Week 3: Output, Business Cycles, Growth & Employment

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Economics 203: Introduction to Macroeconomics

This chapter introduces:

1. Aggregate Demand (AD) & Aggregate Supply (AS)
2. Equilibrium output and potential output
3. Growth in potential output
4. Business cycles and output gaps
5. Output gaps and unemployment
6. The role of Macroeconomic Policy

A Short-Run AD/AS Model

- A short run AD/AS model is introduced in this chapter.
- The chapters that follow explain its structure and use.
- ***Short run assumptions*:**
- Constant factor-prices esp. money wage rates
- Fixed labour force, capital stock & technology
- The money supply is fixed

As a result:

- Δoutput → Δemployment & Δcapital utilization

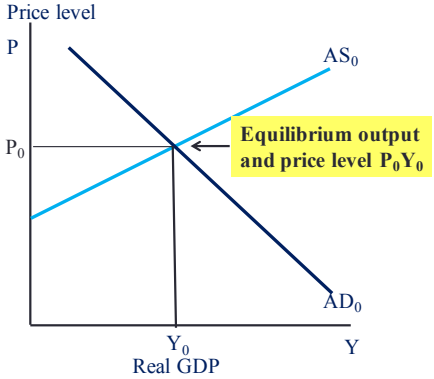
The AD/AS Model in a Diagram

AD = planned (C+I+G+X-IM) at different P levels.

AS = P at different rates of real output

AS reflects unit costs of production with constant input prices and producer price setting

P = general price level



Aggregate Demand (AD)

- **Downward sloping AD from three effects of ΔP:**
  - **Interest rate effect**
    - ↑P → ↑i → ↑ finance cost → ↓Expenditure
  - **Substitution effect**
    - ↑P → ↑P_{CAN}/P_{US} → ↓X + ↑IM →↓Expenditure
  - **Wealth effect**
    - ↑P → ↓(Nominal Wealth)/P → ↓ Expenditure

Aggregate Demand (AD)

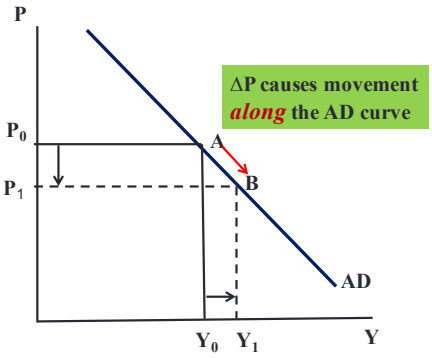
- **The AD curve:**
  - **Assumes:** all determinants of expenditure except price are constant
  - **Shows:** Δ***expenditure caused by*** ΔP
  - **Slope of AD** = $-\Delta P/\Delta Y$
  - **Position of AD:** factors ***other than P*** that affect expenditure

The Aggregate Demand Curve

- **The AD curve:** *Planned* aggregate expenditure: (C+I+G+X-IM) at different prices, *ceteris paribus*
- ***Assume:*** constant *nominal* money supply

- **ΔP** → i effect
  + Substitution effect
  + Wealth effect

  → **ΔY/ΔP < 0**



Aggregate Supply (AS)

The AS Curve:

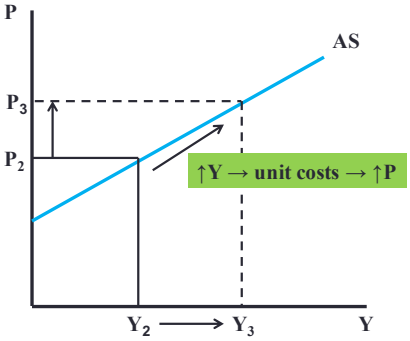
- **Shows relationship between Output & Price level**
- ***Assumes:*** **money wage rates & other input prices are constant**

- **Slope of AS** = $\Delta P/\Delta Y > 0$

- **Position of AS**: reflects input prices & other production conditions

The Aggregate Supply Curve

- **The AS curve:**
- shows prices (P) businesses would require to produce outputs (Y)
- **↑Y → ↑unit costs → ↑P**
- **$\Delta P/\Delta Y > 0$**



Equilibrium Real GDP and Price

Equilibrium: AD = AS

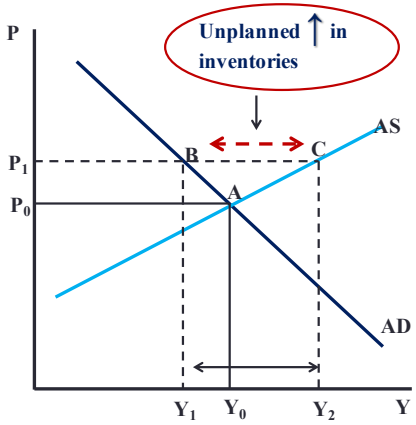
At P_0, Y_0: AD = AS

Planned expenditure on current output = business sector current production

At P_1: AD < AS

$Y_1 < Y_2 \rightarrow$ unplanned

$\uparrow$ inventory $\rightarrow \downarrow Y$



Equilibrium Real GDP and Price

A Numerical Example:

AD: $Y = 1000 - 2P$

AS: $Y = -200 + 10P$

In Equilibrium AD = AS

$$1000 - 2P = -200 + 10P$$

$$12P = 1200$$

P = 100

Y = 800

Equilibrium Output vs. Potential Output

Potential output:

≡ real GDP the economy can produce on a sustained basis without generating inflationary pressure

Equilibrium output:

≡ *actual* real GDP determined by AD = AS

Equilibrium output = Potential output

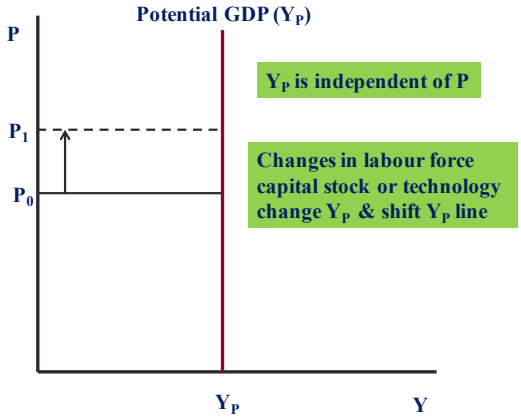
≡ benchmark for macroeconomic performance

Potential GDP

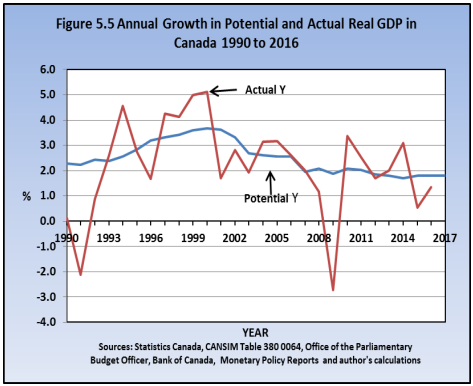
Potential GDP:

Determined by the economy's:

- Labour force,
- Capital stock &
- Technology.



Growth in Potential Output



Potential output grows as the labour force grows and labour productivity increases

Actual output increases or decreases as short run AD & AS fluctuate

Unemployment rates rise when actual output grows more slowly than potential output and fall when actual GDP grows more quickly than potential output

Business Cycles and Output Gaps

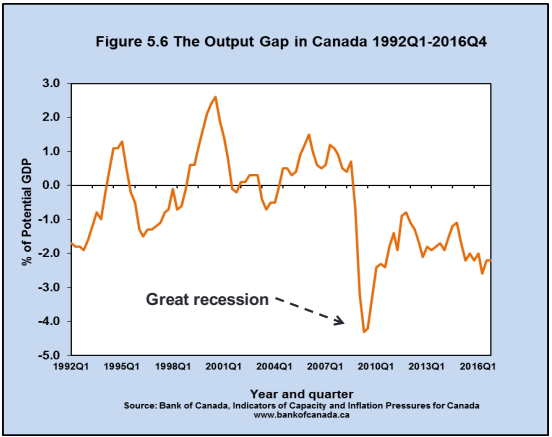
- **Business cycles ≡ fluctuations in Y growth**
  - **Caused by fluctuations in AD/AS conditions**
- **Business cycles → $Y \neq Y_P$ → Output Gaps**
- **Output Gap ≡ $Y - Y_P$**, or in a growing economy:

$$\text{Output gap} = \frac{Y - Y_p}{Y_p} \times 100$$

Business Cycles and Output Gaps

- Output gaps are *indicators of macro performance*
- $Y - Y_P < 0 \rightarrow$ recessionary gap
  - High unemployment, low inflation pressure or dis-inflation
- $Y - Y_P > 0 \rightarrow$ inflationary gap
  - Low unemployment, inflationary pressure
- $Y = Y_P$: 'full employment', stable inflation

The Output Gap in Canada, 1992Q1-2016Q4



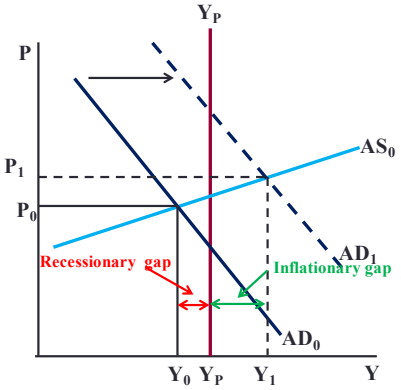
Fluctuations in the Output Gap illustrate the timing and size of business cycles in Canadian real GDP and employment.

Output Gaps in AD/AS diagrams

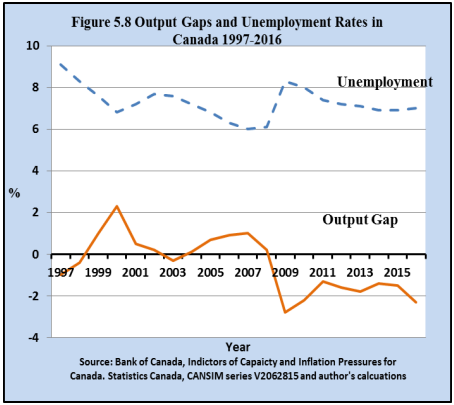
Given Y_P and AS_0

Recessionary gap:
- $AD_0 \rightarrow P_0 Y_0$,
- $Y_0 < Y_P$

Inflationary gap:
- $AD_1 > AD_0 \rightarrow P_1 Y_1$
- $Y_1 > Y_P$



Output Gaps & Unemployment Rates



Equil GDP *grows more slowly* than Potential GDP
→ Employment grows more slowly than labour force
→ Unemployment rate rises

Equil GDP *grows faster* than potential GDP
→ Employment grows faster than labour force
→ Unemployment rate falls

Adjustment to Output Gaps ?

Output Gap ≡ Equilibrium $Y \neq Y_P$

- **Unemployment rate ≠ natural unemployment rate**
- **Producers capacity utilization ≠ normal rate**

Adjustment depends on:

- **flexibility of wage rates and prices**
- **stability of AD when wage rates and prices change**

Adjustment to Output Gaps ?

Assume flexible wage rates and prices

Labour market disequilibrium:

- Δ money wage rate $\rightarrow \Delta$ unit labour costs $\rightarrow \Delta P$

Goods and services market disequilibrium:

- Producer's excess/shortage of capacity $\rightarrow \Delta P$

ΔP shifts AS curve toward AD and $Y = Y_P$

Adjustment to Output Gaps?

If deflation in w and P shift AD to AD_1 by increasing debt burden output gap increases

Initial equil AD/AS_0 involves recessionary gap $Y_0 < Y_P$

High unemployment

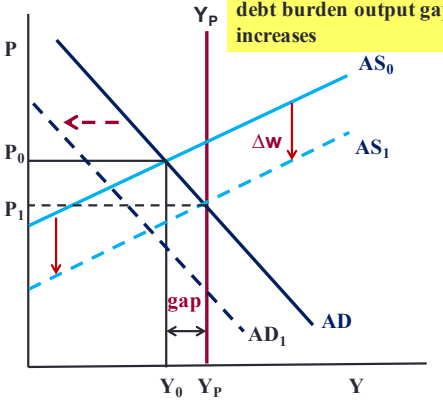
→↓ money wage, w

→↓ unit labour costs

→↓ shift in AS → AS_1

→ If AD undisturbed

Equil at $Y = Y_P$ & $P = P_1$



The Role for Macroeconomic Policy

Two roles for macroeconomic policy:

1. Moderate short term **transitory fluctuations** to *stabilize* output and employment

2. Change AD and AS to *offset* **persistent output gaps**

These objectives are pursued through a combination of *policy design* and *policy changes*

The Role for Macroeconomic Policy

Monetary policy

- → sets short term interest rate to achieve medium term *inflation control target*
- → responds strongly to offset *persistent* output gaps in setting its interest rate

Fiscal policy

- → sets annual budget plan to *control deficits and debt ratios*
- → tax and transfer programs provide built-in short term *AD stabilization*
- → change structural budget balances to offset *persistent* recessionary gaps

Chapter Summary

- Introduce an ***Aggregate Demand & Supply model*** as the ***framework*** for theory, models and policy in later chapters
- An ***Aggregate Demand & Supply model*** explains determination of equilibrium real GDP (Y), employment and the price level (P)
- ***Equilibrium real GDP fluctuates*** as AD & AS conditions change.
- ***Potential output (Y_P)*** is the economy's real GDP at full employment. Unemployment rate = natural rate

Chapter Summary

- ***Business Cycles*** are short-run fluctuations of equilibrium real GDP around Potential GDP

- Business cycles create ***Output Gaps***: $\mathbf{Y_e \neq Y_P}$
  - **Inflationary Gaps: $\mathbf{Y > Y_P}$**
  - **Recessionary Gaps: $\mathbf{Y < Y_P}$**

- ***Internal*** adjustment to output gaps depends on ***factor price flexibility***

- ***Fiscal and Monetary policy*** stabilize and manage equilibrium Y by changing AD to reduce output gaps

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