

Unemployment

Cristina Echevarria

Outline

- Unemployment
- Frictional unemployment
- Natural rate of unemployment
- Wait (cyclical) unemployment
- Measurement
- Patterns of unemployment
 - Duration
 - Demographic variation
- Burden of unemployment

Unemployment

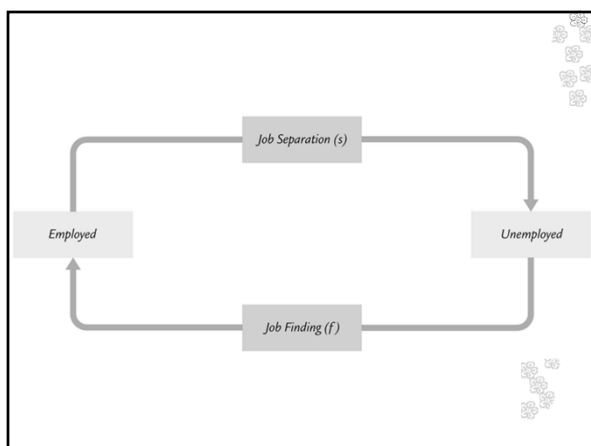
$$L = E + U.$$

- From employed to unemployed = $s \cdot E$ (s = job separation rate)
 - quit,
 - laid off
 - lose job forever.

Assumptions:

s = rate of job separation,
the fraction of employed workers
that become separated from their jobs

f = rate of job finding,
fraction of unemployed workers
that find jobs



Unemployment

- From unemployed to employed = $f \cdot U$
 - recalled or
 - hired.
- A policy reduces unemployment if it lowers s or increases f .

Unemployment

- Unemployment rate depends inversely (negatively) on f and directly (positively) on s .
- Exit to:
 - retire,
 - study,
 - full-time homemaker.
- Entry from:
 - studying
 - full-time homemaking.

Frictional unemployment

Frictional unemployment: due to the time it **should** take to match workers and jobs.

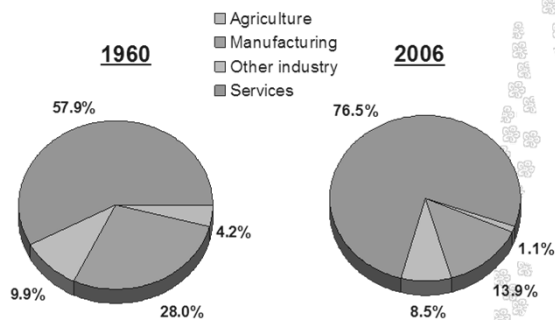
Job search & frictional unemployment

- occurs because
 - workers have different abilities, preferences
 - jobs have different skill requirements
 - geographic mobility of workers not instantaneous
 - flow of information about vacancies and job candidates is imperfect

Sectoral shifts

- Changes in the (sectoral) composition of output among industries.
- *example: Technological change*
more jobs repairing computers, fewer jobs repairing typewriters
- *example: A new international trade agreement*
labor demand increases in export sectors, decreases in import-competing sectors

Structural transformation



Frictional unemployment and sectoral composition

In a dynamic economy, smaller sectoral shifts occur frequently, contributing to frictional unemployment

Natural rate of unemployment

Natural rate of unemployment: rate around which unemployment fluctuates.

Causes:

1. Minimum-wage laws
2. Unions
3. Unemployment benefits and other factors that influence the reservation wage
4. Employment protection regulation
5. Efficiency wages

Minimum wage

- Min. wage may exceed the equil. wage of unskilled workers, especially teenagers.
- Min. wage cannot explain majority of natural rate of unemployment: most workers' wages are well above min. wage.

Unions

- Unions try to secure higher wages for their members.
- When the union wage exceeds the equil. wage, unemployment may result.
- **Insiders:** Employed union workers whose interest is to keep wages high.
- **Outsiders:** Unemployed (non-union) workers who may prefer lower wages and a job.

Workers covered by collective bargaining

| | |
|----------------|-----|
| United States | 18% |
| United Kingdom | 47 |
| Switzerland | 53 |
| Spain | 68 |
| Sweden | 83 |
| Germany | 90 |
| France | 92 |
| Austria | 98 |

Union Membership as a Percentage of Employment

| Country | Percentage Union Workers | Country | Percentage Union Workers |
|----------------|--------------------------|---------------|--------------------------|
| Sweden | 84 | Germany | 33 |
| Denmark | 75 | Netherlands | 28 |
| Italy | 47 | Switzerland | 28 |
| United Kingdom | 41 | Japan | 26 |
| Australia | 34 | United States | 16 |
| Canada | 33 | France | 11 |

Source: Clara Chang and Constance Sorrentino, "Union Membership Statistics in 12 Countries," *Monthly Labor Review* (December 1991): 46-53.

Unemployment insurance (UI)

- UI pays part of a worker's former wages for a limited time after losing his/her job.
- UI increases search unemployment, because it reduces
 - opportunity cost of being unemployed
 - urgency of finding work
 - **f**
- Studies: The longer a worker is eligible for UI, the longer the duration of the average spell of unemployment.

Benefits of UI (EI in Canada)

- By allowing workers more time to search, UI leads to better matches between jobs and workers in the long-run, which leads to greater productivity and higher incomes (Alonso, Echevarria, Tran 2004).

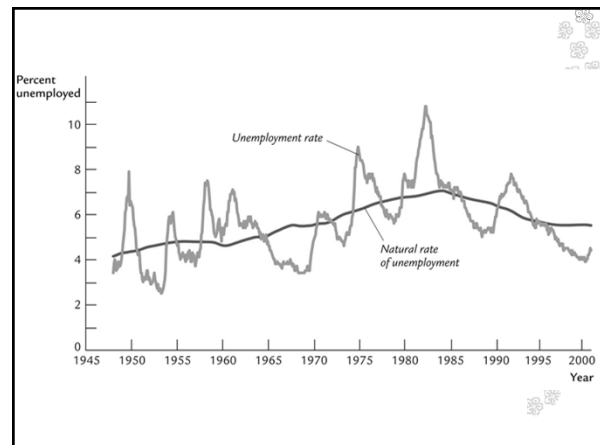
Natural rate of unemployment

Active labour market assistance also make a difference across countries

Active labour market assistance

Govt programs affecting unemployment include:

- **Govt employment agencies** disseminate info about job openings to better match workers & jobs.
- **Public job training programs** help workers displaced from declining industries get skills needed for jobs in growing industries.
- **Reallocation assistance**



Wait (cyclical) unemployment

Wait (cyclical) unemployment: due to the business cycle (or wage rigidity).

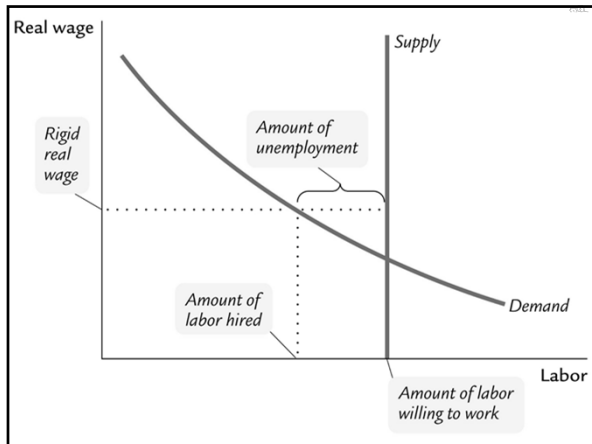
Causes:

1. **Efficiency wages:** Firms pay above-equil. (efficiency) wages to raise productivity.
2. **Risky aversion**

- **Both sides of the same coin**

Efficiency wage theory

- Theories in which higher wages increase worker productivity by:
 - improving health of workers (*in developing countries*)
 - attracting higher quality job applicants
 - increasing worker effort, reducing "shirking"
 - reducing turnover, which may be costly to firms



Measurement

Two problems:

- Discouraged workers
- Involuntary part-timers

Patterns of unemployment

Duration

- Longer duration, higher unemployment rate ceteris paribus.

Unemployment

Both countries: 100 workers, incidence = 5%;

Country 1 duration = 1 m; UR = 5%

Country 2 duration 80% = 1m, duration 20% = 6 m; UR = 10%

| Month | UR |
|---------|----|
| January | 5 |
| Feb. | 6 |
| March | 7 |
| April | 8 |
| May | 9 |
| June | 10 |
| July | 10 |

The duration of unemployment

■ The data:

- More spells of unemployment are short-term than medium-term or long-term.
- Yet, most of the total time spent unemployed is attributable to the long-term unemployed.

Patterns of unemployment

Demographic variation

- In Canada
 - Quebec and Atlantic above average
 - Ontario and BC around average
 - Prairies below average

Patterns of unemployment: Demographics

- Usually higher for younger people (different s not different f).
- Young workers change jobs more frequently (high value of s).
- Middle-aged workers change jobs less often (low s).

The burden of unemployment

For individuals:

1. Economic hardship
2. Loss of experience and tenure
3. Non-pecuniary cost.

Worse the longer the duration.

Chapter Summary

1. The natural rate of unemployment
 - definition: the long-run average or “steady state” rate of unemployment
2. Frictional unemployment
 - due to the time it takes to match workers with jobs

Chapter Summary

3. Duration of unemployment
 - most spells are short term
 - but large portion of unemployment attributable to long-term unemployment

Business cycles

Aggregate demand (AD) and
aggregate supply (AS)

C. Echevarria

Outline

1. Short-run (SR), long-run (LR) and very long-run.
2. Aggregate demand (AD) (ch. 9 until p.301)

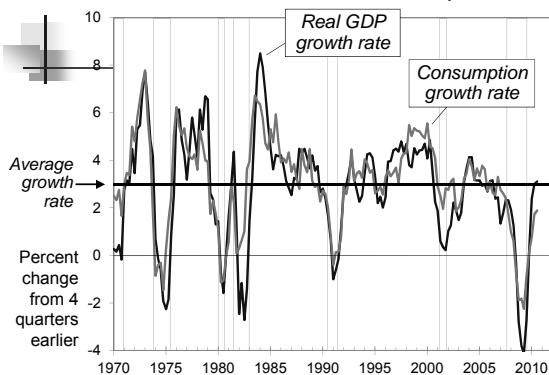
Outline

3. Aggregate Supply (AS) (ch. 13 until p. 433)
 - LRAS (long-run AS)
 - SRAS (short-run AS)
4. Equilibrium
 - Shifts in AD
 - Shifts in AS
 - The "self correcting mechanism".

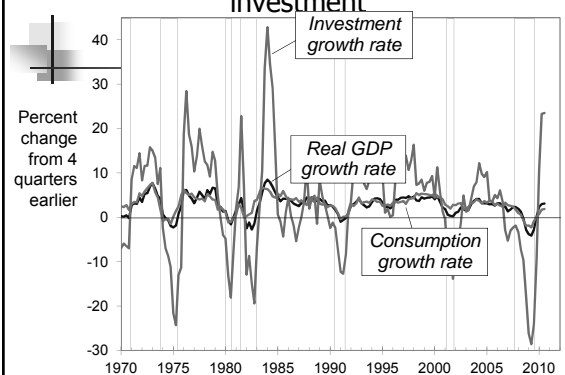
Facts about the business cycle

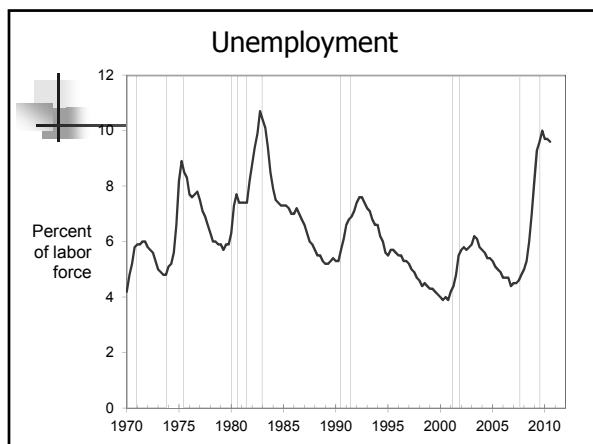
- Consumption and investment fluctuate with GDP, but consumption tends to be less volatile and investment more volatile than GDP.
- Unemployment rises during recessions and falls during expansions.

Growth rates of real GDP, consumption



Growth rates of real GDP, consump., investment





Short run, long run and very long run.

- **Short-run:** sticky prices are fixed (months?)
- **Long-run:** period long enough for prices to adjust but not long enough for technology, stock of capital or population to change. (a few years?)

Short run, long run and very long run

- **Very long-run:** period long enough for technology, stock of capital or population to change. (decades?)
- These categories are just operational.

Recap of classical macro theory (long run)

- Output determined by the supply side:
 - capital, labor, technology
- Changes in demand for goods & services (C, I, G) affect prices, not quantities.
- Assumes complete price flexibility.

When prices are sticky (short run)

Output and employment also depend on demand, affected by:

- fiscal policy (G and T)
- monetary policy (M)
- other factors (ex: changes in C or I)

Aggregate demand

- **Aggregate Demand:** total quantity demanded of final goods and services produced in the economy at different aggregate price levels.
- Downward sloping.

Aggregate demand

Reason: The equation of exchange

$$M \cdot V = P \cdot Y.$$

If M and V constant, inverse relation between Y and P ,

$$Y = M \cdot V / P.$$

- Changes in M (monetary policy) shift the AD curve (both classical and Keynesian).

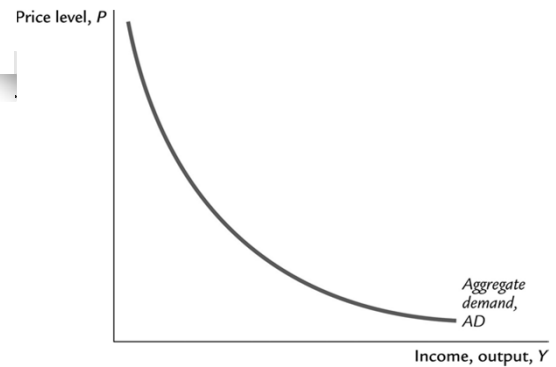


Figure 9.5 The Aggregate Demand Curve
Mankiw, Macroeconomics, Sixth Edition
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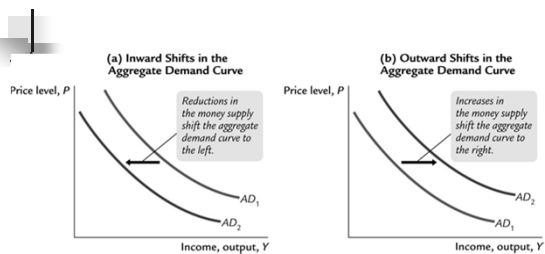


Figure 9.6 Shifts in the Aggregate Demand Curve
Mankiw, Macroeconomics, Sixth Edition
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Aggregate demand

- (Keynesian liquidity preference theory) Changes in $V(i)$ shift the AD curve.
- What can change V ? Look at components of AD,
$$AD = C + I + G.$$

Aggregate demand

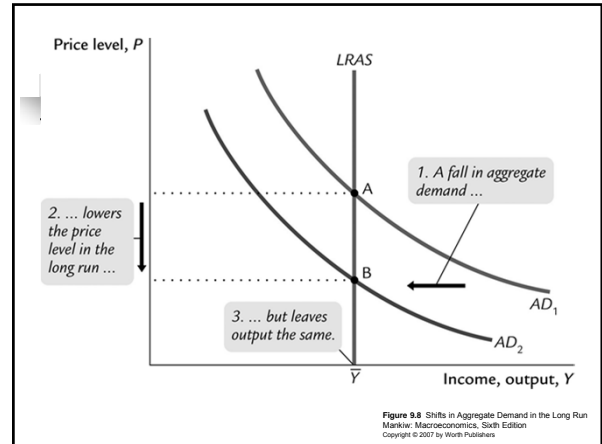
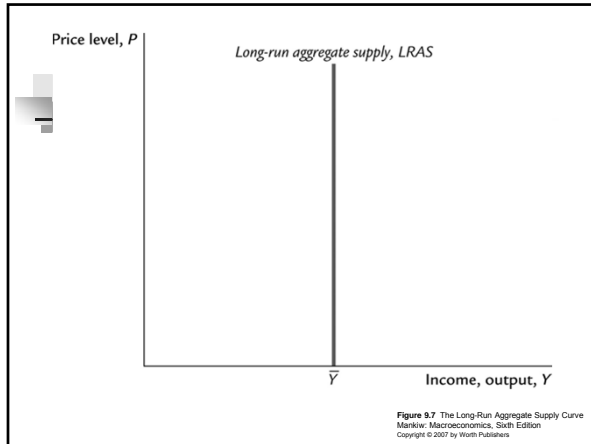
- Fiscal policy.** G and T through $C = C(Y - T)$. If gov. $\uparrow G$ or $\downarrow T$, needs to borrow (or $\uparrow M$, already seen) $\rightarrow i \uparrow \rightarrow V \uparrow \rightarrow$ shifts AD curve.
- Shifts in investment I or consumption function** (Keynes' animal spirits) $\rightarrow i \uparrow \rightarrow V \uparrow \rightarrow$ shifts AD curve.

Aggregate Supply

Aggregate supply: total quantity of final goods and services that firms in the economy want to sell at different (aggregate) price levels.

LRAS

- Y determined by amounts of labour and capital, and technology
$$Y = F(K, L)$$
- LRAS vertical: Y independent of P



Aggregate Supply

SRAS

- Upward sloping.
- Three models to explain why SRAS upward sloping:
 - The imperfect-information model
 - The sticky-price model
 - The sticky-wage model

Aggregate Supply

| | Labour market | Goods market |
|------------------------------|---------------|-----------------------|
| Imperfect information | | Imperfect information |
| Sticky price | Sticky Wage | Sticky price |

Aggregate Supply

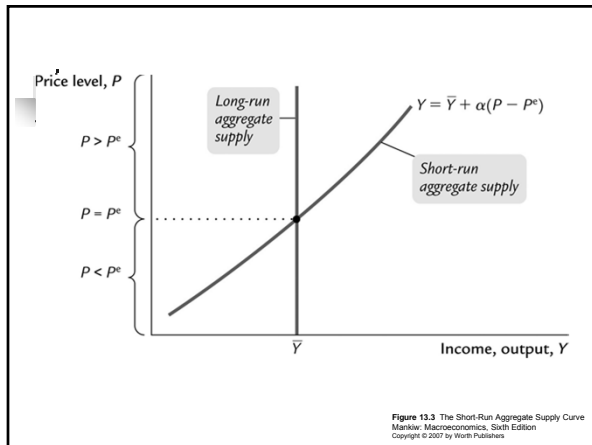
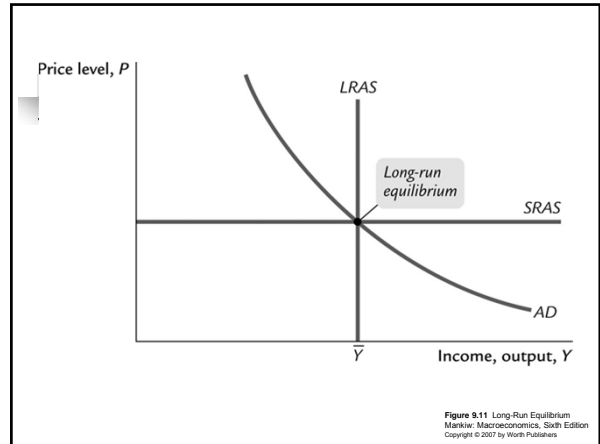
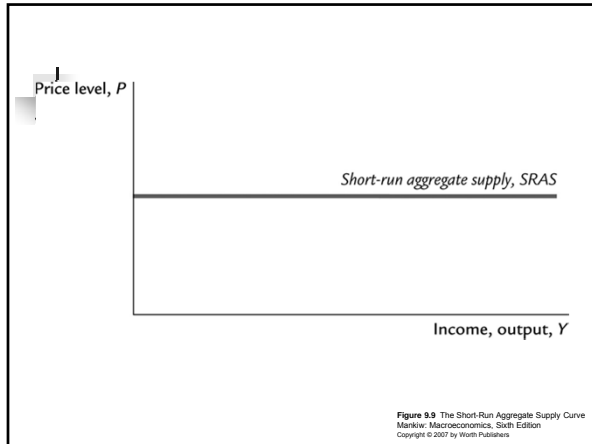
The imperfect-information model

- Entrepreneurs watch relative prices $p \rightarrow$ if $p \uparrow$, they produce more.
- If they confuse ΔP with Δp : positive correlation between P and Y

Aggregate Supply

The sticky-price model

- All prices sticky = horizontal SRAS.
- All prices (including wages) flexible: vertical SRAS = LRAS (by definition).
- Some and some: SRAS upward sloping
 - Larger the proportion of industries with flexible prices: more inelastic (more steep)
 - Larger the proportion of industries with sticky prices: more elastic (more "horizontal")



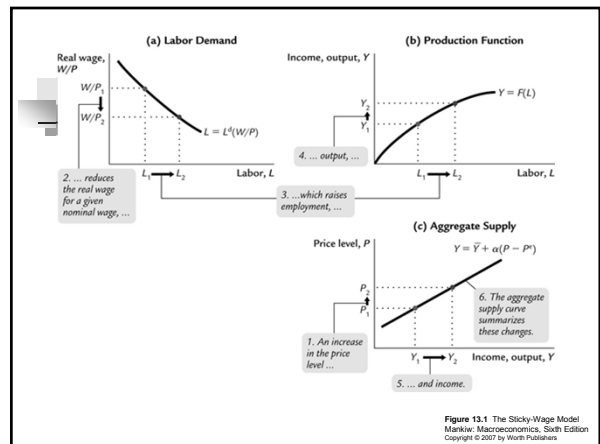
Aggregate Supply

- Why are some prices sticky and others not? Likely to do with the degree of concentration.
 - Prices of commodities (wheat, soybeans, etc.) flexible: perfectly competitive markets.
 - Why are magazines prices sticky? Cost of price change small: "customers do not like it": consideration of monopolistic competition firms.

Aggregate Supply

The sticky-wage model

- Nominal wages W set by LR contracts.
- Given W , for each P , different $\omega = W/P$ (real wage).
- Labour demand depends on ω
- Given W , the higher $P \rightarrow$ the lower is $\omega \rightarrow$ the higher E (employment) \rightarrow the higher Y : positive correlation between Y and P .



Aggregate Supply

Shifts

- ΔW : at the same P , ω is higher \rightarrow less $E \rightarrow$ less $Y =$ SRAS shifts inwards
- (good) productivity shock = $\Delta MPL \rightarrow$ at the same ω (at the same P) \rightarrow more $E \rightarrow \Delta Y$ (for 2 reasons: 1) more E and 2) more Y with the same E) = SRAS shifts outwards

Equilibrium

- AD and AS determine level of output, Y , (and therefore employment) and aggregate price level, P .
- Fluctuations in output, employment and price levels can be explained as shifts in AD (demand shocks) or shifts in AS (supply shocks)

How shocking!!!

- **shocks**: exogenous changes in AD or AS
- Shocks temporarily push the economy away from full employment.
- Example: exogenous decrease in velocity
If M is held constant, a decrease in V means people fewer transactions: a decrease in demand for goods and services.

Equilibrium

Shifts in AD: demand shocks

- ΔM
- ΔV
 - institutional changes?,
 - ΔG
 - ΔT ,
 - shifts in the I or C function,...

Supply shocks

- A **supply shock** changes the general cost structure of the economy
- They can be:
 1. *Favorable* supply shocks lower costs and prices.
 2. *Adverse* (next examples)

Equilibrium

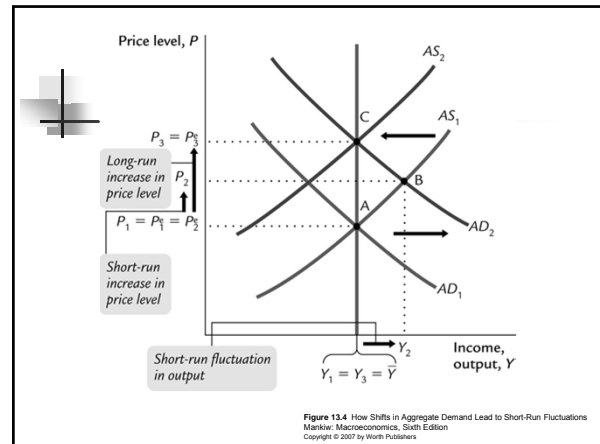
They can be:

1. Temporary shocks to productivity
 - Bad weather reduces crop yields, pushing up food prices.
2. More permanent:
 - Generalized wage increases.
 - New environmental regulations require firms to reduce emissions.
 - Changes in the price of oil (exogenous and a general input)

Equilibrium

The "self correcting mechanism (SCM)".

- Above FE: U below NRU (easy to find jobs, difficult to find workers): tendency $W \uparrow \rightarrow AS$ curve shifts inwards: $\downarrow Y, \downarrow E$. Pressure on wages \downarrow until back to FE.
- Below FE: U above NRU \rightarrow tendency $W \downarrow \rightarrow AS$ curve shifts outwards: $\uparrow Y, \uparrow E$ until back to FE.



Equilibrium

- **Summary:** tendency of the economy to go to FE. Sticky wages \rightarrow movement from unemployment to FE can take a few years = business cycles move economy around FE
- Stabilization policy: either the Gov. or the CB push the AD curve (inwards or outwards) to counteract an unwanted shock: short cut to bring the economy to FE faster than SCM

Equilibrium

- SCM: as the classical theory says, money is neutral in the LR \rightarrow economy goes to FE determined by productive structure.
- As the Keynesian theory says, money is not neutral in the SR: ΔM push AD curve outwards or inwards changing output and employment.

Summary

1. Long run: prices are flexible, output and employment are always at their natural rates, and the classical theory applies.
Short run: prices are sticky, shocks can push output and employment away from their natural rates.
2. Aggregate demand and supply: a framework to analyze economic fluctuations

Summary

- The aggregate demand curve slopes downward.
4. The long-run aggregate supply curve is vertical, because output depends on technology and factor supplies, but not prices.
 5. The short-run aggregate supply curve is upward sloping, because prices are sticky

Summary

6. Shocks to aggregate demand and supply cause fluctuations in GDP and employment in the short run.
7. Gov./CBs attempt to stabilize the economy with monetary/fiscal policy.

Macroeconomic Policy

Cristina Echevarria

Outline

- Goals (ch. 9 from p. 308)
- The Phillips curve (ch. 13 from p. 433)
- Rules versus discretion (ch. 15)

Outline

- Rational expectations
 - Lucas critique
 - Time inconsistency
- More on the Phillips curve
- Appendix: Game theory

Goals

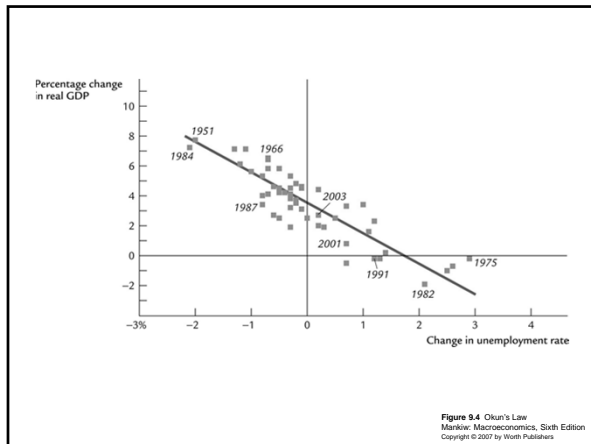
- Two main goals:
 - Low inflation
 - Low unemployment

The Phillips curve

- Macroeconomic policy: shifting the AD (using either monetary or fiscal policy):
 - $\uparrow Y$ and $\downarrow U$ accompanied by a $\uparrow P$
 - $\downarrow P$ accompanied by a $\uparrow U$ and $\downarrow Y$

The Phillips curve

- (short-run) Trade-off between U and inflation π known as Phillips curve: guide to policymakers for many years.
- Sacrifice ratio: Canada (before 1981): $\downarrow \pi$ by 1% costs 2-5% of GNP or 1-2.5% of U .



The Phillips curve

- Inflation that is caused by a shift in the AD curve is called demand-pull inflation
- Inflation caused by a shift in the AS curve is called cost-push inflation.

Rules versus discretion

- Suppose economy below FE. If policymakers could shift AD immediately ... but
- Several lags:
 1. The recognition lag (internal)
 2. The implementation lag (internal)
 3. The effectiveness lag (external)

Rules versus discretion

1. **Recognition lag:** time it takes for policymakers to realize situation.
2. **Implementation lag:** time it takes to change policy instruments.
 1. Monetary policy: not important: OMOs done by noon.
 2. Fiscal policy: change laws and regulations, then change tax tables, get agencies to change spending habits, etc.

Recent example

- January 2009: \$4b ISF (Infrastructure Stimulus Fund): roads, sewers, ...: “shovel ready”
- 1 March 2010: “much of the work has not started yet” (Globe and Mail)

Rules versus discretion

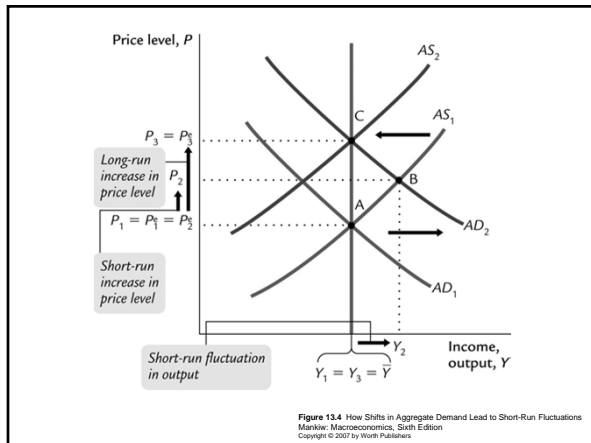
1. **Effectiveness lag:** time it takes for the economy to react to the policy measure once implemented.
 1. Fiscal policy: approx. 1 year ‘til full effect.
 2. Monetary policy: from several months to several years: long and variable.

Rules versus discretion

- Neokynesians (NKs): SCM extremely slow
→ policy: short cut → advocate discretion

Rules versus discretion

- Neoclassicals (NCs):
 - SCM faster than policy
 - Trying to shift AD produces volatility in Y (E) and P : first, AS shifts outwards; then AD shifts outwards = U below NRU → W ↑
→ AS shifts inwards: Y overshoots its target and then ↓; and P ↓ first and ↑ later.



Rules versus discretion

- Advocate rules.
 - Fiscal policy: automatic stabilizers.
 - Monetary policy: $\Delta M = \Delta Y + \pi^T$ where π^T = inflation target.

Rational expectations

- 1950s and 1960s: **adaptive expectations**: people form expectations based on past experience

Rational expectations

- Muth (1961): **rational expectations**: people use all available information to forecast the future.
- Implications for policy? Economic agents watch the government.
- Suppose Government shifts AD outwards

Rational expectations

- NCs:
- 1. **Policy ineffectiveness proposition:** anticipated policy has no effect on Y and E but large impact on P. Agents know that P will \uparrow \rightarrow adjust P and W: AS shifts inwards.
- 2. only unanticipated policy matters for Y and E
- 3. Public can make a wrong guess: effects of policy opposite of intended.

Rational expectations

- NKs: public cannot adjust completely
- 1. Policy measures still have an impact, even when anticipated
- 2. Impact is larger if measure is not anticipated.
- 3. Agree the guessing game is dangerous.

Lucas critique

Economists use models for two purposes:

1. forecasting; and
2. Evaluating the effects of different policies.

Lucas critique

- No problem with first purpose
- Standard models cannot be used for second.

Lucas critique

- Why?
- 1. Parameters in the model capture relations between variables (assumed constant) dependent on expectations
- 2. Parameters estimated using past data.

Lucas critique

3. Once model estimated, gov. economists feed different values for M, G or T into the model (computer) and the computer forecasts results of change in policy.
 - Policy changes \rightarrow expectations change = relation in model change \rightarrow estimated parameters no longer correct.

Time inconsistency

- Example or consequence of rational expectations.
- Common problem in normal life as the accompanying article shows
Time inconsistency: refers to incentive policymakers have to renege on a previous announcement once the economics agent have reacted to it.

Time inconsistency

- Until 1970s: CBs two objectives: stable P, $\downarrow U$
- Assume, at this point, main goal: $\downarrow U$
- Unions want to keep the PP

Time inconsistency

- Non-cooperative game.
 1. CB announces low (L) inflation policy.
 2. Unions can sign contracts for
 1. high (H) wage increases.
 2. low (L) wage increases.
 3. CB
 1. can stick to its word or
 2. pursue a high (H) inflation policy.

Outcomes of the game (CB columns, unions row)

| | H | L |
|---|-----------------------|-----------------------|
| H | High π , same E | Medium π , less E |
| L | Medium π , more E | Low π , same E |

Time inconsistency

- Outcome: H-H.
 - Unions do not trust CB: go for H
 - CB has no option but H
- CB does not have a commitment strategy but

Time inconsistency

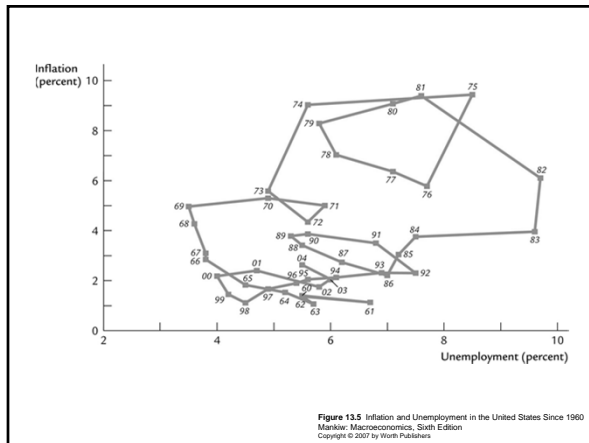
- repeated game: build a reputation.
 - first year: painful in terms of U, but
 - public starts to believe CB
- CBs moved from having 2 goals to have 1: low π
- Since B of C moved in this direction, after initial shock (early 1990s), very little U.

More on the Phillips curve

- Negative relation between U and π worked as a guideline for policy makers from after WWII until the 1970s. During this period gov.s and CBs did not use discretionary policy that often.

More on the Phillips curve

- After the oil shocks, gov.s started to use policy more often → rational public started expecting it: policy is ineffective or not very effective.
- Phillips curve works if public expectations about π constant: when public adjusts expectations, Phillips curve moves: long-run Phillips curve is vertical at the NRU



More on the Phillips curve

- Positive aspect: once the public believes the CB (once CB has reputation), cost of $\downarrow \pi$ much lower
- BC cut π by 8% (from 10 to 2)
- Should have cost 8-20% in U and 16-40% in GNP.
- It cost 11.5 and 23 in GNP.

The 1980s disinflation

| Year | Unemployment | Natural rate | Cyclical |
|-------|--------------|--------------|----------|
| 1982 | 11 | 8.5 | 2.5 |
| 1983 | 11.8 | 8.5 | 3.3 |
| 1984 | 12.2 | 8.5 | 3.7 |
| 1985 | 10.5 | 8.5 | 2 |
| Total | | | 11.5 |

The 1980s disinflation

- Did the Bank of Canada go too far?

Appendix: Game theory

- Game theory: first branch of mathematics developed for the social sciences (economics).
- Developed by Von Neuman; Nash (with Harshanyi and Selten) received the Nobel in economics in 1994 because Von Neuman was dead. (*A beautiful mind*)
- Marginal approach: small agent (lots of agents): no influence on prices
- Game theory: agent influences the outcome (few agents): strategic behaviour.

Appendix: Game theory

A game (oligopoly) has:

- players (oligopolist firms)
- rules---it refers to the environment (economic, social, legal)
- strategies---possible actions of the players (changes in price, advertising, differentiation)
- payoffs (profits).

Appendix: Game theory

There are two kinds of games:

1. Cooperative. Bargaining. It implies:
 1. communication and a
 2. binding agreement
 1. always better to cooperate
 2. enforcing mechanism (legal, etc.)

Appendix: Game theory

2. Non-cooperative.

1. Players cannot communicate (chess, oligopolies)
2. or there is not binding agreement
 1. not always better to cooperate
 2. not enforcing mechanism.

Appendix: Game theory

- Non-cooperative game: prisoner's dilemma: two criminals who jointly committed a crime are being separately grilled by the police.
- They can either confess (C) or maintain innocence (I).
- If both choose I, their payoffs are -5 each (in utility terms): conviction of a minor charge.
- If both confess, harsh treatment: -15 utility each.
- If one confesses and other not: 0 (let off free) and -20 (thrown the book) (Friedman, p. 66)

Appendix: Game theory

| | | |
|---|----------|--------|
| | C | I |
| C | -15, -15 | -20, 0 |
| I | 0, -20 | -5, -5 |

Appendix: Game theory

- Best solution: II;
 - Each thinks: if I do not confess, the other will; so I will
- Equilibrium: CC.

Appendix: Game theory

- Game only played once: CC, at least there is a commitment technology:
 - Mafia, the omertá (law of silence)
 - University: exams compulsory for profs.
- Game played repeatedly: reputation.

Summary (closed economy)

$$\begin{aligned}
 Y &= F(K, L) \\
 C &= C(Y - T) \\
 I &= I(r) \\
 i &= r + \pi^e \\
 M/P &= M^d(i, Y) \\
 L &= L(\omega) \\
 \omega &= W/P \\
 Y &= C + G + I
 \end{aligned}$$

NC (LR)

NK (SR)

| NC (LR) | | NK (SR) | |
|---------|----------|---------|----------|
| exo | endo | exo | endo |
| G | Y | G | Y |
| T | C | T | C |
| M | I | M | I |
| K | r | K | r |
| L | i | W | i |
| π^e | W | π^e | L |
| | P | | P |
| | ω | | ω |

Policy in a Small Open Economy

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Outline

- ✦ Flexible Exchange Rates
 - Neoclassicals (NCs - LR)
 - Neokeynesians (NKs - SR)
- ✦ Fixed Exchange Rates
- ✦ Summary
- ✦ Fixed versus Floating Exchange Rates

Flexible Exchange Rates

Neoclassicals (NCs)

- ✦ **Fiscal Policy.** $\Delta G > NX$ decreases and $\Delta \epsilon$
 - $\Delta G >$ pressure on domestic interest rates $>$ attracts foreign capital (Δ demand C\$) $>$ Δe , NX fall (crowding out)

Flexible Exchange Rates

- ✦ **Monetary Policy.** Neutrality: ΔM affects only nominal variables: W , P , and e (not ϵ). Driven by supply.

Flexible Exchange Rates

Neokeynesians (NKs)

- ✦ Since r^* (global interest rate) is given, fiscal policy cannot push the AD curve.
- ✦ Idem: Changes in consumers' (C) or investors' expectations (I) cannot push the AD curve.

Flexible Exchange Rates

- ✦ Idem: A shift in the NX curve (i.e., new tariffs abroad) does not shift the AD curve: the only effect, change in ϵ .
- ✦ On the other hand, Δr^* pushes AD curve outwards: I decreases, ϵ decreases $\rightarrow \Delta NX$: positive net effect (ΔY and ΔE).

Flexible Exchange Rates

- ✦ **Fiscal Policy.** No difference with NCs (long run).

Flexible Exchange Rates

- ✦ **Monetary Policy.** Similar effects than in a closed economy: ΔP , fall in ω , ΔY (ΔE) and ΔNX .
 - Explanation: ΔM downward pressure on domestic interest rates \rightarrow fall in $\epsilon \rightarrow \Delta NX$.

Fixed Exchange Rates

How does the system works?

- ✦ B of C offers to buy and sell US\$1 per C\$1.
- ✦ Suppose, in USA $1C\$ = 1.1US\$$.
- 1. B of C buys foreign assets (US\$) $\rightarrow \Delta M$.
- 2. People will buy C\$ from B of C and sell them in USA $\rightarrow \Delta M$.

Fixed Exchange Rates

- ✦ Fixed exchange rate: CB does not have control over M: cannot really talk about monetary policy. CB cannot use same tool for 2 purposes:
 - keep e constant
 - Macro policy
- ✦ CB has another tool: devaluation or revaluation.

Fixed Exchange Rates

No differences between NCs (long run) and NKs (long run)

Fiscal Policy. Model driven by demand: demand rigid; supply adjusts: $\Delta G \rightarrow \Delta Y$ and ΔE

$$Y = C(Y - T^*) + I(r^*) + G^* + NX(\varepsilon^*)$$

Adjustment falls on Y . Let us say

Fixed Exchange Rates

$$C(Y - T^*) = \hat{C} + c \cdot (Y - T^*) = \hat{C} + c \cdot Y - c \cdot T^*$$

where \hat{C} = autonomous consumption

c = marginal propensity to consume

$1 - c = s$ = marginal propensity to save

Fixed Exchange Rates

$$Y = \hat{C} + c \cdot Y - c \cdot T^* + I(r^*) + G^* + NX(\varepsilon^*)$$

$$(1 - c)Y = \hat{C} + I(r^*) + G^* + NX(\varepsilon^*) - c \cdot T^*$$

$$Y = \hat{C}/s + I(r^*)/s + G^*/s + NX(\varepsilon^*)/s - c \cdot T^*/s$$

$1/s$ = expenditure multiplier

Fixed Exchange Rates

2. Devaluation: $\Delta NX \rightarrow \Delta Y$ and ΔE

3. Shift (Δ) investment demand (animal spirits) \rightarrow shifts AD outwards $\rightarrow \Delta Y$ and ΔE

4. Consumer optimism (increase in autonomous consumption): same effect.

Fixed Exchange Rates

5. Trade policy (Δ tariffs and quotas): shift NX curve outwards $\rightarrow \Delta Y$ and ΔE

6. Δr^* $\rightarrow I \downarrow$: recession

7. Δ world tariffs or international crises: shift NX curve inwards \rightarrow recession.

Fixed Exchange Rates

Summary

✦ With a rigid e , adjustment falls on quantity: external shocks are imported.

✦ With a flexible e , adjustment falls on e : protects a country from external shocks

Summary

➤ **Fixed Exchange Rates:** effects of policy in a small open economy are the same for NCs (LR) and NKs (SR).

- Fiscal policy: effective
- Monetary policy: ineffective

Fixed ERs (NCs—LR and NKs—SR)

| | Y/E | ε | NX |
|-----------------|-----|---|----|
| Fiscal | + | 0 | 0 |
| Monetary | 0 | 0 | 0 |

Summary

➤ **Floating exchange rates:**

- Fiscal policy: NCs (LR) and NKs (SR): no effect on Y and E (affects ε and NX)
- Monetary policy:
 - NCs (LR): ineffective
 - NKs (SR): effect on Y and E through the effect on ε and NX

Flexible ER (NCs—LR)

| | Y/E | ε | NX |
|-----------------|-----|---|----|
| Fiscal | 0 | + | - |
| Monetary | 0 | 0 | 0 |

Flexible ER (NKs—SR)

| | Y/E | ε | NX |
|-----------------|-----|---|----|
| Fiscal | 0 | + | - |
| Monetary | + | - | + |

Fixed versus Floating Exchange Rates

The case for Flexible Exchange Rates

- Allow monetary policy to be used for other purposes.
- Act as a buffer: international crises, increase in global interest rates, etc.

Fixed versus Floating Exchange Rates

The Case against Flexible Exchange Rates

- Fixed exchange rates impose discipline:

$$\varepsilon = e \cdot P^D/P^F$$

For ε to be constant (at equilibrium),

- e fixed: P^D/P^F needs to be constant.
- e flexible: countries can pursue different monetary policies; e will adjust.

Fixed versus Floating Exchange Rates

- Instability in exchange rates could lead to less international trade and international movements of capital (heard in 1970s and 1980s, not supported by data)

Summary (small open economy, flexible exchange rates)

$$\begin{aligned}
 Y &= F(K, L) \\
 C &= C(Y - T) \\
 I &= I(r) \\
 i &= r + \pi^e \\
 M/P &= M(i, Y) \\
 L &= L(\omega) \\
 \omega &= W/P \\
 Y &= C + G + I + NX \\
 NX &= NX(\varepsilon) \\
 \varepsilon &= e P/P_F
 \end{aligned}$$

NC (LR)

| exo | endo |
|---------|---------------|
| G | Y |
| T | C |
| M | I |
| K | NX |
| L | i |
| π^e | W |
| r | P |
| P_F | ω |
| | e |
| | ε |

NK (SR)

| exo | endo |
|---------|---------------|
| G | Y |
| T | C |
| M | I |
| K | NX |
| W | i |
| π^e | L |
| r | P |
| P_F | ω |
| | e |
| | ε |