TA SECTION 16th/17th OCTOBER 1997
THE LABOR MARKET, AGGREGATE SUPPLY AND AGGREGATE DEMAND

1. OBJECTIVES

In this section, we are going to go through chapters 15 and 16 of the book. The labor market is introduced and we develop a model of aggregate supply and aggregate demand that describes output and price movements from the short run to the long run.

Our previous IS/LM model was devoted to explain short-run effects in our economy. Now, the price level is not fixed anymore and adjustments on it will actually be at the origin of the dynamic movement from the short run to the long run.

2. THE LABOR MARKET

The labor market is at the center of the production adjustment process. That’s the market in which wages are determined.

2.1 Overview of the Labor Market

Some concepts:


The Facts:

Large flows of workers between employment, unemployment and nonparticipation.

Aver. Monthly flow in the US, 68-86

\[
\begin{align*}
N & \rightarrow 1.3M \rightarrow 93.8M \rightarrow 1.5M \\
\rightarrow 1.6M & \rightarrow 0.8M \rightarrow 1.6M \\
6.5M & \rightarrow 1.0M \rightarrow \text{Out of LF} \rightarrow 57.3M
\end{align*}
\]
MOVEMENTS IN UNEMPLOYMENT:

What we observe:

- Evidence of a small upward trend;
- The trend increase is dominated by large fluctuations in the unemployment rate (closely associated with recessions and expansions).

2.2 Wage determination

We are going to assume the following:

\[ W = P^e F(u, z) \]

- \( P^e \): Expected Price Level;
- \( u \): Unemployment rate;
- \( z \): Catchall variable that stands for all other variables that affect the outcome of wage setting.

- \( P^e \): Workers and firms care about real wages, not nominal wages. When \( W \) is set the price level is still to be known.
- \( u \): Higher unemployment weakens workers’ bargaining power, forcing them to accept lower wages.
- By convention, \( z \) is defined in such a way that an increase in \( z \) leads to an increase in \( W \).

2.3 Price Determination

We look at the determination of prices given wages.

Assumption: Firms produce goods using labor as the only factor of production and according to the following production function:

\[ Y = A \cdot N \]

- \( A \): Labor Productivity, \( N \): Employment
Assume $A=1$, so that $Y=N$.

$\Rightarrow$ The cost of producing an additional unit of output is the cost of employing one more worker, and is thus equal to the wage.

Since many markets are not perfectly competitive,

$$P = (1+\mu) W$$

$\mu$ - markup of price over cost.

2.4 The Natural rate of Unemployment

Here we assume that $P^e=P$, expectations are fullfilled.

The Wage-Setting Relation

$$\frac{W}{P} = F(u,z)$$

The Price-Setting Relation

$$\frac{W}{P} = \frac{1}{1+\mu}$$

2.5 Equilibrium Real Wages, Employment, and Unemployment

In equilibrium:

$$F(u,z) = \frac{1}{1+\mu}$$

$u_n$ - Unemployment rate such that Price and Wage decisions are consistent.

What makes these curves shift:
From Unemployment to Output

\[ u = \frac{U}{L} = \frac{L - N}{L} = 1 - \frac{N}{L} \rightarrow N = L(1-u) \]

Output is then \[ Y = N = L(1-u) \]

Generally, the natural level of Output is defined implicitly by:

\[ F(1-\frac{Y}{L}, z) = \frac{1}{1+\mu} \]

We’ve derived the natural rate of unemployment, and the associated levels of employment and output, under two assumptions:

- Equilibrium in the labor market;
- \( P^e = P \).

There is no reason for the second assumption to be true in the Short-Run. In the SR, there is no reason for unemployment to be equal to the natural rate, or for output to be equal to its natural level.

The factors that determine movements in output in the SR are the ones we’ve seen in the previous chapters: monetary policy, fiscal policy, and so on.

In the LR, variables return to their natural values and factors that determine unemployment and output are indeed the factors that appear in our equations.

3. AGGREGATE DEMAND AND AGGREGATE SUPPLY

NOW WE TAKE INTO ACCOUNT EQUILIBRIUM IN ALL MARKETS (GOODS, FINANCIAL, LABOR).

EQUILIBRIUM IS REDUCED TO 2 EQUATIONS:

- AGGREGATE SUPPLY: captures eq. in the labor market.
- AGGREGATE DEMAND: characterizes both eq. in the goods and financial markets.

These 2 Equations will permit us to determine the general eq. level of output and prices.

3.1 AGGREGATE SUPPLY

Captures the effects of output on the price Level. It is derived from the eq. in the labor market.

\[ W = P^e F(u, z) \]
\( P = (1 + \mu)W \)

Combining both,

\[
P = P^e (1 + \mu) F \left( 1 - \frac{Y}{L}, z \right), \quad \text{where} \quad u = 1 - \frac{Y}{L}
\]

This is the Aggregate Supply Relation.

Two main characteristics:
1. A higher expected price level leads to a higher actual price level;
2. An increase in \( Y \) leads to an increase in \( P \).

\[ P \quad \text{AS} \]
\[ Y \]

3.2 AGGREGATE DEMAND

Any Variable other than the Price Level that shifts either the IS curve or the LM curve also shifts the Aggregate Demand relation.

\[ i \]
\[ Y \]

We summarize the Ag. Demand relation by:

\[
Y = Y \left( \frac{M}{P}, G, T \right) \\
(+, +, -)
\]
3.3 Movements in Output and Prices

Output tends to return over time to its natural level.

Because the expected price level has such a strong effect on the actual price level in the aggregate supply relation, the dynamics of output and prices depend very much on how wage setters form their expectations.

**Assumption:** \( P_t^e = P_{t-1} \)

**AS:** \( P_t = P_{t-1}(1+\mu)F(1-\frac{Y}{L}, z) \)

**AD:** \( Y_t = Y \left( \frac{M}{P_t}, G, T \right) \)

Position of AS depends on last year’s price level.

**Adjustment Mechanism:**

![Diagram](image)

The mechanism: As long as the economy is operating above its natural level, prices are increasing.

In the SR, output can be above or below its natural level. In the LR, however, output eventually returns to its natural level. The adjustment process works through prices.

**The effects of a Monetary Expansion (Neutrality of Money):**

![Diagram](image)