

Intermediate Macroeconomics – Econ 2201

Macroeconomic policy

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A framework for macroeconomic policy

- **Objectives:** social goals (social welfare function?)
- **Targets:** specific goals to measure performance
- **Instruments:** tools that ultimately influence targeted variables
- **Indicators:** proximate determinants of targeted variables
- **Transmission mechanisms:** causal links from instruments to indicators to targets

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Macro policy: a relatively new concept

- **Income tax:** Britain in 1799 (reformed in 1842 at 3%); U.S. in 1862; Canada in 1917 to finance WWI
- **Social security:** Old-age insurance in Germany in 1889; Canada in 1952 federal Old Age Security Act
- **Unemployment insurance:** Austria/Belgium in 1920; Canada in 1940 federal Unemployment Insurance Act.
- **Central banking:** Bank of England in 1694; U.S. Federal Reserve in 1913; Bank of Canada in 1935

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Macro policy: a broad concept

- **Multiple reasons:** missing markets (insurance), externalities (environment and financial market regulation), redistribution, coordination
- **Multiple objectives:** social insurance, stabilization
- **Wide scope:** credit and money, labour market and employment, old-age security, . . .
- **Many instruments:** taxes, transfers, money supply

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Macro policy: an evolving concept

- **19th century context:** expanding frontier and labour scarcity; relatively young population; predominance of financial interests in policy making
- **2000s:** periodic high unemployment; an aging population; demand for regulation and supervision (of financial and energy sectors)

In general: emergence of new risks and changes in political preferences

Central Banking

The Bank of Canada, Canada's central bank, is

- a crown corporation of the Government of Canada,
- not a commercial bank providing retail banking services

Four major functions

Mandate: "to promote the economic and financial well-being of Canada."

1. Financial system management
 - The bankers' bank
2. Funds management
 - The government's bank
3. Currency
4. **Monetary policy**

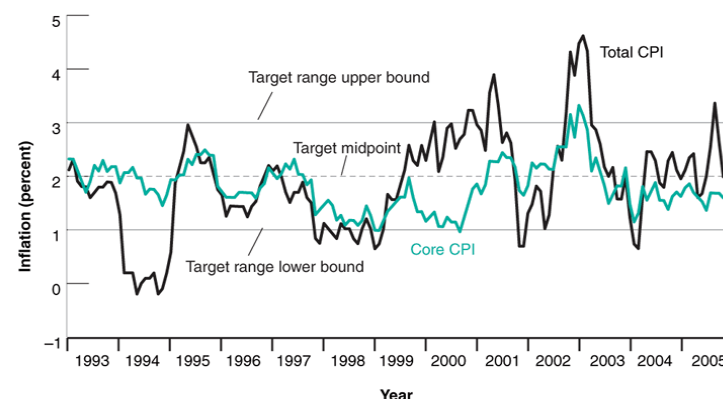
A framework for monetary policy

- **Objectives:** low and stable inflation; high level of output; low unemployment; stable exchange rate
- **Targets:** employment; inflation rate; exchange rate
- **Instruments:** monetary base; short-term interest rates
- **Indicators:** stock prices; long-term interest rates
- **Monetary transmission mechanisms:** exchange rate; expectations; multipliers

Bank of Canada: Canadian monetary policy

- Since 1990 single target: **inflation rate** (next slide); **float**
- Instruments: overnight interest rate i_1^p (conventional), quantitative easing (2008-2009), credit easing (unconventional)
- Indicators: expected changes in the price level and output (forward looking)
- Transmission mechanisms: exchange rate, goods market, financial markets, and labour market

Actual inflation and target inflation range, Canada 1993-2005



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Transmission mechanisms: propagation

Important: Investment decisions by firms, and consumption decisions by households depend on the long-term interest rate, NOT on the overnight interest rate

Propagation mechanisms

The responses of output, employment, and prices to changes in monetary policy are through goods, labor, and financial markets

(Recall the material we have studied so far!)

Transmission mechanisms: financial markets I

A change in the **current** overnight interest rate i_{1t}^p

- affects the long-term interest rates, i_{2t} through the **term structure of interest rates**

$$i_{2t} = \frac{1}{2}(i_{1t}^p + i_{1,t+1}^e)$$

- affects the exchange rate, E through the **interest parity relation**

$$i_{2t} = i_{2t}^* + \frac{\bar{E}^e - E_t}{E_t}$$

Transmission mechanisms: financial markets II

A change in the **future** overnight interest rate $i_{1,t+1}^{pe}$

- affects the long-term interest rates, i_{2t}
through the **term structure of interest rates**

$$i_{2t} = \frac{1}{2}(i_{1t} + i_{1,t+1}^{pe})$$

- affects the exchange rate, E
through the **interest parity relation**

$$i_{2t} = i_{2t}^* + \frac{\bar{E}^e - E_t}{E_t}$$

Transmission mechanisms: financial markets III

Quantitative easing (open market operation)

- directly affects the long-term interest rates, i_{2t}^p
- affects the exchange rate, E
through the **interest parity relation**

$$i_{2t}^p = i_{2t}^* + \frac{\bar{E}^e - E_t}{E_t}$$

Notation

- expected inflation rate, π_{t+1}^e

$$\pi_{t+1}^e = \frac{P_{t+1} - P_t}{P_t}$$

- growth rate of output, g_{yt}

$$g_{yt} = \frac{Y_t - Y_{t-1}}{Y_{t-1}}$$

Monetary policy reaction function

$$i_t^p = \omega(g_{y,t+1}^e - g) + (1 - \omega)(\pi_{t+1}^e - \bar{\pi})$$

- $0 < \omega < 1$ weight on targets
- g_y^e expected growth rate of output
- g growth rate of potential output
- π^e expected inflation rate
- $\bar{\pi}$ target inflation rate

Operational aspects of monetary policy

Forward looking (1–2 years) monetary policy

1. Term structure and interest parity condition
link changes in i^p to market interest rates and E
2. Goods and financial markets eqn. (AD relation)
links changes in i^* to g_y^e
3. Okun's law
links g_y^e to unemployment rate u^e
4. Labour market equilibrium (AS relation)
links u^e to π^e

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An expected increase in income

Operational issues

- Implications for expected output growth, unemployment and inflation
- By how much?
- What should the Central Bank do?

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Growth rate of potential output

Potential output Y_n depends on

- labour force
- capital stock
- productivity (technology)

Potential output may change without a change in u_n

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Okun's law

An empirical relation that relates the change over time in the unemployment rate to the difference between the actual, g_{yt} , and growth rate of potential output, g

$$u_t - u_{t-1} = -\beta(g_{yt} - g), \quad \beta > 0$$

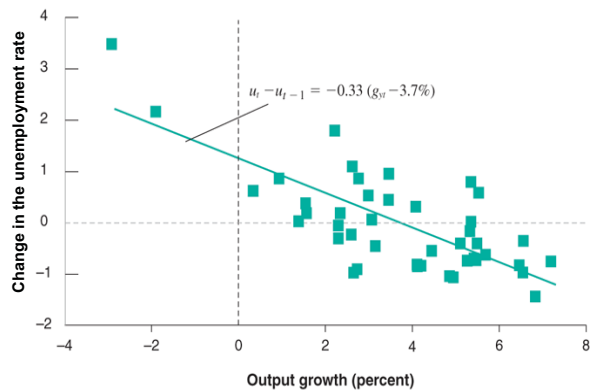
(Uninformative about the structural rate of unemployment.)

See next slide.

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Okun's Law, Canada 1962 - 2005



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From price level to inflation

1. Labour market equilibrium in the short run

$$P_t = P_t^e(1 + \mu)(1 - \alpha u_t + z)$$

2. Inflation (divide both sides by P_{t-1} and rearrange)

$$(1 + \pi_t) = (1 + \pi_t^e)(1 + \mu)(1 - \alpha u_t + z)$$

3. For small values of π_t and π_t^e use an approximation

$$\pi_t - \pi_t^e = (\mu + z) - \alpha u_t$$

Inflation and unemployment

1. Medium-run equilibrium: $\pi_t^e = \pi_t$

$$u_n = \frac{(\mu + z)}{\alpha} \quad (\text{neutrality of money})$$

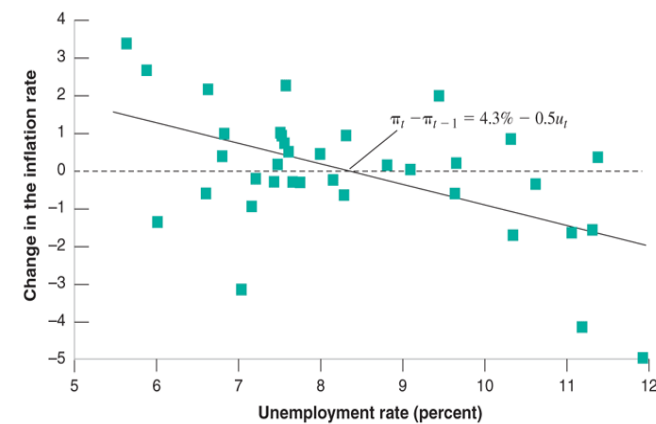
2. Medium-run adjustment: $\pi_t^e = \pi_{t-1}$

$$\pi_t - \pi_{t-1} = -\alpha(u_t - u_n)$$

(inflation-unemployment tradeoff)

Expectations augmented Phillips curve: An unanticipated increase in the inflation rate is associated with a reduction in the unemployment rate (see next slide)

Expectations augmented Phillips curve, Canada 1970-2005



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Data

- growth rate of potential output

$$g \approx 3.5\%$$

- inflation rate (target)

$$\pi = \bar{\pi} = 2\%$$

- structural rate of unemployment (Phillips curve)

$$u_n = [2.5 - 6.5] \% (?)$$

Fiscal policy

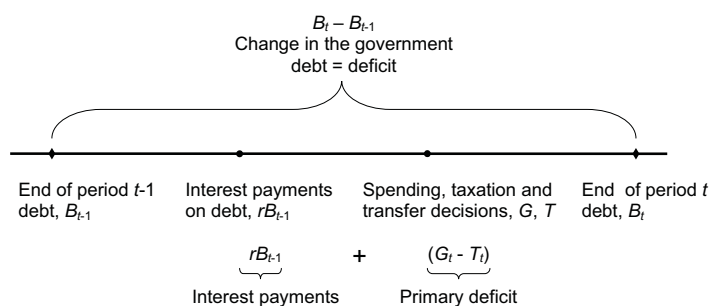
The government budget constraint

B_{t-1} : government debt at the end of period $t - 1$

r : real interest rate, $r = i - \pi$

rB_{t-1} : interest payments on government debt in period t

The Accounting of Deficits and Debt



Debt-to-GDP ratio

- Debt at the end of period t

$$B_t = (1 + r)B_{t-1} + (G_t - T_t)$$

- Divide both sides by Y_t

$$\frac{B_t}{Y_t} = (1 + r) \left(\frac{Y_{t-1}}{Y_t} \right) \frac{B_{t-1}}{Y_{t-1}} + \frac{G_t - T_t}{Y_t}$$

- Rearrange for small values of r and g_y

(note that $1 + g_{yt} = Y_t/Y_{t-1}$)

$$\frac{B_t}{Y_t} = (r - g_{yt}) \frac{B_{t-1}}{Y_{t-1}} + \frac{G_t - T_t}{Y_t}$$

Fiscal policy debate

1. The desired relation between g and $G - T$

$$\frac{B_t}{Y_t} = (r - g) \frac{B_{t-1}}{Y_{t-1}} + \frac{G_t - T_t}{Y_t}$$

2. Intergenerational issues: beneficiaries and financiers of current spending
3. Redistribution
4. Risk-sharing

Fiscal policy: no debate

Contain the debt-to-GDP ratio

At high debt, r is no longer “small”

$$\frac{B_t}{Y_t} = \underbrace{(r - g)}_{\uparrow} \frac{B_{t-1}}{Y_{t-1}} + \frac{G_t - T_t}{Y_t}$$

Robustness

Do we need 350 equations to understand the **qualitative** responses of output, price level, etc. to changes in (monetary) policy?

Answer: “no.”

Do we need so many equations to know the **quantitative** response of output, price level, etc. to changes in (monetary) policy?

Answer: Still an open question.