

5 Inflation, Activity and Money Growth

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Output, unemployment and inflation

- Our objective in this chapter is to build a model to understand disinflation policies. Those policies are under the responsibility of the central bank.
- We will be using 3 relations:
 - **Okun's law:** relates changes in unemployment to deviations of output growth from normal output growth.
 - **Phillip's curve:** relates changes in inflation to deviations of unemployment from NAIRU.
 - **Aggregate demand relation:** If we assume a constant fiscal policy, the *AD* relation relates output growth to the rate of growth of real money.

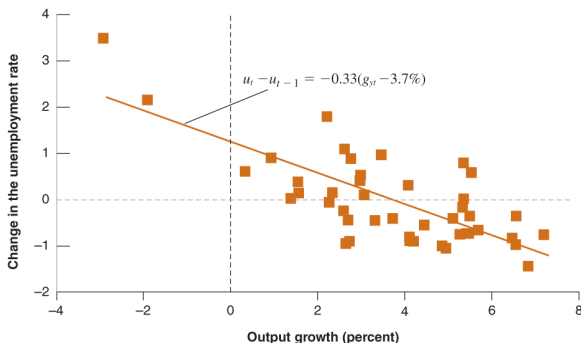
Okun's law

- Let \bar{g}_y represent potential output growth. This potential growth is due to increases in the labor force and in productivity.
- If g_{yt} is the actual output growth for period t , then we have:

$$u_t - u_{t-1} = -\beta (g_{yt} - \bar{g}_y)$$

- If $g_{yt} < \bar{g}_t \rightarrow \uparrow u_t$.
- If $g_{yt} > \bar{g}_t \rightarrow \downarrow u_t$.
- We have β instead of 1 because:
 - some workers are needed no matter what the level of output is (v.g. administrative staff).
 - the presence of training costs induces firms to hoard labor.

Okun's law


FIGURE 12-1

Changes in the Unemployment Rate versus Output Growth in Canada, 1962–2006

High output growth is associated with a reduction in the unemployment rate; low output growth is associated with an increase in the unemployment rate.

Source: Real GDP using CANSIM II variable V3862685; unemployment rate 1976–2005 using CANSIM II variable V2062815 after 1976, 1961–1975 series D233, *Historical Statistics of Canada*.

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Okun's law

TABLE

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Okun's Law Coefficients across Countries and Time

Country	1960 to 1980	1981 to 2006
United States	0.39	0.42
Germany	0.20	0.29
United Kingdom	0.15	0.51
Japan	0.02	0.11

Source: Calculations by Oliver Blanchard.

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Output, unemployment and inflation

- **The Phillips curve:** $\pi_t - \pi_{t-1} = -\alpha (u_t - u_n)$
- **The aggregate demand relation:** Assume that we have the following aggregate demand relation:

$$Y_t = \gamma \frac{M_t}{P_t}.$$

This leads to:

$$g_{yt} = g_{mt} - \pi_t,$$

where g_{mt} represents the growth in nominal money supply.

The medium run

- In the medium run, $u_t = u_n$. This implies that $u_t - u_{t-1} = 0$.
- From Okun's law, we can deduce that we must have $g_{yt} = \bar{g}_y$ in the medium run.
- From the aggregate demand relation we then deduce $\pi = \bar{g}_m - \bar{g}_t$, where $\bar{g}_m - \bar{g}_t$ is the *adjusted nominal money growth*.
- In the medium run, inflation equals adjusted nominal money growth.

Disinflation I: Traditional framework

- Suppose an economy at the medium run equilibrium so that we have $\pi = \bar{g}_m - \bar{g}_t$.
- Assume that we want to reduce inflation.
- $\downarrow g_{mt} \xrightarrow{AD} \downarrow g_{yt} \xrightarrow{\text{Okun}} \uparrow u_t \xrightarrow{\text{Phillips}} \downarrow \pi_t$
- **Sacrifice ratio:** number of point/years of excess unemployment needed to reduce the inflation by 1%.
- From the Phillips curve, we know that $\pi_t - \pi_{t-1} = -\alpha (u_t - u_n)$.
- The sacrifice ratio = $\frac{1}{\alpha}$.

An example

- Suppose an economy at the medium run equilibrium with $\pi = 14\%$, $\bar{g}_y = 3\%$, $u_n = 6\%$, $\alpha = 1$ and $\beta = 0.4$. The central bank wishes to reduce inflation to 4% in 5 years (2% per year).

Table: Dynamics of inflation, unemployment, output and money supply

	0	1	2	3	4	5	6	7	8
π_t	14%	12%	10%	8%	6%	4%	4%	4%	4%
u_t	6%	8%	8%	8%	8%	8%	6%	6%	6%
g_{yt}	3%	-2%	3%	3%	3%	3%	8%	3%	3%
g_{mt}	17%	10%	13%	11%	9%	7%	12%	7%	7%

- $\pi_t - \pi_{t-1} = -2\% = -(u_t - u_n) \rightarrow u_t = 8\%$
- $u_t - u_{t-1} = 2\% = -0.4(g_{yt} - 3\%) \rightarrow g_{yt} = -2\%$
- $u_t - u_{t-1} = -2\% = -0.4(g_{yt} - 3\%) \rightarrow g_{yt} = 8\%$
- $g_{mt} = g_{yt} + \pi_t$

Disinflation II: Expectations, credibility and nominal contracts

- 2 groups:
 - Lucas and Sargent: clear and quick disinflation policies.
 - Fischer and Taylor: if the disinflation policy is too quick it creates more unemployment.
- Rational expectations and Lucas critique and $\pi_t - \pi_t^e = -\alpha(u_t - u_n) \rightarrow$ if $\pi_t^e \downarrow$ then we can $\downarrow \pi$ with $u_t = u_n$.
- Sargent argues that credibility of the central bank is an essential ingredient to lower π_t^e . Because a clear and quick disinflation policy is more credible, it is more desirable.
- Fischer and Taylor acknowledge the validity of the rational expectations argument but argue that a disinflation policy that is too quick will create more unemployment in presence of nominal wage rigidities.