

Topics

- Aggregate Output, Prices, And Economic Growth
- Understanding Business Cycle
- Monetary and Fiscal Policy

Aggregate Output, Prices, And Economic Growth

重点

- GDP
 - Definition
 - Nominal and Real GDP (base price)
 - GDP deflator (nominal/real)
 - Expenditure-base and income-based
 - Income: national, personal, personal disposable
 - $C+I+G+(X-M) = C + S + T$
- IS-LM 模型 (利率-GDP)
 - IS: interest inversely related to aggregate income
 - 影响因素
- AD-AS 模型 (价格-GDP)
 - 定义
 - Aggregate Supply 总需求对总供给的影响
 - Very Short (VSRAS), Short (SRAS), Long (LRAS, potential GDP)
 - 影响因素
 - AD: 总需求
 - SRAS: 影响成本的
 - LRAS: 影响经济增长的
 - 经济现象 (situation, price, GDP)
 - AD and SRAS Independent Effects **单独**影响
 - recession, Inflation, stagnation
 - AD and SRAS Joint Effects **联合**影响
- Economic Growth 经济增长

Gross Domestic Product (GDP) 国内生产总值

- Total **market** value of goods and services **produced** in a **country** within a certain time period
 - Only purchase of **newly produced** goods 新产品
 - **Market** value of **final** goods and services 最终产品、市值
- Exclusion
 - Sale or resale of good produced in **previous** periods
 - **Transfer** payment made by government (unemployment, retirement, welfare benefits)
 - Value of chips (because value of computers is in GDP)
 - Value of a Rembrandt painting (produced many years) sold
 - Value of labor not **sold**, such as homeowner's repairs to his house
 - **By-products** of production, such as environment damage
- Inclusion

- Goods and services **provided** by **government**
 - Police, judiciary, road, infrastructure improvement
 - Not market price, but **cost** to government
- Value of owner-occupied housing, price is **estimated**

Gross National Product (GNP) 国民生产总值

- Similar to GDP, but it only applies to the **residents** of a country

Real and Nominal GDP 真实和名义 GDP

- **Nominal GDP 当前价格**
 - The GDP we have calculated under the expenditure approach
 - $\text{Nominal GDP}_t = \sum P_{i,t} \times Q_{i,t}$
- **Real GDP 参考价格**
 - Use price from a **base year**, removing the effects of inflation
 - $\text{Real GDP}_t = \sum P_{i,t-1} \times Q_{i,t}$ (Assume base price is one year ago)
- **GDP Deflator 平减指数**
 - $\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$
 - Paasche Index
- Per-Capita Real GDP = GDP / #population

GDP Calculation Approaches

- Production Approach 生产法
- Expenditure Approach 消费法（买方的支出）
 - Sum the **spending** on **newly** produced goods and services
- Income Approach 收入法（卖方的收入）
 - Sum the **income received** by producing **newly** goods and services

Production-Based GDP 生产法

- Value-of-final-output method 最终值
 - value of **final** goods
- Sum-of-value-added method 附加值
 - Sum of **additions** to **value created** (or income **received**) at each **stage** of production and distribution

Expenditure-Based GDP 支出法

- GDP = consumption + investment + government spending + net exports (exports minus imports)
- GDP = 消费 + 投资 + 政府支出/采购 + 净出口
- **GDP = C + I + G + (X - M)**
- Investment: capital equipment, inventories

Income-Based GDP 收入法

- 两大主体：私人（消费和储蓄）和政府（净税收）
 - **GDP = C + S + T**

- C: consumption 消费
- S: house hold S_H and business savings S_B 储蓄
 - $S = S_H + S_B$
- T: net taxes (taxes paid R - transfer payment received F)
 - $T = R - F$
- GDP
 - GDP = national income + capital consumption allowance (CCA) + statistical discrepancy
 - **GDP = national income + CCA + statistical discrepancy**
 - Capital consumption allowance (CCA) 资本消耗补偿/固定资产折旧费
 - The **depreciation** of physical capital from production
 - The amount needs to be **reinvested** to maintain the productivity
 - Statistical Discrepancy 统计误差
 - The difference between income and expenditure approach
- **National Income 国民收入（个人、企业、政府）**
 - + Compensation of employees (wages and benefits) 个人补贴（工资福利）
 - + corporate and government enterprise profits **before taxes** 企业税前利润
 - The direct tax is included here 包含直接税
 - + unincorporated business net income (business owner's incomes) 私人企业净收入
 - + interest income 利息收入
 - + rent 租金收入
 - + **indirect** business taxes 间接税
 - – subsidies (taxes and subsidies that are included in final prices) 补贴
- **Personal Income 个人收入（税前）**
 - Pre-tax income received by household
 - Exclude **taxes and profits** that go to **government or business**
 - Personal income = national income 国民收入
 - + transfer payments to **households (F)** 转移支付
 - - Tax R
 - - indirect business taxes 企业间接税
 - - corporate income taxes 企业所得税
 - - undistributed corporate profits ($S_B - CCA$) 企业留存收益
 - **Personal income = consumption 消费 C + saving 储蓄 S_H**
 - $\rightarrow GDP - CCA + F - R - (S_B - CCA) = C + S_H$
 - $\rightarrow GDP = C + (S_B + S_H) + (R - F) = \mathbf{C + S + T}$
- **Personal Disposable Income (PDI) 可支配收入（税后）**
 - Personal income after tax
 - $PDI = PI - \text{personal tax}$
- **Household Saving**
 - 居民储蓄=PDI-消费支出-给企业的利息-国外转移支付
- **Business Saving**
 - 企业储蓄=留存收益 + 资本消耗补偿

GDP Equation

- **Equation**
 - $GDP = C + S + T = C + I + G + (X - M)$
 - $\rightarrow (I - S) + (G - T) + (X - M) = 0$
- **Saving 储蓄**
 - $S = I + (G - T) + (X - M)$
 - 储蓄的来源：私人投资、政府额外支出、贸易盈利
 - $G - T$ Fiscal balance 财政余额（支出）
 - $X - M$ trade balance 贸易余额（净出口）
- **Fiscal Balance 财政余额**
 - $(G - T) = (S - I) - (X - M)$
 - $G - T > 0$ budget deficit, borrowing
 - $G - T < 0$ budget surplus, saving
 - budget deficit must be financed by
 - trade deficit
 - excess of private saving over investment
- trade balance ($X - M$) 贸易余额
 - $X - M > 0 \rightarrow$ trade surplus
 - $X - M < 0 \rightarrow$ trade deficit

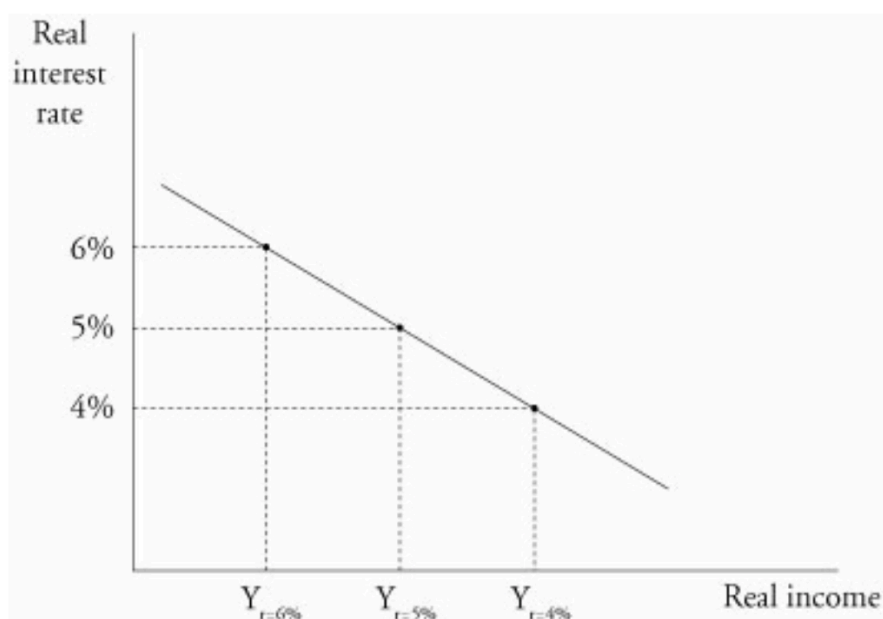
GDP Factors

- **Consumption（因子：可以支配收入）**
 - It is a function of **disposable** income.
 - Marginal propensity to consume (MPC) 边际消费倾向
 - Marginal propensity to save (MPS) 边际储蓄倾向
 - $MPC + MPS = 1$
- **Investment（因子：预期盈利能力、融资成本）**
 - A function of **expected profitability** and **cost** of financing.
 - expected profitability: depend on overall level of **economic output**
 - financing cost
 - **real interest** rate = nominal interest rate – expected inflation rate
- **government purchases**
 - **independent** of economic activity
 - tax and fiscal balance: function of **economic output**
- **Net exports（因子：本国收入、外国收入、相对价格）**
 - **Domestic** disposal income (affect imports)
 - **foreign** disposable income (affect exports)
 - **relative prices** of goods in foreign and domestic markets

Income-Saving (IS Curve – goods market)

- Good Market 商品市场均衡
 - $Y = GDP = C + I + G + (X - M)$
 - $C = a' + b'Y \rightarrow Y = a' + b'Y + I + c \rightarrow I = a + bY$
- **Interest: 融投资成本（不是投资利率）**
- A **negative** relationship between **real interest** rate and **real income** consistent with equilibrium in the **goods** market. 融资成本高、产出减少

- Movement along: 利率水平
 - 利率下降，融资成本下降，产出增加，沿着曲线向右
- Shift
 - G: 政府支出增加，总产值增加，向右移动（财政影响，货币不影响）
 - X-M: 净出口增加，说明总产值增加
- Interest rate decrease 利率下降
 - saving reduces \rightarrow investment increase
 - 消费增加，储蓄减少；投资增加，因为融资成本低
 - $S - I < (G - T) + (X - M)$
- Solution is to increase Income \rightarrow increase saving, increase tax and import
 - 为了平衡，需要增加收入 \rightarrow 增加储蓄，增加税收，增加进口



Money Demand (money market) 持有现金（和收入和利率相关）

- 货币需求就是是否愿意持有现金
- Transaction money balance 交易型（和收入相关）
 - Hold to finance transaction to increase GDP
 - Ratio of transaction balance/GDP is stable
- Precautionary money balances 预防型（和收入相关）
 - Provide a buffer against unforeseen events
- Speculative money balance 投机型（投资需求）（和利率相关）
 - Hold money based on potential opportunities or risk
 - Tend to fall as returns available on other finance assets rises
 - 融资利率高，用于投资，现金减少，因此是相反关系。

Money Supply 提供现金（一定时期相对不变）

- $MV = PY$
 - $M \times v = P \times Y$
 - M: money supply

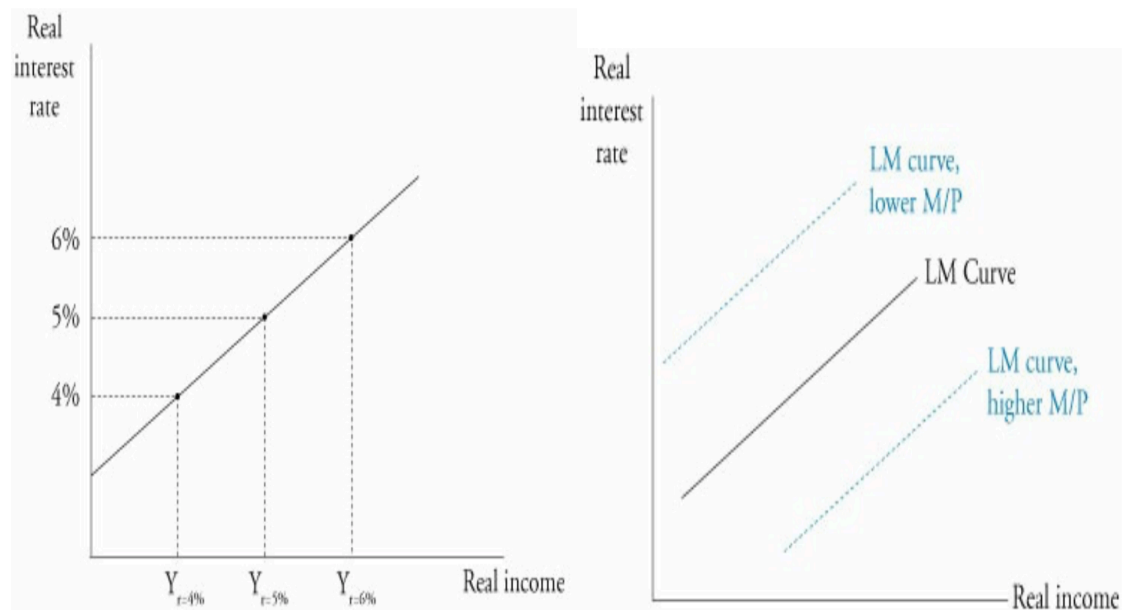
- V: 货币流动速率 speed
- P: 价格水平
- Y: 总收入/产出
- Nominal remains **constant** since it is predetermined by the central bank
- Real Money supply = Nominal money supply / Pricing level 真实 = 名义 / 物价水平
 - $\frac{M}{P} = k \times Y$
 - $k = \frac{1}{v}$ 每单位货币收入下持有的货币数量

Liquidity Preference Theory

- Assume people hold bond or money 持有现金或者债券
- **High interest 高利率，现在买债券，减少现金**
 - Bond price is low today (price = face value / (1+r)^n) 债券价格低
 - Believe interest will go low, and price will go up 利率之后会将，价格高
 - People buy bond today and hold less money 用现金买债券
 - Money demand is less 对现金的需求量低=持有的现金
- **Low interest 低利率，持现金，用于之后买债券**
 - Bond price is high, believe interest will go up and price will fall 之后会降价
 - people hold money to buy later 持有现金用于以后购买
- **Liquidity Trap**
 - All the people do the same
 - High interest, price low, more people buy, price increase, then gain is reduced

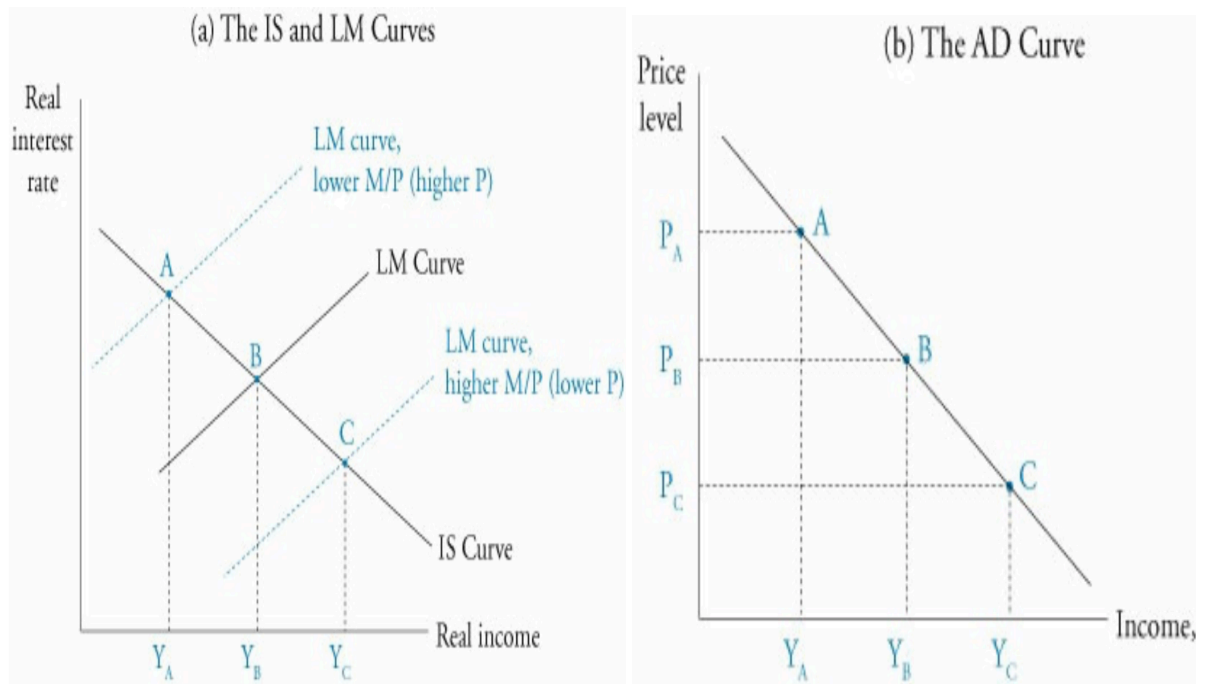
Liquidity-Money (LM Curve)

- **假定 real money supply M/P 固定**
- **Positive** relationship between **interest rate** and **income** consistent with equilibrium in the **money** market
- 利率上升，投资增加，储蓄减少，需要收入来平衡
- Interest rate increase -> decrease quantity of real money people wants to hold
- Movement along 利率水平
 - 利率上升，收入上升
- Shift
 - M：名义货币供应量，货币政策
 - P：物价水平
- Price effects
 - Price increase, M/P lower, Y lower, shift to left
 - Price decrease, M/P higher, Y higher, shift to right



Aggregate Demand Curve 总需求曲线（价格-GDP）

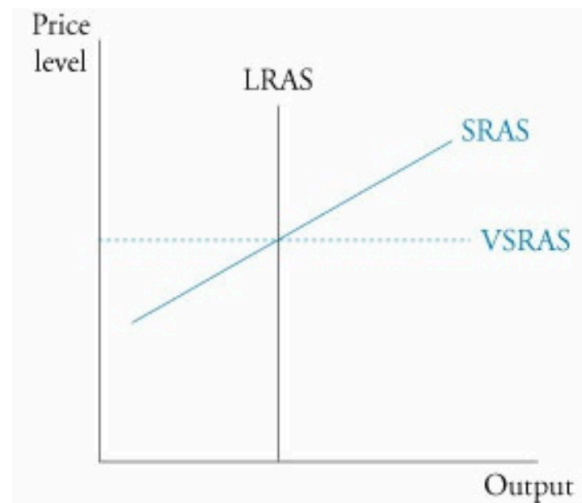
- IS-LM
 - Simultaneous equilibrium in the goods and money market
 - goods market: $Y = C + I + G + (X - M)$
 - money market: $\frac{M}{P} = L_1(Y) + L_2(r)$
- AD 曲线
 - 假定 Nominal money supply 固定
 - Price & Y - a downward-sloping line
 - Real income = real GDP = real output demand
 - High price 高价格 → low real money 低财富 → high real interest rate 高利率
→ 国内产品价格相对国外高 → domestic demand 国内需求降低
- 影响因素
 - goods market: $Y = C + I + G + (X - M)$
 - G: 财政政策
 - money market: 货币政策



Aggregate Supply Curve 总供给曲线

- Price ~ Real GDP
- Three supply functions
 - VSRAS: very short-run 超短期
 - SRAS: short-run 短期
 - LRAS: long-run 长期
- **Elastic Curve**
 - VSRAS \rightarrow SRAS \rightarrow LRAS 逆时针旋转，变得完全不弹性
- **VSRAS – 水平曲线（产出价格不变）**
 - Elastic: 水平曲线，完全弹性
 - Demand increase, no change in price 超短期不影响价格
 - Adjust labor hours and intensity of PP&E 工作时间、资本利用率
- **SRAS – 向上曲线（产出价格上升，投入品价格不变）**
 - Elastic: upward curve
 - 产出价格增加、投入成本不变
 - Demand increase \rightarrow Output price 增加，但是 input price 不变
 - More demand \rightarrow output price increase \rightarrow nominal salary **constant** \rightarrow real salary decreases \rightarrow cost low \rightarrow more output
- **LRAS - 垂直曲线（产出价格上升 \rightarrow 投入品价格上升）**
 - Elastic: 垂直曲线，无弹性
 - 产出价格增加、投入成本增加
 - Output price 增加，input price 增加
 - **Potential GDP 潜在 GDP 或者 Full-employment GDP 充分就业 GDP**
 - 利用所有资源后的最大产出
 - 还是有失业：有摩擦性和结构性失业

Figure 7: Aggregate Supply Curves



总需求增加对供给的影响

	VSRAS 超短期	SRAS 短期	LRAS 长期
价格弹性 Elastic	完全弹性	向上曲线	完全无弹性
产出价格 output prices	不变	增加	增加
投入成本 input prices	不变	不变	增加
Output	Adjust labor hours intensity of PP&E	Increase output	
GDP			Potential GDP Full Employment GDP
Factor		Cost factor	Economic factor

影响总需求和总供给的因素

- Movement Along: price
- Demand 影响需求的因素
 - 财富和产能
 - 预期（收入、销售）
 - 政府（货币、财政）
 - 外汇和全球经济
- Supply: short-run and long-run
 - 影响长期的会应影响短期，但是影响短期的不一定会影响长期
- Short-Run Supply
 - 影响成本的
 - 因素：生产效率、投入品价格、预期、减税、加补贴、外汇升值
- Long-Run Supply
 - 影响经济增长的
 - 因素：劳动力供给、人力资本、有形资产、自然资源、技术

Factors that Increase Demand $GDP=C+I+G+(X-M)$

Factor	Reason	Category
居民财富 Consumer wealth increase	Wealth increase, save less, spend more	C
高产能利用率 High capacity utilization	High utilization tends to invest in PP&E	I
企业销售预期 Business expectation	Increase investment in PP&E and inventory	I
消费者收入预期 Consumer expectation of future income	Better job stability or raising wage	C
扩张货币政策 Expansionary monetary policy 降低利率，减少准备金， 公开市场买卖	lower interest 低利率 C: purchase on credit -> more spending I: more investment	C and I
扩张财政政策 Expansionary fiscal policy	C: Decrease tax 税收 G: Increase spending 支出	C and G
汇率贬值 Exchange rate decrease 国内价格低	Domestic prices are lower X: More exports M: less imports	X-M
全球经济增长 Global Economic Growth 外国经济增长需求	Growth in foreign country X: More exports M: less imports	X-M

Short-run Supply: input prices are constant and output prices increase

cost-related 成本

Factor	Detail
生产效率 Labor Productivity	Increase output 相同成本，产出增加
投入品价格 Input Prices	Real wages and input prices reduce Wages 加上上涨，名义工资不变，实际工资降低
未来产出价格预期 Expectation of future output prices	Expand production
税收和政府补贴 Taxes and government subsidies	Decrease in tax Increase subsidies
外汇升值 Exchange rate	Appreciation will increase import, reduce import cost 升值，从国外购买，减少投入成本

Long-run Supply: input prices increase, and output prices increase

影响完全就业下的 GDP：生产要素和生产效率 – 经济增长因素

Factor	Detail
劳动力供给 Labor quantity and quality Supply	Increase in labor force (population, net immigrations, participation rate)

自然资源增加 Increase in the supply of natural resource	Productive input 生产要素
固定资产增加 Increase in the stock of physical capital	Accumulated stock of capital equipment 资产、设备、厂房
人力资本增加 Human Capital (skilled and educated)	Skills (training and education) -> productivity 生产效率
技术改革 Technology	Labor productivity 生产效率

需求和短期供给单独对经济的影响 (starting point is long-run full-employment)

- **Short-Run Recessionary Gap 经济萧条/短期通货紧缩缺口**
 - 原因：总需求下降
 - **移动：左下角移动（价格和产出下降）**
 - Unemployment rise, cost reduce, expansionary fiscal and monetary -> supply increase
 - 最终 GDP 回到原点，但是价格下降了
- **Short-Run Inflationary Gap 经济过热/短期通过膨胀缺口**
 - 原因：总需求增加
 - **移动：右上角移动（价格和产出上升）**
 - Price increase, cost increase, contraction policy -> supply decrease 最终 GDP 回到原点，但是价格上升了
- **Short-Run Stagflation 经济滞涨**
 - 原因：总供给不足
 - 移动：左上角移动（价格上涨，产出下降）
 - 经济停滞（产出下降）+ 通货膨胀（价格上涨）
 - A difficult situation
 - 增加需求，导致价格最终上涨
 - 减少需求，导致价格和产量进一步减少
 - 可以减少工资和投入品价格来增加供给
- **第四种**
 - 原因：总供给增加（重要原材料价格下降）
 - 移动：右下角移动（价格下降，产出上升）

总需求和短期供给单独对经济的影响

Type of change	Real GDP	Price	Unemployment	Situation
AD Increase	Increase	Increase	Decrease	Inflation
AD decrease	Decrease	Decrease	Increase	recession
SRAS increase	Increase	Decrease	Decrease	Good
SRAS decrease	Decrease	Increase	Increase	Stagnation

Unemployment is **reversely** related to GDP

Figure 11: Adjustment to a Decrease in Aggregate

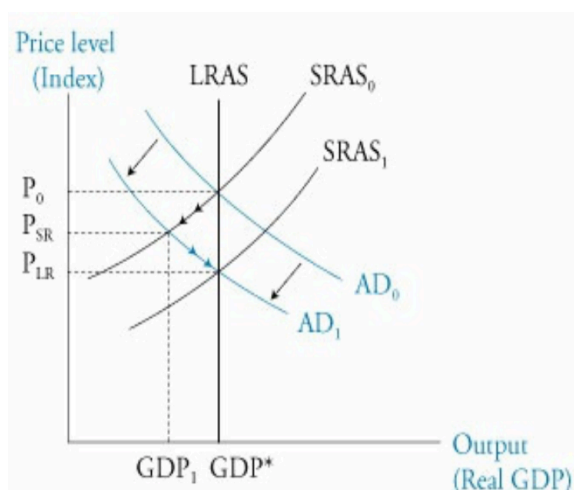


Figure 12: Adjustment to an Increase in Aggregate Demand

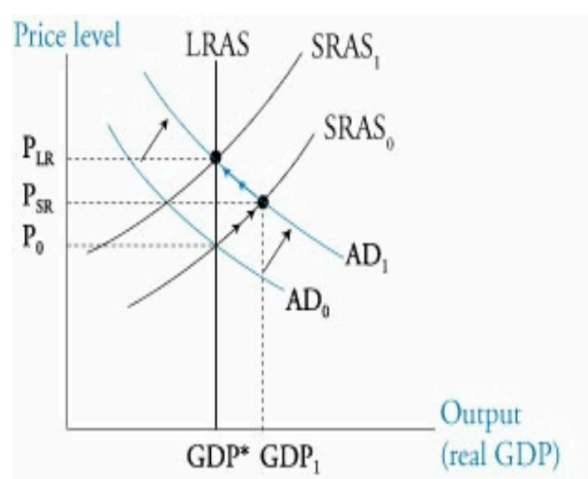
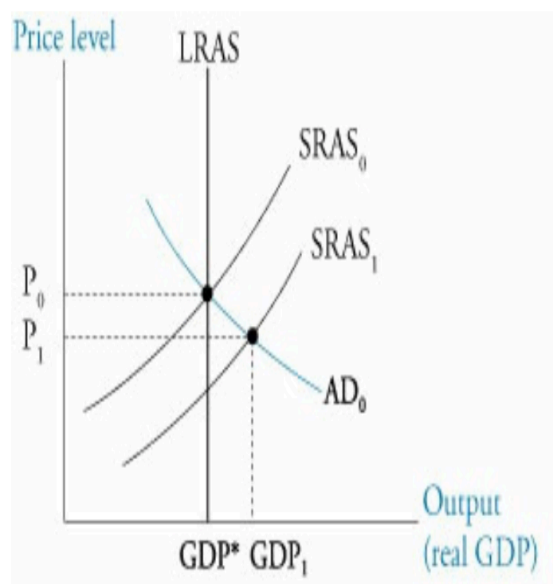
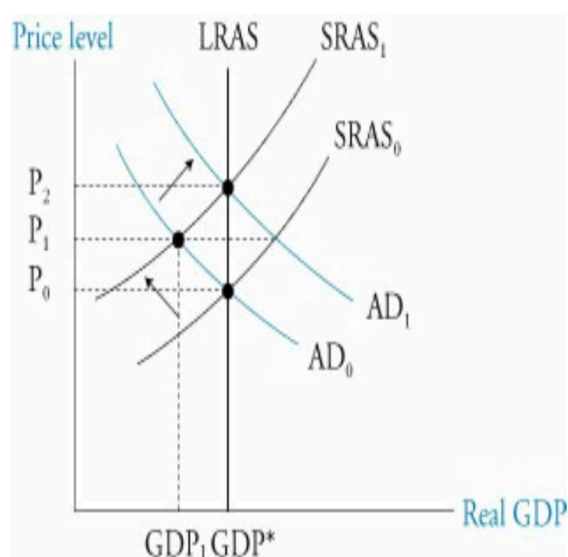


Figure 13: Stagflation



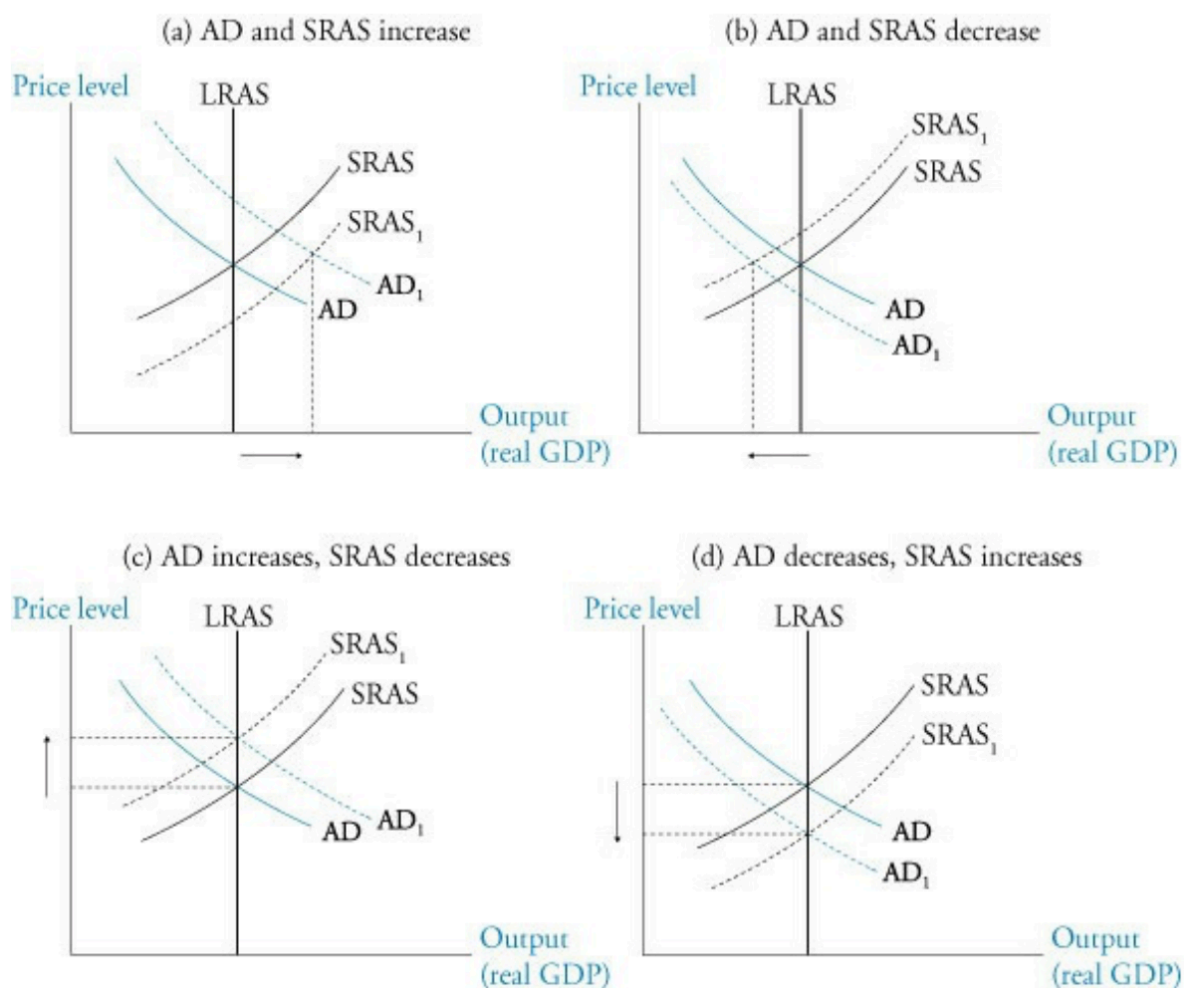
总需求和供给组合对经济的影响

- GDP: AD 和 SRAS 一致性
- Price: AD 和 SRAS 不一致
- 变化一致影响 GDP，不一致影响价格

总需求和短期供给联合对经济的影响

AD	SRAS	GDP	Price
Increase	Increase	Increase	?
Increase	Decrease	?	Increase
Decrease	Increase	?	Decrease
Decrease	Decrease	Decrease	?

Figure 16: Changes in Aggregate Supply and Aggregate Demand



Economic Growth 经济增长

- Sources
 - Labor supply, human capital, physical capital, natural resources, technology
- Sustainability of Economic Growth 可持续发展率
 - Potential GDP = aggregated hour worked * labor productivity
 - 时间 * 劳动生产率
 - Growth in potential GDP 可持续发展率
 - = growth in labor force + growth in labor productivity
 - 劳动增长率 + 生产效率增长率
 - Sustainable rate of economic growth
 - Rate of increase in the economy's productive capacity (**potential GDP**)

Production Function 生产函数

- Production Function
 - $Y = A \times f(L, K)$
 - Y: aggregate economic output
 - A: **total factor productivity** (TFP) 全要素生产率/技术水平
 - Factors not accounted by capital and labor force

- Main factor is technology, not observed but estimated
 - L: size of labor force 劳动力
 - K: amount of capital available 资本
- **Cobb-Douglas function**
 - $Y = A \times K^\alpha \times L^\beta$
 - α, β are output elasticities of capital and labor.
 - α and β
 - constant returns to scale $\alpha + \beta = 1$
 - return to scale are decreasing $\alpha + \beta < 1$
 - return to scale are increasing $\alpha + \beta > 1$
 - α and β - special
 - Assume **perfect** competition and constant normal return to scale, α and β can be shown to be capital's and labor's **shares** of output.
 - Simplified
 - $Y = A \times K^\alpha \times L^{1-\alpha}$
- **GDP Growth**
 - $Y = A \times K^\alpha \times L^{1-\alpha}$
 - $\Rightarrow \ln Y = \ln A + \alpha \ln K + (1 - \alpha) \ln L$
 - $\Rightarrow \frac{\Delta Y}{Y} = \frac{\Delta A}{A} + \alpha \frac{\Delta K}{K} + (1 - \alpha) \frac{\Delta L}{L}$
 - $\% \Delta A$: 技术进步率
 - $\% \Delta K$: 资本增长率
 - $\% \Delta L$: 劳动增长率
 - $W_K = \text{labor} / \text{national income}$ 劳动力收入/国民收入
 - $W_L = \text{capital} / \text{national income}$ 资本收入/国民收入
- **Per-capita Production Function**
 - $y = \frac{Y}{L} = A \times K^\alpha \times \frac{L^{1-\alpha}}{L} = A \times \left(\frac{K}{L}\right)^\alpha = A \times k^\alpha$
 - $\rightarrow y = A \times k^\alpha$ 人均产出 = 技术 \times 人均资本
- **Per-capita Growth**
 - $\frac{\Delta y}{y} = \frac{\Delta A}{A} + \alpha \frac{\Delta k}{k}$ 技术进步率, 人均资本
- **GDP - labor**
 - $Y = \frac{Y}{L} \times L = y \times L$ 人均产出 \times 劳动力
- **GDP labor growth**
 - $\frac{\Delta Y}{Y} = \frac{\Delta y}{y} + \frac{\Delta L}{L}$ 人均产出率 + 劳动增长率
 - Growth rate in labor force
 - Labor productivity growth rate

Understanding Business Cycle

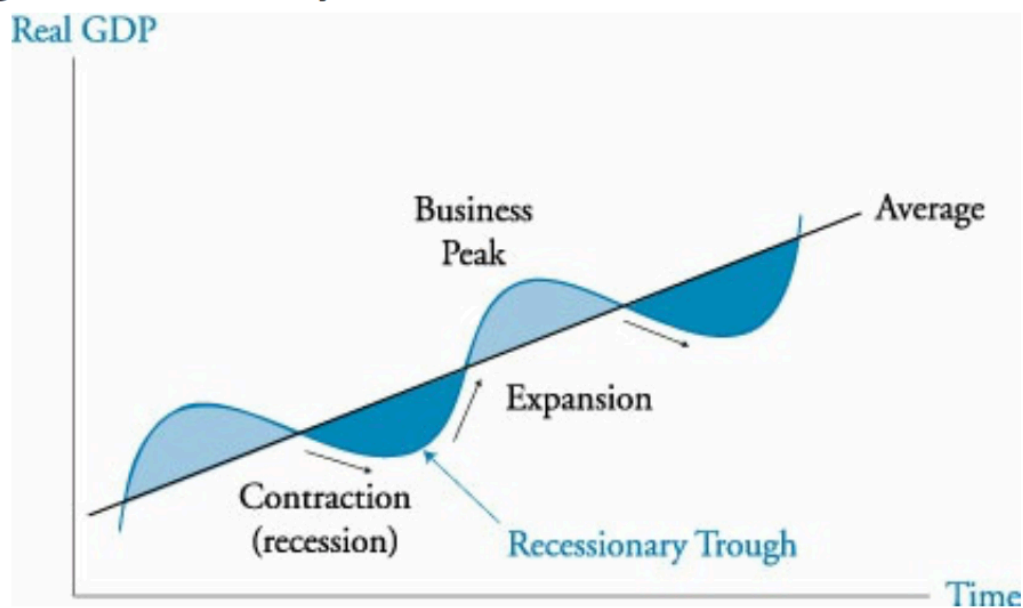
重点

- Business cycle 各阶段特征
- 理论学派
 - Neoclassic (technology)
 - Austrian-school (government intervention)
 - New classic (real business cycle, utility maximization)
 - Keynesian (expectation, **salary** downward sticky)
 - Neo Keynesian (**input** prices are sticky)
 - Monetarist (money supply)
 - 原因
 - 政府是否应该干预: Keynesian
- 失业 Unemployment
 - People: Population > working-age > labor force > employed + unemployed
 - Ratio: participation, unemployment
 - Workers: voluntarily unemployed, Underemployment, Discouraged
 - Unemployment: frictional, structural, cyclical
- 通胀 Inflation (change in price level)
 - Category: inflation, hyperinflation, disflation, deflation
 - Price Index: CPI & PPI, headline & core
 - Measure: Laspeyres (base), Paasche (current), Fisher
 - Cause: cost-push and demand-pull
- 经济指标 Economic Indicators
 - Leading, coincide, lagging

Business Cycle

- Expansion 扩张
- Peak (Recession)
- Contraction
- Trough (Revival)

	Trough (Revival)	Expansion	Peak	Contraction (Recession)
Unemployment	High Overtime and temporary workers	Decrease Hire accelerate	Decrease Hire slow	Increase Work hours decrease
GDP growth	Negative -> positive	Increase	Decrease	negative
Consumer & Business Spending	Durable product Housing may increase	More investment		
Inflation	Moderate or decreasing	Increase	Increase	decrease



Business Cycle Characteristic

- Rely on **business** enterprise 企业来组织
- Four **phases**: expansion, recession (peak), contraction, revival (tough)
- All **sectors** of economy 所有部门都出现
- **Recurrent** cycle not periodic 反复出现, 不定期
- Last between 1 to 10 years 持续时间 1 到 10 年

Inventory-sale ratio 存货销售比

- Peak (high)
 - More Inventory, and less sale
- Tough (low)
 - Less inventory, and more sale

Labor Supply

- Changing workers effects
 - Direct expense
 - Damage employee morale and loyalty
- Short term
 - Adjust productivity
 - Adjust working hours (overtime)
- Long term (cycle persistent)
 - Hire or lay off employers

Capital Spending

- Measure: number of orders tangible assets
- Short term
 - Adjust intensity, maintenance, replacement
 - Use less intensive, reduce maintenance, delay replacement
- Long term
 - Buy or sell

Housing Sector

- Mortgage rate 按揭利率
 - lower interest rate -> higher activity (more buying)
- housing cost relative to Income level 收入
 - incomes are cyclical **high relative** to home costs -> more home buying and construction
 - activity can decrease even if income is increasing but home prices are rising **faster** than income
- Speculative activity (investment): 投资
 - Price increase, buy more
- Demographic factors 人口因素
 - More people in 25-40, more buy

External Trading Sector Activity 对外贸易部门的行为

- Domestic GDP growth 国内经济 -> 进口
 - Increase -> more **imports**
- Foreign GDP Growth 国内经济 -> 出口
 - Increase -> more exports
- Currency
 - Increase -> more import and less export 升值-> 进口多, 出口少
 - Decrease -> more exports and less import 贬值->进口少, 出口多
 - Currency affect trading in response **trend** in exchange rate rather short-term
 - 汇率的趋势影响贸易, 而不是短期汇率

Business Cycle Theory

- **Neoclassic class** 新古典主义 – 技术变革导致
 - Driven: Technology 技术驱动供需改变
 - Business cycle: deviation from long-term equilibrium
 - Wage 降低工资来应对危机
 - 主张政府不干预
- **Austrian School** 奥地利学派 – 政府干预导致
 - Shares several views with **neoclassic** theory, but focus on the role of money and government
 - Business Cycle – 政府干预
 - Government intervention in the economy
 - Policymakers force interest rate down
- **New Classical School** 新古典学派 – RBC
 - **Real business cycle theory (RBC)**
 - Utility theory 把微观用到宏观
 - Business cycle is an **efficient** reaction to external shocks
 - Business cycle – 外部冲击、技术变革
 - Changes in Technology
 - External shocks
 - Proposal 政府不干预

- Expansions and contractions are **efficient** market responses to real external shocks.
- Limitation
 - Fail to explain unemployment and decreasing required salary in market during recession
- **Keynesian School 凯恩斯 – 需求 – 期望 – 干预**
 - Business Cycle 经济周期是由需求的改变导致的
 - Caused by shifts in **demand** curve
 - Demand Shift – expectation 需求是由期望的改变导致的
 - Overinvest and Overproduce
 - Underinvest and underproduce
 - Salary Limitation
 - downward sticky 工资下降有限
 - Recession 主张直接财政和货币干预
 - Increase demand directly using monetary or fiscal policy
 - A reduction in wage in downward stickiness in the short term
 - Limitation
 - Fiscal **deficit** is danger to government finance
 - Expansionary fiscal policy may cause **overheat**
 - Has a time **lag**
- **New Keynesian School 新凯恩斯学派 – 投入品价格**
 - Productive **input prices** are downward sticky 投入品的价格下降有限
 - Menu cost: costly to adjust price frequently
- **Monetarist School 货币学派 – 需求 – 货币供给速度**
 - Business Cycle – wrong decision
 - Inappropriate decisions by monetary authorities 错误货币决策
 - Demand Shift – money supply 需求是由货币供给速度改变导致的
 - Caused by rate of growth of money supply
 - Recession Cause 外部冲击和货币供应减少
 - External shocks
 - decrease in money supply
 - Recession Solution 稳定增长的货币供应
 - **steady and predictable** increase in the money supply

Population > working-age people > labor force = employed + unemployed

- Population
 - The whole people
- Working-age people
 - Age larger than 16
- Labor force 劳动力 (**actively** seeking)
 - Working-age people who are employed or unemployed (**actively seeking**)
- Voluntarily unemployed 自愿性失业
 - Working-age people choose not to be in the labor force

Employed

- **Employed**
 - People who have a job
 - **exclude** people working in informal sector (illegal workers, unlicensed drivers)
- **Underemployed 大材小用**
 - worked **part time** but prefer to work **full time**
 - employed at a low-paying job but is **qualified** at a higher-paying job

Unemployed

- A person who is not working and he is **actively searching** for work.
- **long-term unemployed**
 - Seeking a job for several months is **long-term unemployed**

Unemployment Category

- Frictional Unemployment 摩擦性失业 (有技能, 找工作)
 - Time lag necessary to match employees who needs their **skills**.
- Structural Unemployment 结构性失业 (长期改变, 无技能)
 - **Long-run** changes in the economy that eliminate some jobs
 - They do not have the **skills** to perform available jobs
- Cyclical Unemployment 周期性失业
 - Changes in general level of economic activity
 - Positive when operating at less than full capacity
 - Negative when expansions

Hidden Unemployment

- Underemployed
- Discouraged workers

Discouraged workers 气馁工人 (介于 labor force 和 unemployed 之间)

- available for work but are neither employed nor actively seeking employment
- recession -> stop seeking jobs
- expansion -> seek job
- early in expansion 扩张早期
 - discouraged workers enter, cause unemployment to increase

Rates (working age -> labor force -> unemployed)

- Participation ratio (activity)
 - **Participation ratio** = $\frac{\text{labor force}}{\text{working age people}}$
- unemployment rate
 - **unemployment rate** = $\frac{\text{unemployed}}{\text{labor force}}$
 - a lagging indicator due to discourage workers

Inflation

- **Inflation 通货膨胀**
 - **Persistent** increase in the price level over time
 - Inflation favour borrowers

- 所有产品，价格持续上升
- **Hyperinflation 恶性通货膨胀**
 - Accelerate out of control 500%-1000%
- **Disinflation 反通货膨胀**
 - Inflation (price still rising) but increasing at a **decreasing** rate
 - Inflation rate that is **decreasing** over time but remains **greater** than zero
 - A **reduction** of inflation from a higher to lower, but still above zero, level
- **Deflation 通货紧缩**
 - Persistent decreasing in price level
 - Delay purchase, deep recessions
- **Stagflation 停滞**
 - High inflation and **slowdown** of economy

Inflation Rate 通货膨胀率（价格指数的变化）

- **Define**
 - Percentage increase in **price** level compared to the prior year
- **Comparison**
 - >0 inflation
 - Speed > t: hyperinflation
 - speed > 0: disinflation (speed decrease)
 - <0 deflation

Price Index 价格指数

- **Consumer Price Index (CPI) 消费者价格指数**
 - $$CPI = \frac{\text{cost of basket at current prices}}{\text{cost of basket at base period prices}} \times 100$$
 - Difference in composition, weight, collected data
- **Producer Price Index (PPI) / wholesale price index (WPI) 生产者价格指数**
 - Input prices of **domestic** producers
 - PPI **leading** CPI, reflect future CPI
- GDP Deflator: GDP
- **Headline inflation 整体**
 - Inflation of **all** goods
- **Core inflation 核心**
 - Headline – **food** and **energy** because they are more **volatile**

Inflation Measures 价值指数

- Current P and Q , base P_t and Q_t
- Laspeyres index (基准数量)
 - $$\text{Laspeyres index} = \frac{\sum P \times Q_t}{\sum P_t \times Q_t}$$
 - Biased **upward**
 - **Consumer price inflation**
- Paasche index (当前数量)
 - $$\text{Paasche index} = \frac{\sum P \times Q}{\sum P_t \times Q}$$

- Biased downward
- Fisher Index = $\sqrt{\text{Laspeyres index} \times \text{Passche index}}$

Laspeyres – Price bias upward

- **Quality change - upward 质量**
 - People move to high quality with high pricing
 - Solution: **Hedonic** 享乐定价法 can be used to adjust the price
- **New Goods - upward**
 - Older products are replaced by new and more **expensive** product 新贵产品
 - New goods are added to the market basket, older good being replaced are reduced in **weight** in the index
 - 旧产品的数量或者已经下降，但是还是用的旧的，分子高估
- **Substitution - upward**
 - Move to cheaper substitutes, and reduce the weight of old products
 - 旧产品的数量或者已经下降，但是还是用的旧的，分子高估
 - Solution: chained or chain-weighted

Inflation Types

- **Cost-push 成本推动**
 - Increase in Labor (**wage**) and **raw materials**
 - Wage upward pressure
 - Cyclical unemployment is low 失业率本来就低了
 - Indicators
 - Hourly and weekly earnings
 - unit labor cost=labor compensation/output per hour
 - **expected** inflation is high 预期通货膨胀高
 - indicator: yield spread in TIPS and similar non-indexed Treasury bonds
 - **Reduce** potential GDP
- **Demand-pull 需求拉动**
 - $Y=C+I+G+(X-M)$
 - Increase Money supply, government spending
 - GDP above full-employment GDP, not sustainable
 - Low unemployment -> high salary pressure -> reduce supply
 - Indicator: **Capacity** utilization 产能利用率
 - High means more inflation pressure
 - **Increase** potential GDP
- **Increase wage demand** – both cost-push and demand-pull

Figure 3: Cost-Push Inflation

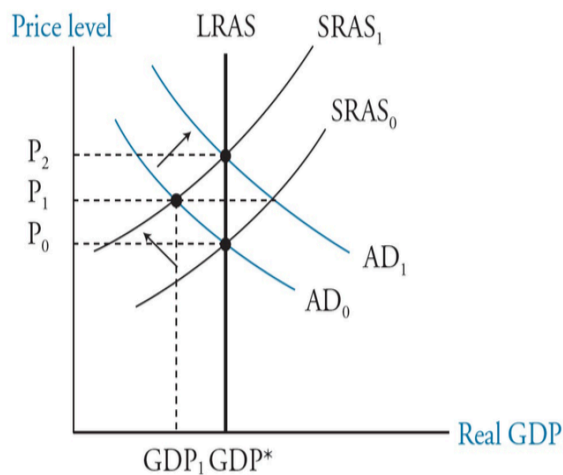
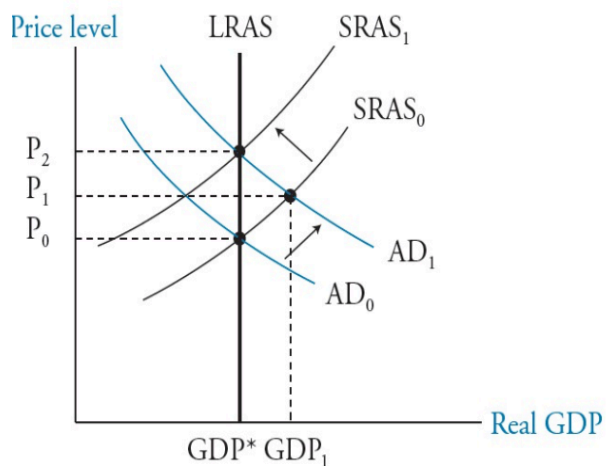


Figure 4: Demand-Pull Inflation



NAIRU

- Non-accelerating inflation rate of unemployment (NAIRU) 无加速通货膨胀失业 Or Natural rate of unemployment (NARU) 自然失业率
 - 不会引起通货膨胀的失业率
 - Change over time 随时间改变
 - Different across country 每个国家不一样
 - Cannot be observed directly
 - No cyclical unemployment
 - **Below which -> inflation increase**
 - **NAIRU > rate without cyclical unemployment**
- Full-employment unemployment rate 完全就业下失业率
- 大部分情况一样的，但是后者可能比

Economic Indicator 经济指标

- Leading 领先的
 - New **orders** for consumer goods
 - Average **weekly working hours**
 - Initial claims for **unemployment insurance**
 - **Stock price**, M2 money supply
 - **Maturity spread**: Interest rate spread between 10-year and overnight borrowing
- Coincident 一致的
 - real personal income
 - manufacturing and trade sales
 - employees on nonfarm payrolls
 - index of industrial production
- Lagging 滞后的
 - **Unemployment rate, inventory-sale**
 - prime lending rate, commercial and industrial loans
 - change in **consumer price index**

Monetary and Fiscal Policy

Key points

- **Policy**
 - Fiscal (tax & spending) and monetary (money & credit)
 - Goal: maintain **stable prices** and positive **economy growth**
- **Money**
 - Function (exchange medium, unit account, store value)
 - Definition (narrow & broad)
 - **Creation (multiplier=1/reserve)**
 - Quantity theory ($MV=PY$)
 - Demand types (transaction, precautionary, speculative)
 - Demand & Supply Curves (**short-term** interest rate \sim quantity of money)
 - **Fisher Effect**: Nominal interest = real interest + **expected** inflation
- **Central Bank**
 - Roles (supplier, banker, regulator, lender, exchange, **policy**)
 - Goals (**price stability**, full employment, moderate long-term interest, positive economic growth, stability in exchange rate)
 - Target (**inflation**, interest rate, exchange rate)
 - Effective (independence (operational/target), credibility, transparent)
 - Tools (policy rate, reserve, **open market** operation)
 - Transmission (short-term interest +, asset price -, expectation -, currency +)
 - Policy (expansionary/neutral/contractionary, policy rate vs neutral rate)
 - neutral rate = real trend rate + **inflation target**
 - Limitation (short vs long, bank hold money not **lend**, consumer hold money not **consume**, rate cannot below **zero**)
- **Fiscal**
 - Roles (discretionary, automatic stabilizer)
 - Goals (influence **economy** activity, **redistribute** wealth, **allocate** resource)
 - Tools (spending (transfer/current/capital), taxation (direct/indirect))
 - Multiplier (fiscal, tax, balanced)
 - Ricardian Equivalence (spending +, save -)
 - Debt (debt/GDP)
 - Policy (expansionary/neutral/contractionary, deficit or surplus)
 - Delay (recognition/action/impact)
- Monetary & Fiscal

Policy

- Fiscal 财政
 - Government: Taxation (T) and spending (G)
 - Budget (T-G): surplus, balanced, deficit
- Monetary 货币
 - Central bank: money and credit
- Goals
 - Maintain stable **prices** 物价稳定
 - Positive **economy growth** 经济增长
 - Fiscal – redistribute income and wealth 重新分配财富

Barter

- double coincidence of wants 双方都一致

Money Function 货币功能

- **Medium of exchange** 交换媒介
 - Means of payment
 - Depends on shared beliefs about its value.
- **Unit of account** 记账单位
 - Reduce the number of prices compared to barter economy
- **Store of value** 财富储藏
 - Money received can be used for future purchase
 - Money's high value relative to its weight offers the convenience of wealth portability in fulfilling a variety of transaction needs.
 - A **high** value relative to its **weight** is a characteristic of money

Money Definition 货币定义

- Narrow
 - Notes and coins in **circulation** 流通中的纸币和银币
 - Balance in checkable bank deposit
- Broad
 - Narrow + liquid assets 流动资产

Money Creation 货币创造

- Fractional reserve banking 部分准备金银行
 - Reserve requirement 准备金要求
- Money multiplier 货币乘数
 - $\text{money multiplier} = \frac{1}{\text{reserve requirement}}$

Money Quantity Theory 货币数量论

- Quantity of money is related to some spending in the economy
- Quantity equation of exchange
 - $\text{money supply} \times \text{velocity} = \text{price} \times \text{real output} = \text{nominal GDP}$
 - $M \times V = P \times Y$
- Velocity 货币流通速度
 - Average number of times per year each unit of money is used for purchase

Money Neutrality – Monetarist 货币中立

- Money variable: supply and price level
- Money constant: velocity and GDP output (not affected by variables)
- Increase money supply only increases price level

Money Demand Types 货币需求

- Transaction demand 交易需求

- Finance transaction as GDP grow
- Precautionary demand 预防需求
 - **Unforeseen** future needs
 - Directly related to GDP
- Speculative/investment demand 投机/投资需求
 - Take advantage of opportunities in the future
 - Money 和 securities 是替代品, 互相竞争
 - **Inversely** related to market **return**
 - 市场回报高, 用于投资, 持有现金少
 - **Positively** related to **risk** of instrument
 - 金融产品风险高, 持有现金多

Money Demand curve (short-term interest 短期借款利率 and hold quantity)

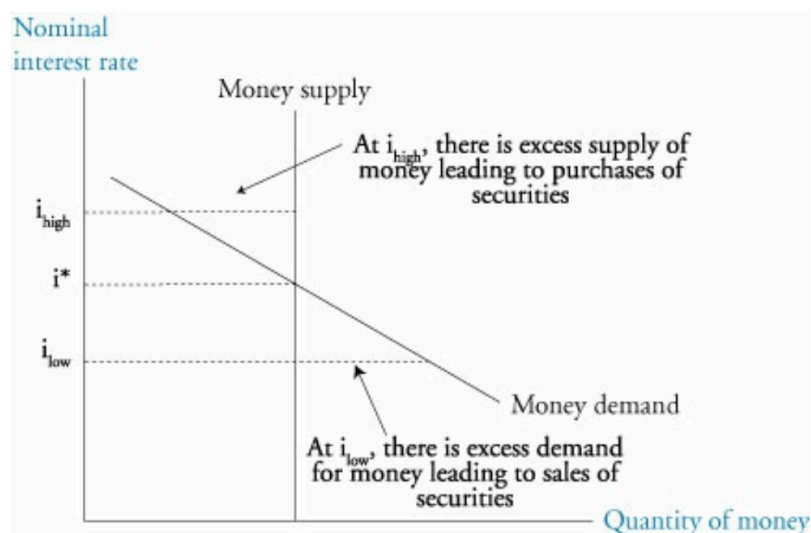
- **Short-term** interest rate and money quantity wish to **hold**
- **Money** and **interest-bearing** asset are substitutes 替代品
- Interest is low, people hold more money
- Interest is high, people hold less money, hold more interest-bearing assets

Money Supply 货币供给

- Determined by central bank
- **Independent** of interest rate
- Perfectly **inelastic** 完全无弹性

Money Demand and Supply Equilibrium 货币供需平衡

- **Interest** rate and securities **prices** are **inversely** related
- Increase money supply 钱用于买证券, 提高了价格, 降低了借款利率
 - More money provided, but need less money, so buy more securities
 - Securities price increase, interest decrease
- Decrease money supply 卖证券用钱, 降低了价格, 提高了借款利率
 - Less money supplied, but need more money, so sell securities
 - Securities price decrease, security interest increase



Fisher Effect

- Nominal interest = real interest + **expected** inflation 名义利率=实际利率+通胀预期
 - Assume real interest is stable, increase is caused by **expected** inflation
 - It is consistent with money neutral
- Nominal interest = real interest + **expected** inflation + **risk premium**
 - Risk premium for uncertainty

Central Bank Roles 央行职能

- **Sole supplier of currency** 垄断货币供应
 - Gold-backed: backed by gold 金本位
 - Legal tender: money supplied by central bank by law 法定货币
 - **Fiat** money: **not** backed by any **tangible** value 法偿货币
- **Bankers** to government and other banks 政府和银行的银行
 - Provide service
- **Regulator and supervisor** of payment systems 支付系统的监督和管理者
 - Ensure smooth operations of clearing system
- **Lender** of last resort 最终贷款人
 - Print money to prevent bank runs
- Holder of gold and foreign **exchange** reserves 黄金和外汇储备
- Conduct of monetary **policy** 货币政策
 - Control or influence quantity of money supplied and growth

Central Bank Objective 央行目标

- **Price Stability via inflation control** – 控制通货膨胀维持物价稳定
 - The primary goal
 - To promote **price stability**
 - Inflation cause: menu costs and shoe leather costs
 - Inflation in developed countries around 2% - 3%
- Full employment 充分就业
- **Moderate** long-term interest rate 温和的长期利率
- Sustainable positive economic growth 经济增长
- Stability in exchange rate with foreign currencies 外汇稳定
 - Pegging exchange rate with dollar
 - Must manage interest rate and economic activity
 - Commits to make inflation rate equal to that of the pegged country
- US
 - maximum employment and moderate long-term interest rate
- Japan: deflation is a problem

Expected and Unexpected Inflation 预期和非预期通货膨胀

- Expected high inflation
 - Cost of hold money is high -> hold less money
- Unexpected inflation 非预期通货膨胀
 - Volatility (higher or lower)

- Higher than expected: benefit borrower (money worth less)
- Lower than expected: benefit **lender** (money worth more)
- High volatility: lenders request more risk premium 风险溢价
- Supply & demand information become less **reliable** 供需信息不可靠
- Increase the magnitude or frequency of business cycle 加剧经济周期

Monetary Policy Tools 货币政策工具

- Policy Rate 政策利率/官方利率
 - Not **defined** by central bank, but **commercial** interest rate 商业银行利率
 - increase -> reduce credit availability
 - US: discount rate (bank borrow from fed reserves)
 - US: federal funds rate (bank charge each other on overnight reserve loan)
 - ECB: refinancing rate
 - UK: two-week repo rate
- Reserve Requirement 准备金 (reverse -> interest rate)
 - Increase -> decrease money supply & funds available for lending -> increase interest rate
 - Only work well when
 - Banks are willing to lend, customers are willing to borrow
- Open market operation 公开市场操作 (operation -> reserve -> interest rate)
 - Buy and sell securities
 - Buy securities -> bank have excess **reserves** -> increase money supply -> reduce interest rate
 - US: Fed's **most commonly** used tool

Monetary Transmission Mechanism – policy rate 货币传导机制 – 官方利率上升

- Short-term interest rate 短期利率上升
 - Reduce demand (reduce credit purchase, cut investment)
- Appreciation of domestic currency relative to foreign currencies 外汇升值
 - Interest increase -> attract foreign investment -> currency **appreciation** -> increase price of exported products -> reduce exports
- Bond/equity/asset prices decrease 资产价格下降
 - Interest increase -> save more and spend less -> reduce demand -> price decrease
- Expectation for future economic growth decrease 市场信心下降
 - Consumers & producers reduce expenditures

Transmission Mechanism – interbank lending rate 传导机制 – 同业利率下降

- Market rate decrease (short and long-term) 市场利率下降
- Asset prices increase (discounted less) 资产价格上升
- Raise expectation for economic growth and profitability 市场信心上升
- Domestic currency depreciates due to outflow of foreign money 外汇流出贬值
- Increase interbank rate -> increase demand and domestic inflation

Effective Central Banks 有效的央行

- Independence 独立
 - Free from political interference
 - Independence: relative rather than absolute
 - **Operational** independence 操作独立
 - Determine policy rate 政策利率
 - **Target** independence 目标独立
 - Define how inflation is **computed**, set target inflation **level**, and the **horizon** to achieve it 通货膨胀的计算, 目标, 实现时期
- Credibility 可信
 - Credible central bank's target become self-fulfilling prophecies
- Transparency 透明
 - Aids credibility
 - **Disclosure** state of economic environment by issuing inflation reports
 - Report economic and other **indicators** they consider in setting interest rate

Central Bank Target 央行目标

- Inflation (most common) 通胀
 - Most common target is $2\% \pm 1\%$
 - Not **current** inflation, but inflation in the **future** (i.e., 2 years)
- Interest rate 利率
 - Interest rate higher -> increase money supply
- Exchange rate (most developing countries) 外汇
 - foreign exchange value fall relative to US 外汇本币贬值 -> use foreign reserve to purchase domestic currency 用外汇买本币
 - effective in the short-term but not long term (i.e., may out of foreign reserve)
 - commits to make inflation rate equal to that of the targeting country

Expansionary, Neutral, Contractionary 扩张、中立、紧缩

- real trend rate 真实趋势利率
 - long-term sustainable real growth rate
- neutral interest rate 中立利率=真实趋势利率+通胀目标
 - neutral interest rate = real trend rate + **inflation target**
- policy rate : 当前利率, neutral rate: 目标利率
 - policy rate = real trend rate + **inflation**
- situation =
$$\begin{cases} \text{contractionary,} & \text{policy rate} > \text{neutral rate} \\ \text{neutral,} & \text{policy rate} = \text{neutral rate} \\ \text{expansionary,} & \text{policy rate} < \text{neutral rate} \end{cases}$$
- should reflect the inflation source
 - cause by higher demand -> contractionary is ok
 - cause by supply shocks -> contractionary make it worse

Monetary Policy Limitation 货币政策局限 – 预期

- short-term and long-term 短期和长期反向变化
 - 预期是一起变化, 但是由于通胀预期导致反向变化

- increase money supply -> reduce short-term rate -> but increase expected inflation -> increase long-term rate
- bond market vigilantes
 - decrease short-term rate -> decrease long-term demand -> increase long-term rate
 - contraction -> recession -> future money worth more -> long-term bonds attractive -> reduce long-term rate
 - expansion -> future money worth less -> long-term bonds less attractive -> increase long-term rate to make it attractive
- **liquidity** trap 流动性陷阱/消费者愿意持有，不愿意消费和投资
 - increase money supply -> hold more money because of **risk** in securities
 - situation: **deflation** -> money supply expansionary -> hold more because future money worth more
- **deflation** – hard to fight
 - expansionary
 - -> hold more money instead of investing it
 - Central bank cannot reduce it below zero
 - contraction -> worse
- not willing to lend by banks 银行不愿意借
 - increase money supply -> bank hold it
- Quantitative Easing 量化消除
 - Situation: deflation and short-term rates are near zero
 - Large purchases of government bonds in maturity (three-five years)
 - Provide more money to bank to encourage lending
- Developing countries 发展中国家
 - Open market operation: **difficult** to implement (distorted information)
 - Neutral rate: hard to **determine**
 - Central bank: lack **credibility**, less independence
 - Rapid financial innovation: change the demand to hold money aggregates

Fiscal Objectives 财政目标

- Influence the level **economic** activity and aggregated demand 影响经济活动 and 需求
- **Allocate** resources among economy sectors 资源配置
- **Redistribute** wealth and income among population segments 重新分配财富

Fiscal Roles 财政职能

- Use taxation and spending to meet macroeconomic goals
- Budget = $\begin{cases} \text{surplus, } T > G \\ \text{balanced, } T = G \\ \text{deficit, } T < G \end{cases}$
- Keynesian: fiscal policy should be used
- Monetarist: monetary policy should be used, fiscal policy is temporary
- Discretionary fiscal policy 自由财务政策
 - decisions to **stabilize** the economy 稳定经济
- Automatic stabilizers 自动平衡器
 - Recession -> less tax and more unemployment insurance -> expanding

- Economic boom -> high tax and less social benefits -> contraction

Fiscal Policy Tools – Spending 财政支出工具

- Transfer Payment
 - **Not included** in GDP
 - Unemployment insurance benefits, redistribute wealth, taxing relief
- Current Spending 常规持续支出（商品和服务）
 - Purchase **goods and services** on **ongoing** and **routine** basis
- Capital Spending 投资支出（基础建设）
 - Spending on **infrastructure** to boost future economy productivity
 - Infrastructure: roads, schools, hospitals
 - Subsidize investment in R&D for high-risk ventures
- Properties – **slow & delayed** impact
 - Transfer payment takes time to implement, **delay** the impact
 - Capital spending takes a **longer** time to implement. The economy may have recovered by the time its impact is felt.

Fiscal Policy Tools – Revenue 财政收入工具

- Direct Taxes – 直接税（收入和财富）
 - Levied on **income or wealth**
 - Tax: income, wealth, estate, corporate, capital gains, social security
 - Properties - slow
 - Take **time** to implement, delay the impact of policy
- Indirect Taxes – 间接税（商品和服务）
 - Levied on **goods and services**.
 - Tax: sales, value-added (VAT), excise.
 - Properties - quick
 - **Social policies** can be implemented very **quickly/ instantly**.
 - Reduce consumption on goods (tobacco, gambling, alcohol)
 - **Influence** and deter consumer choices
 - Increase revenue quickly without significant additional cost
- **Properties 优点**
 - Simply: simple to use and enforce
 - Efficiency: least interference with market forces
 - Subjective Fairness
 - Horizontal: similar pay similar
 - Vertical: richer pay more
 - Sufficiency
 - Generate revenues to meet spending needs

Fiscal Policy Influence 财政影响

- Influence **expectation** 影响预期
 - Increase tax -> reduce consumption -> reduce demand
- increasing **demand**
 - Spending tools are more **effective** than tax reduction
 - Tax reduction is more **effective** for **low income** people

- **low income** people
 - lower income, spend a larger partition on consumption
 - MPS low and MPC high

Fiscal Multiplier 财政乘数

- Define
 - Marginal propensity to consume: MPC
 - $MPC = \frac{\text{consumption}}{\text{disposable income}}$
 - Tax rate: tax
- Fiscal multiplier (\$1 spending) 先交税、再消费
 - 1 -> disposable income $(1 - tax)$ -> consumption $(1 - tax) \times MPC$
 - $\text{fiscal multiplier} = \frac{1}{1 - (1 - tax) \times MPC}$
 - 支出 1 块，可支配钱用于消费后能带来的效果
- Fiscal multiplier if pre-tax consumption rate is X
 - $MPC = \frac{X}{1 - t}$
 - $\text{fiscal multiplier} = \frac{1}{1 - X}$
- Tax Reduction Multiplier (\$1 tax reduction)
 - $-1 \text{ tax} \rightarrow +1 \text{ revenue} \rightarrow + MPC \text{ spending} \rightarrow MPC \times \text{fiscal multiplier}$ 减少一块的税，收入增加一块，用于消费的是MPC
 - 减少一块钱税等价于政府支出了 $MPC < 1$
 - $\text{Tax Multiplier} = MPC \times \text{fiscal multiplier} = \frac{MPC}{1 - MPC \times (1 - tax)}$
- Balanced Budget Multiplier 平衡财政乘数
 - \$1 spending and \$1 tax increase will get balanced budget multiplier
 - $\text{Balanced} = \text{fiscal multiplier} - \text{tax multiplier}$
 - $= (1 - MPC) \times \text{fiscal multiplier}$
 - 相当于整体支出了 $1 - MPC$
 - \$1 spending and t tax increase to get balanced budget 0
 - $(1 - t \times MPC) \times \text{fiscal multiplier} = 0 \rightarrow t = \frac{1}{MPC}$

Ricardian Equivalence 等价（增加支出=增加未来税收）

- Increase current deficit means greater **taxes** in the future.
- Government increase spending, but taxpayers reduce consumption, so **no effect** on aggregated demand 政府增加支出，居民储蓄起来，用于以后支付税收
- If taxpayers **underestimate** their future liability for servicing and repaying the debt, the aggregated demand is increased by equal spending and tax increases, Ricardian equivalence **does not** hold.

National Debt 国家债务

- Debt ratio
 - $\text{Debt ratio} = \frac{\text{Debt}}{\text{GDP}}$
 - Real debt interest > real economic growth rate -> debt will grow
- For

- High deficits -> higher future taxes -> disincentive -> **lower long-term economic growth**
- If lose confidence in government -> government **default** or print money -> **high inflation** (if print money)
- **Crowding-out** effects: government borrowing take places of private sector borrowing 挤出效应
- Against
 - If debt is mostly **domestic**, overstated the problem
 - Finance **productive** capital investment, future gains will be sufficient
 - Deficits may prompt needed **tax reform**
 - Deficits would not matter if private sector saving just offsets government deficit, Ricardian equivalence hold
 - Operating **less than** full capacity, can aid in increasing GDP and employment.

Implementation Difficulties 实施困难

- **Discretionary fiscal policy** 自由财务政策
 - **Forecasts** may be wrong -> incorrect decisions 预测失败
 - **Delay** of implementation and impact on economy 延迟效果
 - Lags make fiscal policy **counterproductive**.
- **Lag Types** 延迟类型
 - **Recognition Lag**
 - time to **recognize** the nature and extent of problems
 - Action lag (**implement**)
 - time taken to discuss, vote on, and enact policy change
 - time required to actually **implement** a policy action
 - Impact Lag (**take effect**)
 - time for action to become evident in the economy.
- **Macroeconomic issues** 宏观经济问题
 - Misreading economic statistics
 - **Crowding-out effect** 基础效应
 - expansionary may crowd out **private** investment
 - **Supply shortage** 供应不足
 - slow due to resource constraints, expansionary -> **inflation**
 - Limits to deficits 赤字有限
 - if deficit too high -> funding problem -> high interest
 - Multiple targets 多个目标
 - high unemployment and high inflation, cannot address both

Expansionary/Contractionary

- Change in balance
 - Increase in surplus -> contraction
 - Increase in deficit -> expansionary
- Recession
 - Increase balance transfer and reduce tax -> deficit -> not expansionary
- Structural/cyclically adjusted budget deficit
 - Deficit when economy was at full employment

Interaction of Monetary and Fiscal Policy

- Impact is greater when fiscal actions are combined with **expansionary** monetary policy
- Poor
 - Government transfer > tax reduction > broader-based transfer
- Monetary: interest (-), private (+)
- Fiscal: demand, public
- GDP: combined, vary when public is low but private is high

Monetary	Fiscal	Interest	Private sector spending	Public sector spending	GDP Output
Expansion	Expansion	Lower	Higher	Higher	Higher
Expansion	Contraction	Lower	Higher	Lower	Varies
Contraction	Expansion	Higher	Lower	Higher	Increase
Contraction	Contraction	Higher	Lower	Lower	Lower