four headwinds
- Paul Romer sees a positive outlook

(source for chart:Paul Romer blog, *Economic Growth*, October 12th, 2015)



Key Equations

- LTSG = Labor productivity growth + Labor force growth
- Fisher Equation: $i = r + \pi$
- Okun's Law: $\%\Delta Y = LTSG - 2\,(\Delta U)$
- Phillips Curve: $\pi_t = \pi^e + \alpha\,(U^* - U_t)$
- Quantity Equation: $\%\Delta M + \%\Delta V = \%\Delta P + \%\Delta Y$
- Taylor Rule: $ff = r^* + \pi + 0.5\ x\ (\pi - \pi^*) + (U^* - U)$
- Real Exchange Rate: $q_{US/EU} = E_{\$/€}\,(P^{€}/P^{\$})$
- UIP: $i_{€} - i_{\$} = -\Delta E^e/E$
- Unit labor costs: Hourly wage rates/Labor productivity

Financial System

- S = I in a closed economy
- Efficient Markets Hypothesis (EMH)
- Arbitrage eliminates any riskless wagers
- Ex-ante vs ex-post real interest rates
- US Treasury Securities: T-bills, T-notes, T-bonds, TIPS
- Duration vs Default
- Loanable Funds Model assumes S = I and EMH
  - Model with only corporate market was rejected, extended with T-bond mkt
- Adaptive expectations: Bubbles in financial markets

Great Recession

- Housing bubble from 2001 to 2007
  - House prices kept increasing
  - Credit extended to subprime borrowers
  - Risky bets by financial institutions
- Bear Sterns was merged with JP Morgan
- Lehman Brothers was allowed to fail in September 2008 which triggered the crisis
- AIG was about to fail which would have made the situation worse
- Congress approved a package to inject capital to financial firms

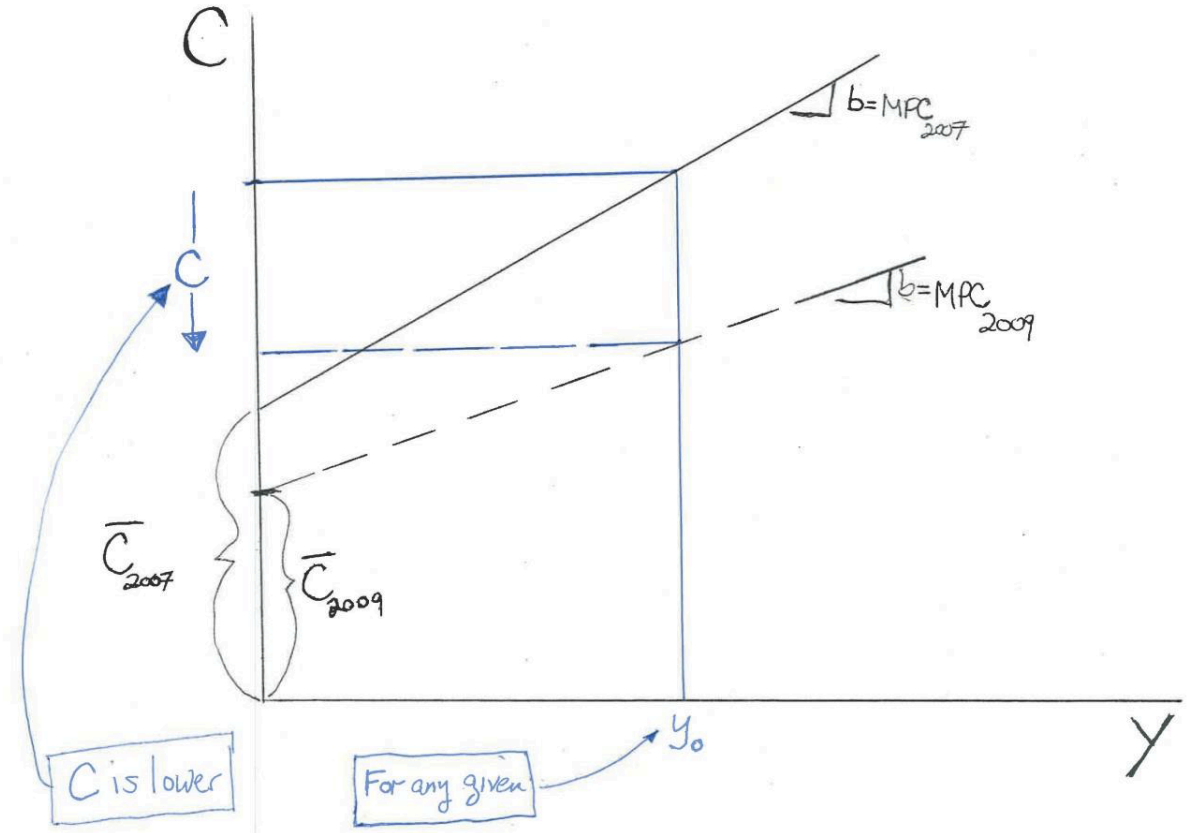
(Short-Run) Macroeconomic Models

- Aggregate Expenditure Model
  - Output vs Spending: Inventories swing, price steady
- Aggregate Demand / Aggregate Supply Model
  - Demand vs Supply: Prices and quantities shift
- Expanded Loanable Funds Model
  - T-bills vs T-bonds vs Corporate bonds
  - HH supply funds
  - Government and corporations demand funds
  - Fed buys and sells T-bills to target short-term real interest rate (real FFR)

Aggregate Expenditure Model

- AE model is expectations based
- A consumption function is the driver
- Unplanned inventory changes can create a boom/bust cycle
- Responses to inventory changes drive the economy back toward equilibrium
- Key idea: In a year, the level of GDP is mainly determined by the level of aggregate expenditure

- In 2009, falling sentiment drove autonomous spending down
- In 2009, plunging wealth drove the MPC down

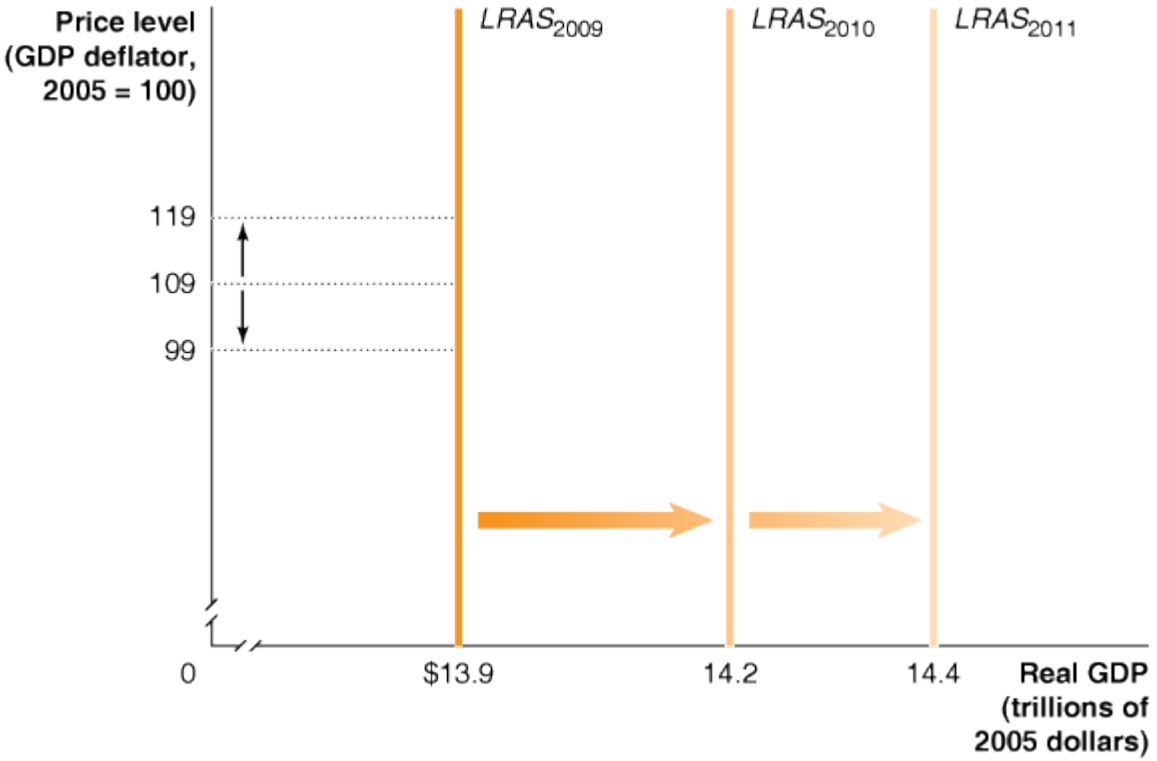


Aggregate Demand

- Downward slope: Wealth / Interest / International-Trade Effects
- Movements along and shifts of the curve
- Shifts in AD:
  - Monetary policy: Interest rates
  - Fiscal policy: Government purchases, Taxes
  - HH income expectations
  - Firms' profit expectations
  - US vs ROW prices and growth rates
  - US exchange value of the dollar

Long-Run Aggregate Supply

- In the long run, real GDP determined by the number of workers, the level of technology, and the capital stock
  - None of these elements is affected by the price level
- LRAS curve is a vertical line, at the level of potential or full-employment GDP



Short-Run Aggregate Supply

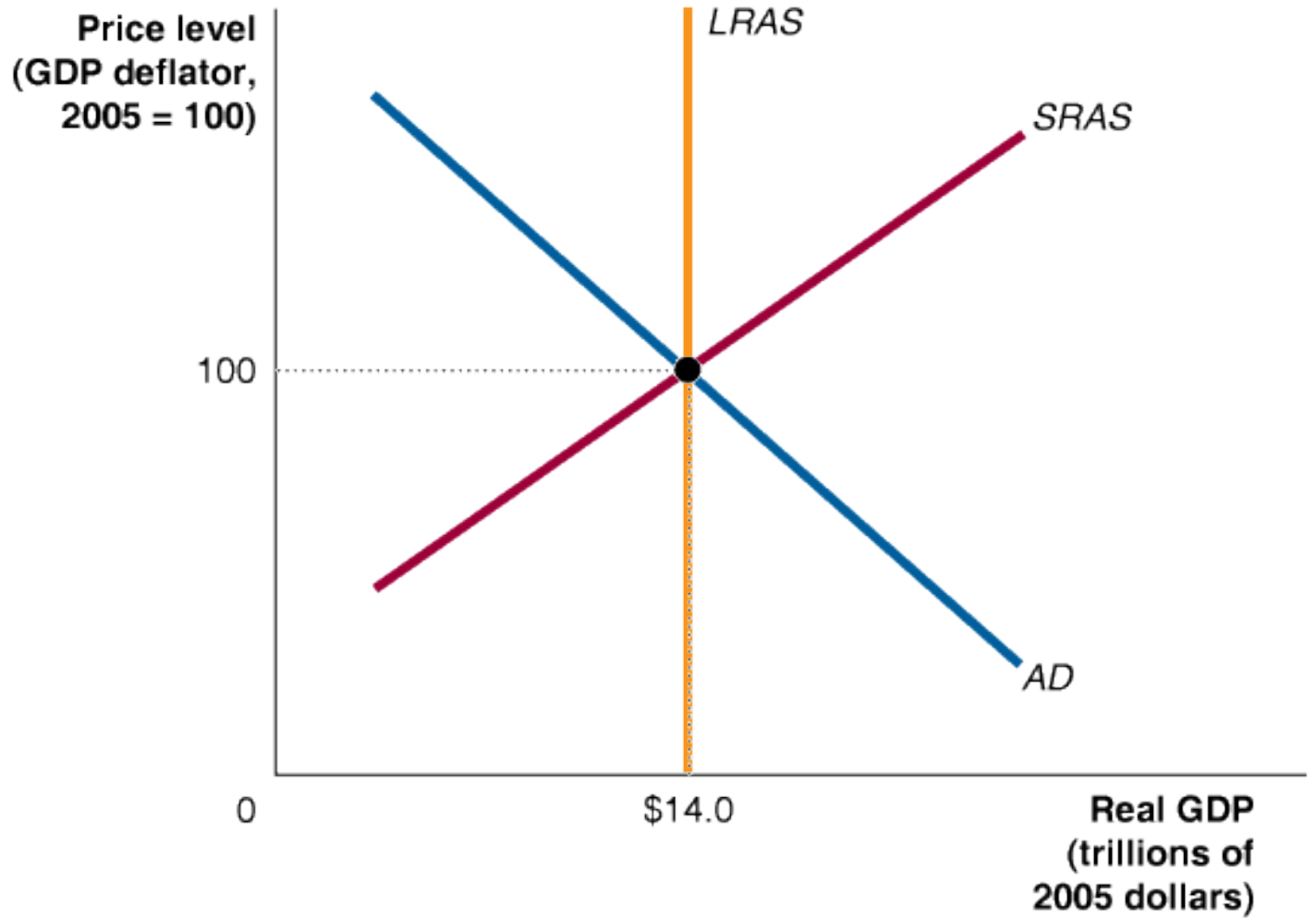
- Upward slope reflects sticky wages
  - If I can raise my prices and don't pay higher wages, I can produce more output at a profit

- SRAS shifts when:
  - Input prices change (nominal wages, commodity prices)
  - Factors of production change
  - Technology changes

Long-Run Macroeconomic Equilibrium

- The short-run macroeconomic equilibrium occurs when the AD and SRAS curves intersect

- The long-run macroeconomic equilibrium occurs when the AD and SRAS curves intersect at the LRAS



Dynamic Equilibrium

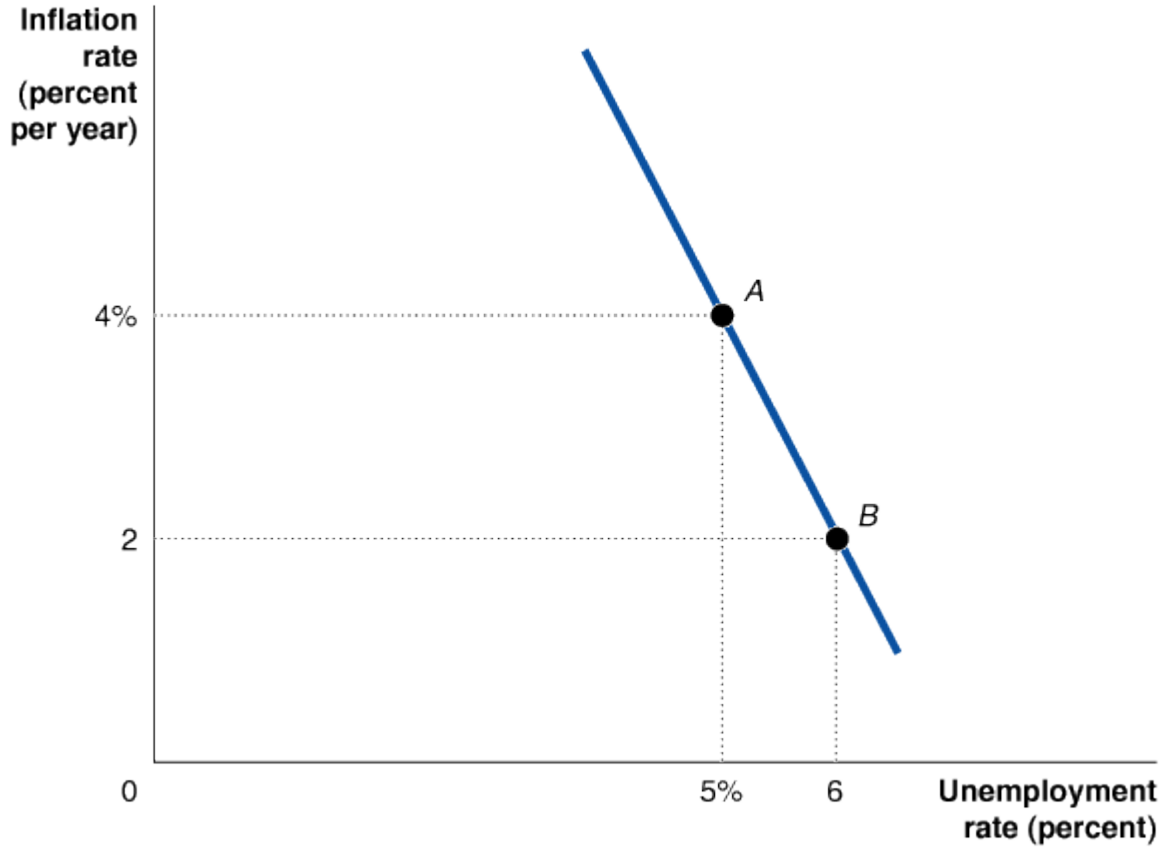
- We don't have a stable price level
  - P = 100
- We have a stable inflation rate
  - π = 2%
- We don't have a stable output level
  - Y = $18 trillion
- We have a stable growth rate
  - $\Delta Y_t / Y_{t-1} = 2\%$

AD-AS: Conclusions

- Adverse supply shocks are the worst of both worlds:
  - Inflation accelerates and output falls
- Positive supply shocks are the best of all possible worlds:
  - Inflation rates fall and real GDP growth accelerates
- Adverse demand shocks have good and bad elements:
  - Inflation decelerates as output falls (assuming you are not in or near a deflation)
- Positive demand shocks have good and bad elements:
  - Inflation rates accelerate as real GDP growth accelerates

Phillips Curve

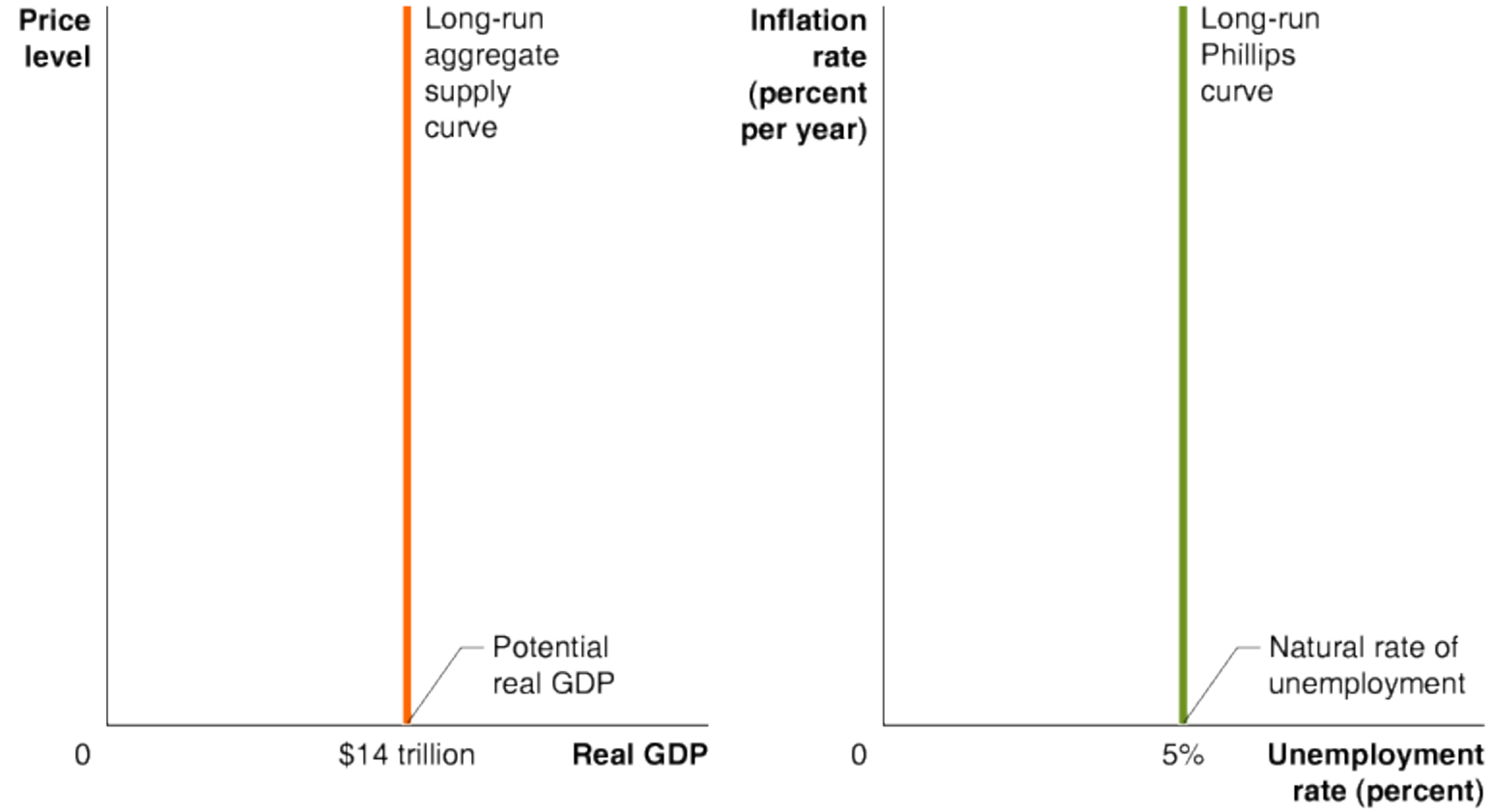
- Short-run trade-off between U and π



Long-Run Phillips Curve

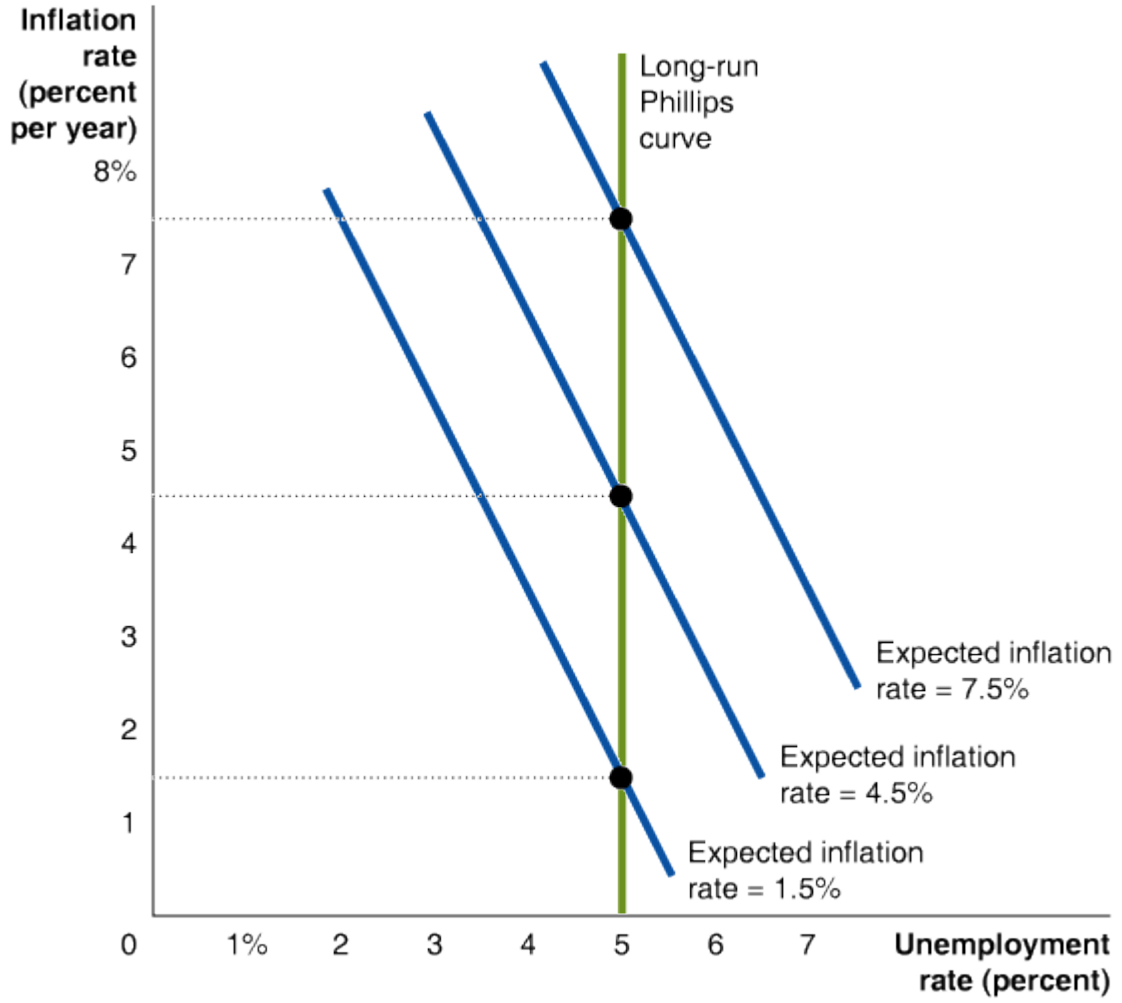
- In the long run, employment is determined by output, which in long run does not depend on the price level

- A vertical long-run AS curve is compatible with a vertical long-run PC



A Short-Run Phillips Curve For Every Inflation Rate

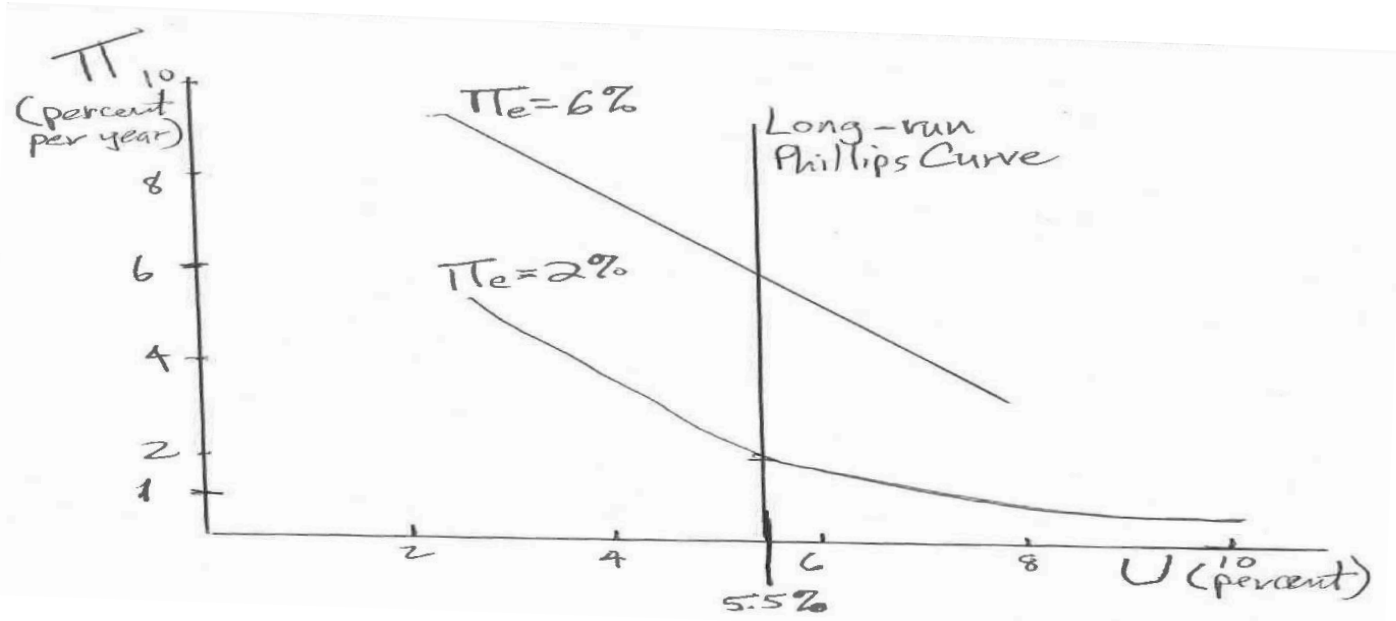
- A SRPC for every level of π^e
  - Each SRPC intersects the LRPC at the π^e rate
  - A $\pi\uparrow \rightarrow U\downarrow$ only if the increase in π is unexpected
- When $\pi = \pi^e$, U = U*—i.e. the long-run Phillips curve



Zero Bound is a Problem for Disinflation and PC

- π declines are much smaller as you approach zero

- There is no divine coincidence
  - PLOGs can exist without producing deflation
  - Therefore, a central bank focused just on π will not ease as much as a dual mandate central bank

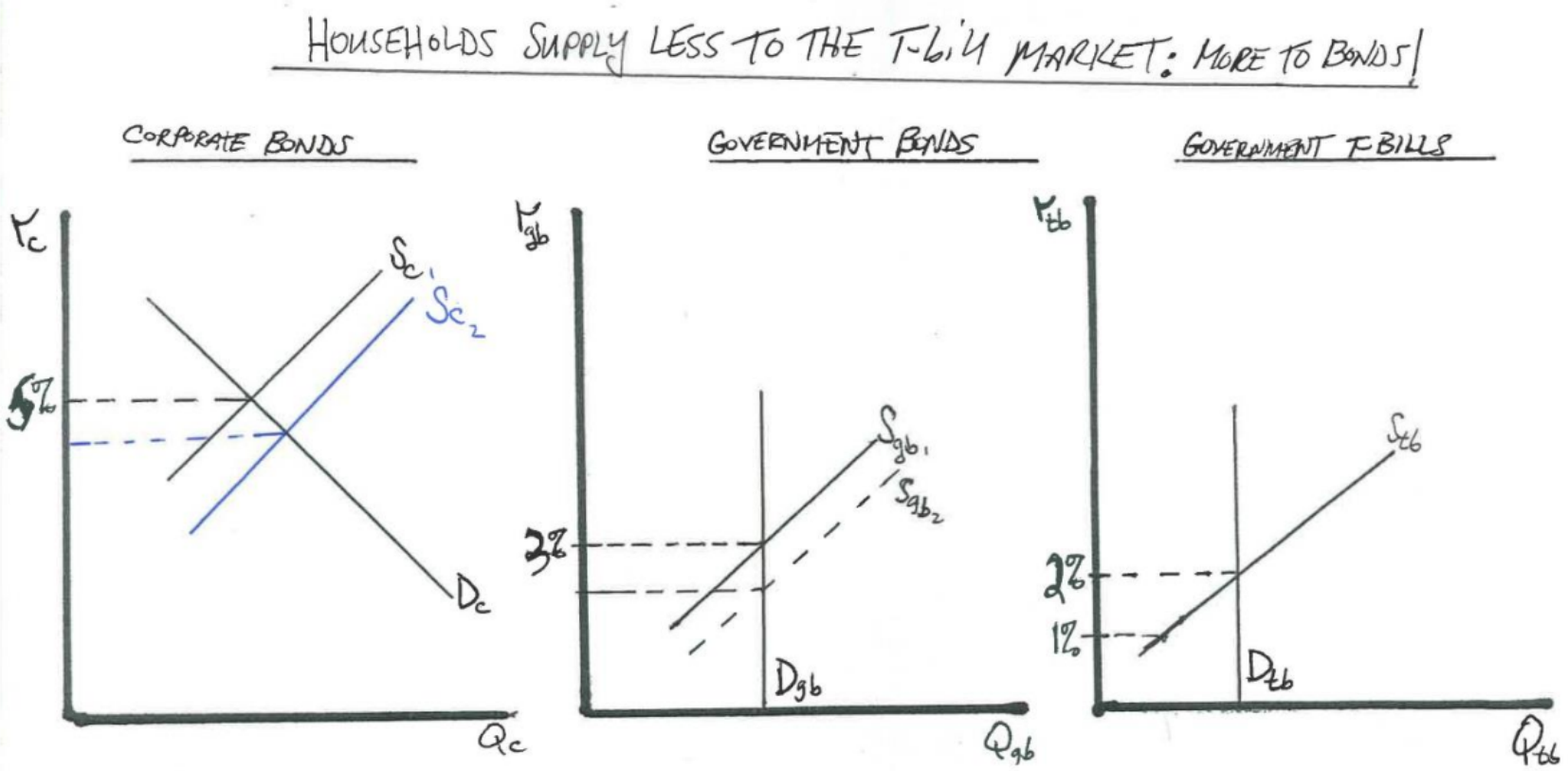


Monetary Policy

- Goals:
  - Keep inflation low
  - Keep real growth strong
  - Must protect the financial system
- Tools:
  - OMO primary tool in ‘normal’ times to achieve goals
  - Fed sets a target for the FFR and expects to influence other interest rates
  - FFR: Interest rate banks charge each other to borrow reserves
- Contractionary and expansionary MP

Example: Expansionary Monetary Policy

- Fed sets short rate to influence other rates (faced by HH and firms)
- Indirectly attempts to influence output and inflation



Rules vs Discretion

- We know the Fed wants low inflation, high employment, strong growth and safe banks
- Should they actively pursue these goals?
  - Policy discretion
- Or should we impose a rule on the Fed?
  - Policy rules

The Quantity Theory of Money vs The Taylor Rule

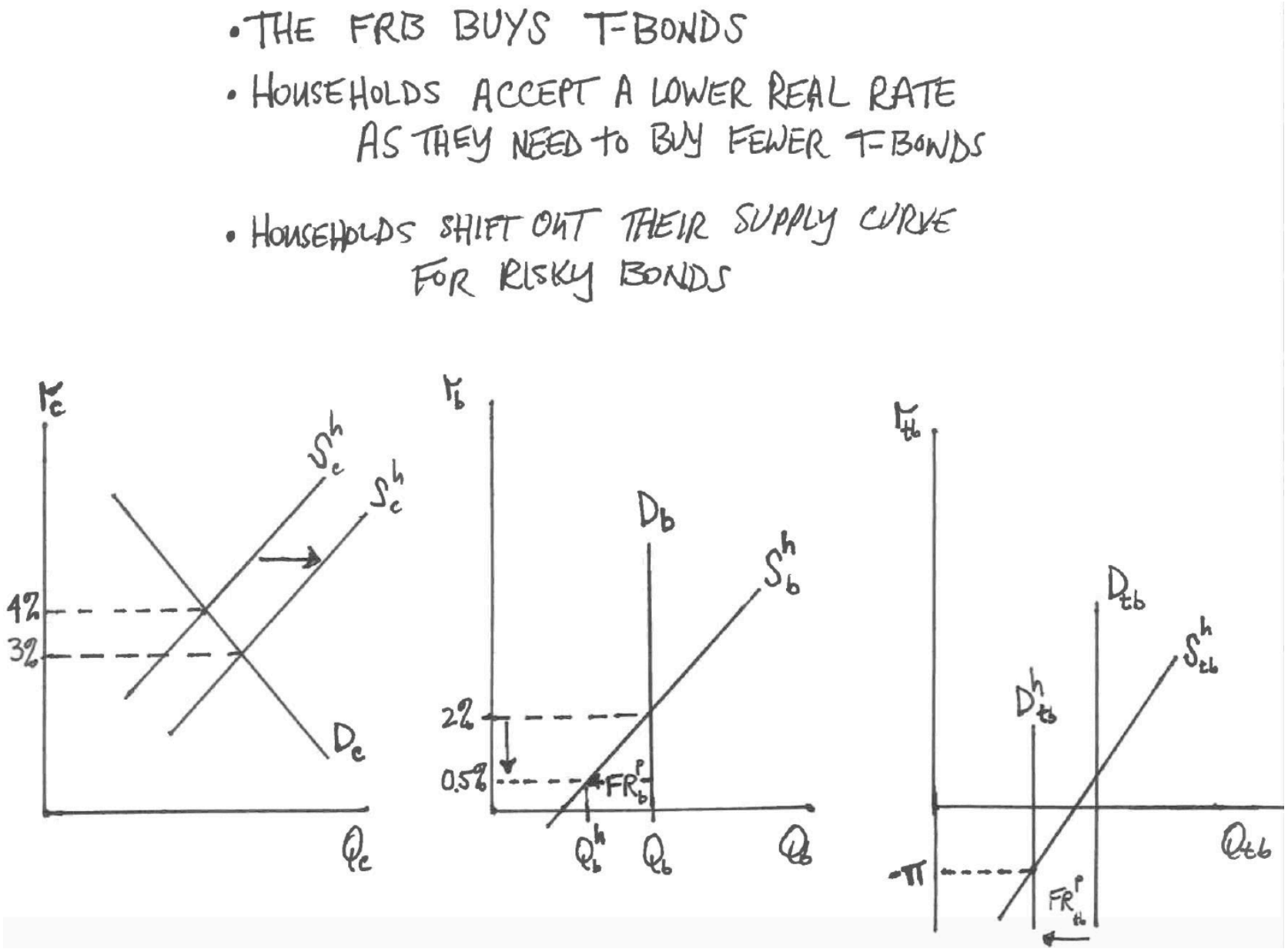
- Quantity Equation: $\mathrm{M} \times \mathrm{V} = \mathrm{P} \times \mathrm{Y}$
- Quantity Theory of Money: $\%\Delta\mathrm{M} = \%\Delta\mathrm{P} + \%\Delta\mathrm{Y}$ requires V stable

- John Taylor's rule replaces money targeting

$$ff = r^* + \pi + 0.5\ x\ (\pi - \pi^*) + (U^* - U)$$

- What do we do when the Taylor rule signals the need for negative FFR?
  - Zero lower bound problem

- By directly buying T-bonds (QE), Fed attempts to lower long rates



Size of the Government and Cyclical Fiscal Policy

- The long run question:
  - How big should the government be?
  - What percent of GDP should be public vs private?

- The business cycle question:
  - Should we manipulate government spending or tax rates to make economy grow faster or more slowly in the short run?

- Before hitting the ZLB for FFR, most economists agreed on letting monetary policy to handle cyclical issues

Fiscal Policy

- Government a preferred provider of public goods
  - Free-rider problem
- Nations have different sizes of government
- Laffer curve
  - Super high tax rates destroy incentives and may lower revenues
- Expansionary and contractionary fiscal policy
  - Multiplier
- When monetary policy confronts the ZLB, fiscal policy may make sense

Discretionary Fiscal Policy? Only in the Worst of Times

- Monetary policy is more nimble, and so better suited to manage the macroeconomy (steer the bus)

- Fiscal stimulus
  - Policies that give money away are very easy to enact but very hard to take back

- Fiscal policy is a product of Congress and the White House so:
  - It is always highly politicized
  - It takes TOO much time

Thinking About the Economy From a Global Perspective

- Economies are connected by flows of G&S and financial assets
- Balance of payments
  - Current account, financial account, capital account
  - It always has to balance
- S = I + CA in an open economy
- Net Foreign Asset position is a stock that shows the ‘net debtor’ or ‘net lender’ status of countries
  - ROA of US-owned foreign assets is higher than ROA of foreign-owned US assets, even though US is a net debtor

Exchange Rates

- Nominal exchange rates vs Real exchange rate
  - Relative price of currencies vs Relative purchasing power
- Appreciation vs Depreciation
- Equilibrium in the forex market
  - Shifts in curves
  - Currency movements reflect supply/demand for tradable goods and for assets
- Exchange rate regimes
- Purchasing Power Parity vs Uncovered Interest Parity

A Nation Actually Has Four Monetary Policy Options

- Target the money supply
- Target an interest rate
- Target its exchange rate
- Join a monetary union, give up its currency and surrender control of interest rates to an international authority

International Financial System

- Main episodes of the international monetary system
  - Gold standard (XIX to WWI)
  - Interwar period
  - Bretton Woods (1944-1971)
  - Post-Bretton Woods
- Euro and the euro crisis
- China