Introduction to Macroeconomics

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Outline

These slides follow the original slides of Quijano/Quijano that accompany the Blanchard textbook.

The labor market and the IS-LM model: the idea

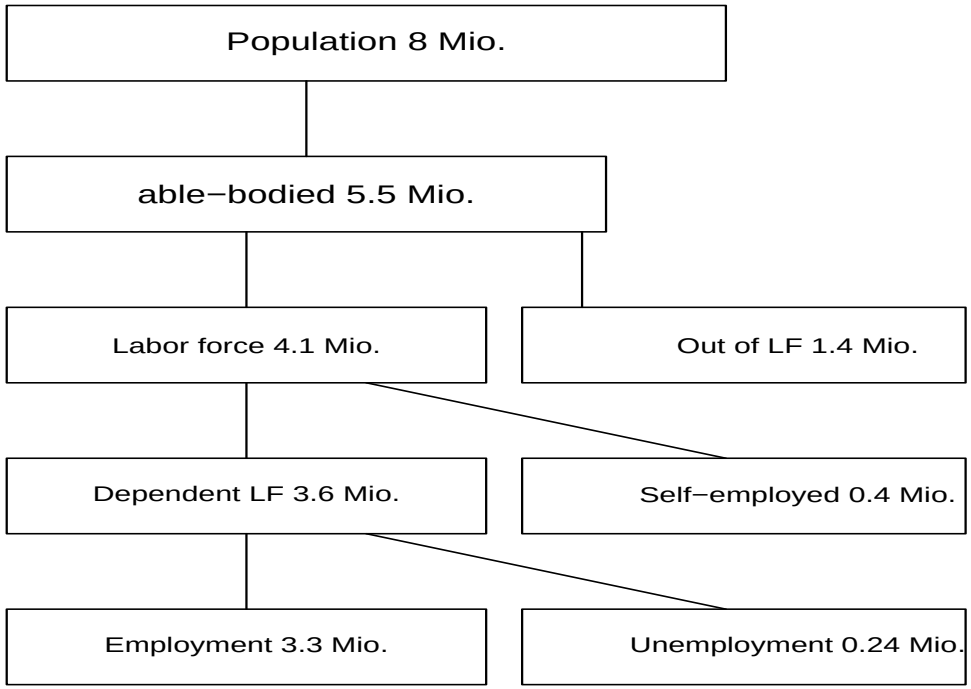
- The goods and financial markets establish a relation between real output Y and the price level P. Higher prices entail a contraction of real money and a fall in output. This is reflected in a declining curve of aggregate demand (AD) in a (Y, P) diagram;
- In the labor market, higher output causes an upward pressure on the price level through wages W. This is reflected in an upward slope of an aggregate supply (AS) curve in a (Y, P) diagram.

Supply and demand in the three markets

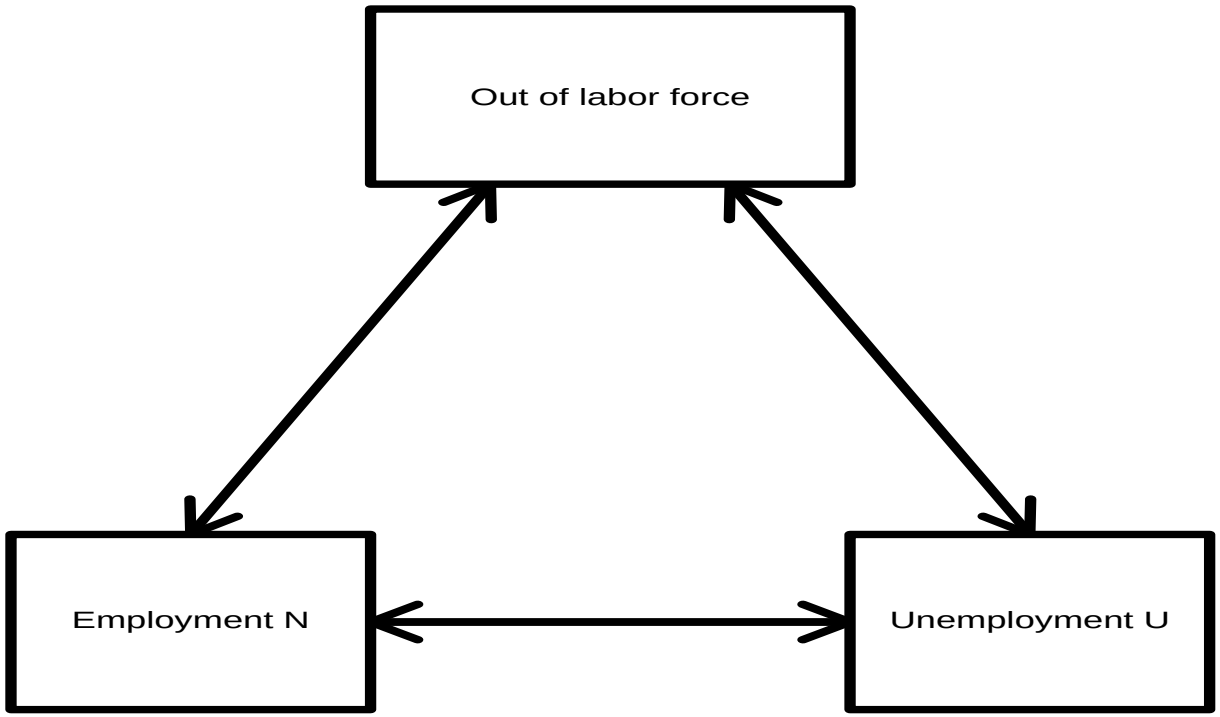
- In the *goods market*, *supply* is provided mainly by the production of *firms*, *demand* comes from *households*, firms, and the government;
- In the *financial market*, the *supply* of money is provided by the *central bank* and other banks, *demand* comes from *households* and other economic agents;
- In the *labor market*, *households supply* their labor force, whereas *firms* and the government have a *demand* for labor.

Whereas the goods market and financial market are typically in equilibrium, the labor market does not clear in the short run: there is unemployment.

Main variables of the Austrian labor market



Continuous flows of workers



Every person in the able-bodied population is either employed, unemployed, or not in the labor force. There are sizeable flows among the three pools.

The flows across segments

- Persons not in the labor force enter the labor market, for example returning from maternity leave or having finished their education: some get employed, some are searching for some time and are then unemployed;
- Workers leave employment and become unemployed, due to layoffs (by the employer) or quits (for example to search for a better job);
- Unemployed workers have searched successfully and become employed;
- Unemployed workers abandon their search and quit the labor market (discouraged workers);
- Employed workers quit in order to retire early or to study: they leave the labor force.

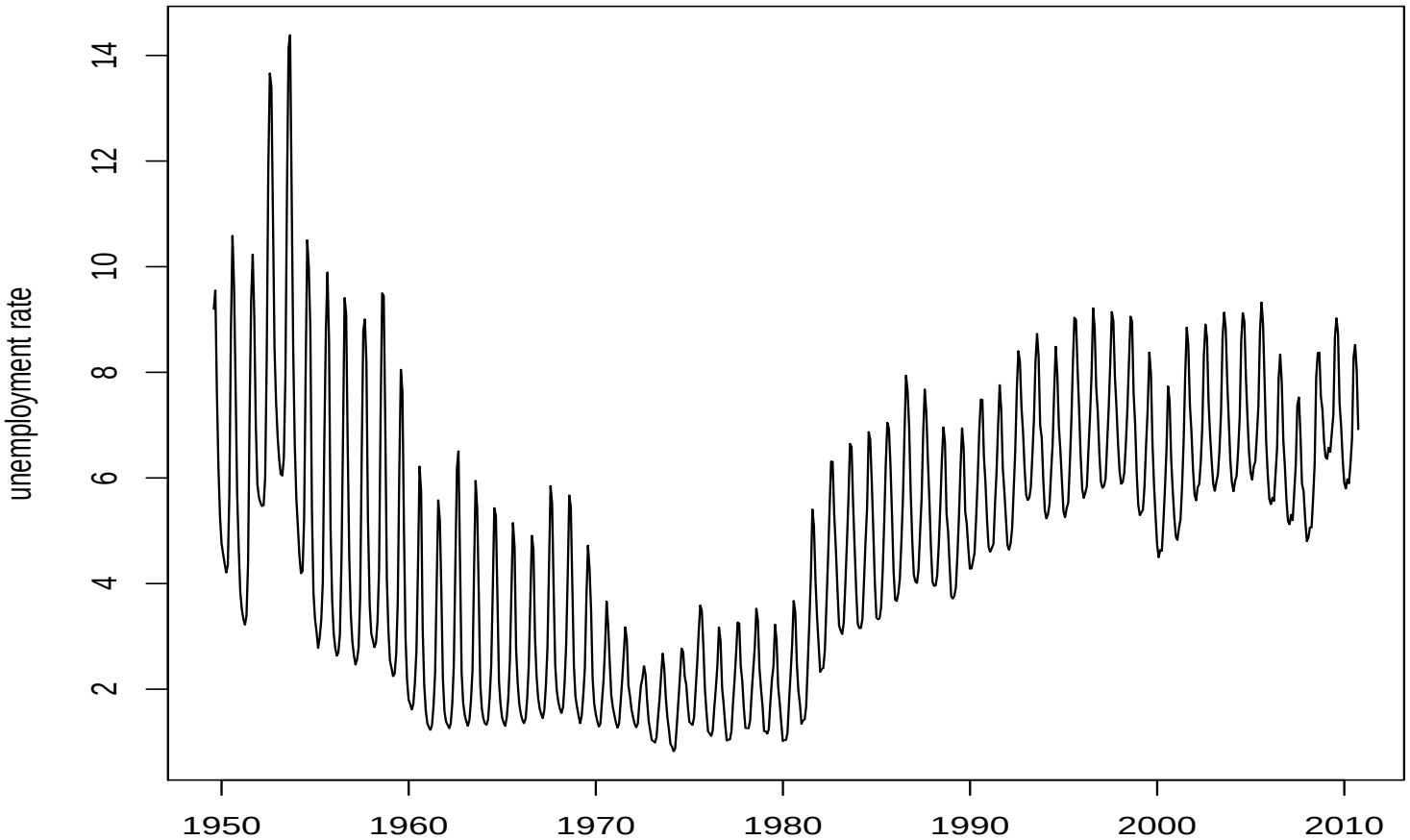
The unemployment rate: concept

- Traditonally, the **unemployment rate** u is defined as

$$u = \frac{U}{L} = \frac{U}{U + N}.$$

- This rate may be high because of many persons searching and finding new jobs, and because of a stagnant pool of long-term unemployed. The average duration of unemployment may be a better indicator of the unemployment problem.
- A non-employment rate, which sums up the unemployed and the persons out of the labor force, may also be a good indicator that represents the discouraged workers.
- According to OECD standards, u is not calculated as above, but by census and questionnaires. In Austria, the OECD rate is lower than the **registered unemployment rate** u, in other countries it is much higher (Spain).

The Austrian unemployment rate: monthly data



The effects of the unemployent rate on workers

Fluctuations in the aggregate unemployment rate affect individual workers via two effects:

- The effect of movements in the aggregate unemployment rate on the welfare of individual workers;
- The effect of the aggregate unemployment rate on wages.

There are implications for both employed and unemployed workers:

- If the adjustment takes place through fewer hires, the chance that an unemployed worker will find a job diminishes;
- If the adjustment takes place instead through higher layoffs, then employed workers are at a greater risk of losing their jobs.

Determinants of the wage level

The labor market is not assumed to be a perfect market. Wages are determined by a **bargaining** process. Firms and workers have different degrees of **bargaining power**. There may be **collective bargaining** or individual bargaining.

Wages must exceed a legally determined **minimum wage**.

Wages are typically set above the individual **reservation wage**, at which a worker is undecided between offering her work or not (costs of work).

Wages depend on labor market conditions. The lower the unemployment rate, the higher the wages.

Bargaining power of workers

The bargaining power of a worker depends on two key aspects:

- How costly it would be for the firm to replace him—the nature of the job;
- How hard it would be for him to find another job—labor market conditions.

Efficiency wages

Economists call theories that link the *productivity* or the *efficiency* of workers to the wage they are paid **efficiency wage theories**. These theories also suggest that wages depend on both the nature of the job and on labor-market conditions:

- Firms that see employee morale and commitment as essential to the quality of their work, will pay more than firms in sectors where workers' activities are more routine;
- Labor market conditions will affect the wage.

Historical example: car manufacturer Ford increased employees' wages: sick leaves and 'shirking' decreased, workers' productivity increased.

An equation determining the wage level

$$W = P^e F(u, z)$$
$$(-, +)$$

The aggregate nominal wage W depends on three factors:

- The expected price level P^e;
- The unemployment rate u;
- A catchall variable z that summarizes various other variables that may increase workers' bargaining power and affect the outcome of wage setting.

The expected price level

Both workers and firms care about real wages (W/P), not nominal wages (W).

Workers do not care about how many currency units they receive but about how many goods they can buy with those currency units. They care about W/P.

Firms do not care about the nominal wages they pay but about the nominal wages W they pay relative to the price P of the goods they sell. They also care about W/P.

Unemployment affects bargaining power

Also affecting the aggregate wage is the unemployment rate u.

If we think of wages as being determined by bargaining, then higher unemployment weakens workers' bargaining power, forcing them to accept lower wages. Higher unemployment allows firms to pay lower wages and still keep workers willing to work.

Other factors z affecting bargaining power

The third variable z is a catchall variable that stands for all the factors that affect wages, given the expected price level and the unemployment rate.

- **Unemployment insurance** is the payment of unemployment benefits to workers who lose their jobs. Its existence and the conditions for eligibility affect workers' bargaining power;
- **Unionization**, i.e. the share of trade union membership among workers, may increase bargaining power;
- A generally better education or skill level among employees may also increase their bargaining power.

A simple production function

A **production function** is a relation between the inputs used in production (factors of production) and the quantity of output produced.

Assuming that firms produce goods using only labor (one factor only), the production function can be written as:

$$Y = AN,$$

where Y is output, N is employment (labor), and A is a proportionality coefficient that can be interpreted as **labor productivity** Y/N, i.e. output per worker.

Blanchard simplifies this function by assuming $A = 1$. This means that every worker produces one good per time unit (year).

Price setting

Under competition, it is known that every factor is paid its marginal product. For the simple function $Y = AN$, this would imply

$$\frac{W}{P} = A,$$

with W being compensation per year. Thus, the price for the product should be $P = W/A$ (or $P = W$ for $A = 1$), as prices should equal costs. There is no profit under competition.

Markets are not assumed to be perfectly competitive here. There is bargaining power for workers, and there is market power for entrepreneurs. Thus, it is assumed (with $A = 1$) that

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

with μ being a **mark-up** of the price over the cost of production. Under competition, $\mu = 0$.

Wage setting, price setting, equilibrium

We now have the wage-setting equation

$$W = P^e F(u, z)$$

and the price-setting equation

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

Generally, $P \neq P^e$. The special case where price expectations are fulfilled defines an interesting type of equilibrium. Thus, we investigate the consequences of the assumption $P = P^e$ now.

The wage-setting relation

Assuming $P = P^e$ yields the equation

$$W = P \cdot F(u, z)$$

or

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

Real wages depend negatively on unemployment u and positively on some catchall z. In the following, this equation will be called the **wage-setting relation**.

The price-setting relation

The price-determination equation is (with $A = 1$):

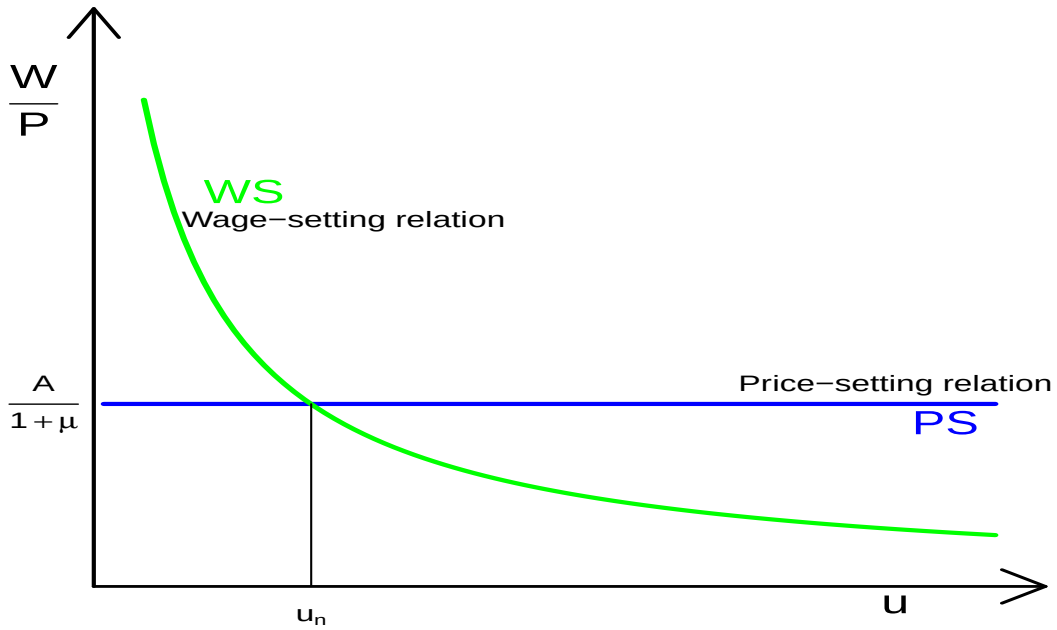
$$P = (1 + \mu)W$$

or

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

This equation expresses real wages by a constant that depends on the mark-up. It will be called the **price-setting relation**.

The natural unemployment rate: graph



The natural rate of unemployment u_n is the unemployment rate such that the real wage chosen in wage setting equals the real wage implied by price setting.

The natural unemployment rate: formula

Elimination of W/P from the wage-setting and the price-setting relations yields an equilibrium unemployment rate, the **natural rate of unemployment** u_n:

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

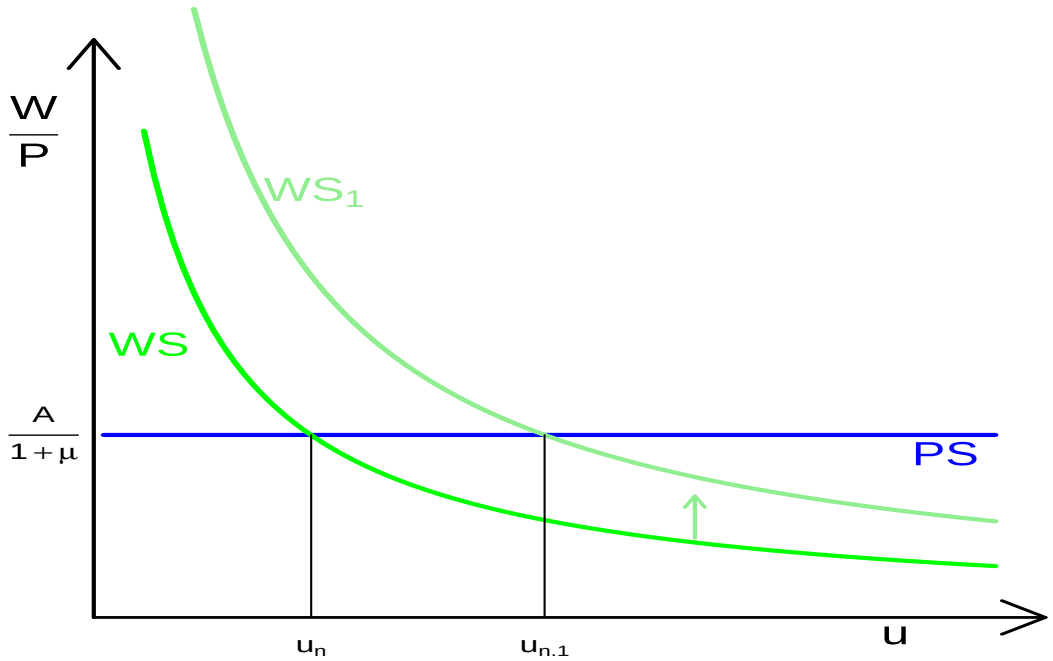
for $A = 1$ (or $\frac{A}{1+\mu}$ in general). This is an implicit expression, determining u_n requires inverting the function F.

Natural unemployment depends on z and μ

The positions of the wage-setting and price-setting curves, and thus the equilibrium unemployment rate, depend on both z and μ:

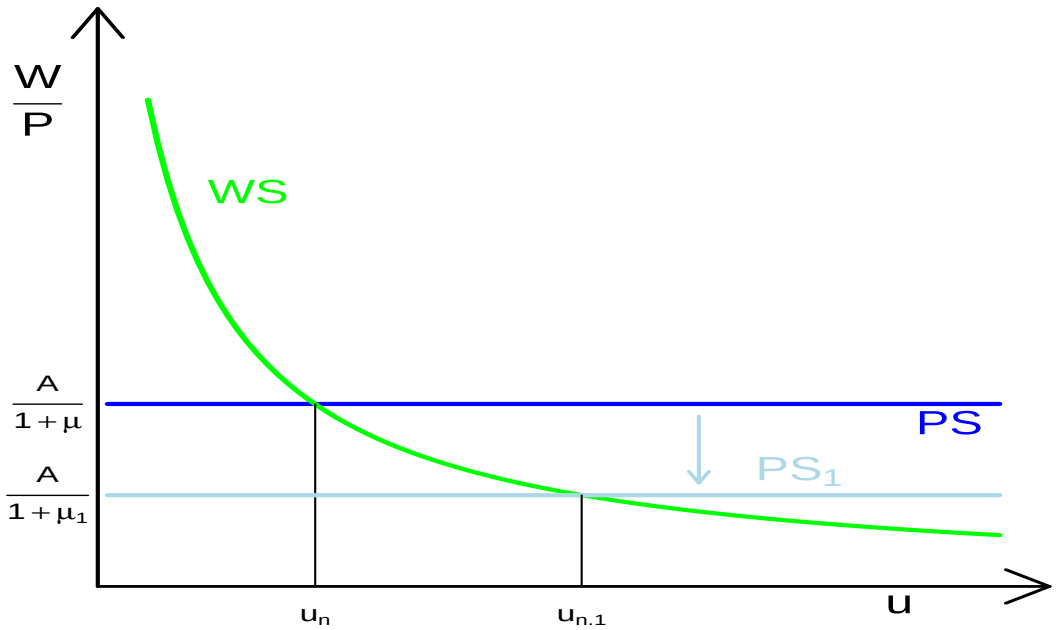
- At a given unemployment rate, (for example) higher unemployment benefits lead to a higher real wage. A higher unemployment rate is needed to bring the real wage back to what firms are willing to pay;
- By letting firms increase their prices given the wage, less stringent enforcement of antitrust legislation (which raises the mark-up μ) leads to a decrease in the real wage.

Higher z increases the natural rate: graph



An increase in unemployment benefits leads to an increase in the natural rate of unemployment.

Higher μ increases the natural rate: graph



An increase in mark-ups decreases the real wage and leads to an increase in the natural rate of unemployment.

The natural unemployment rate: comments

Because the equilibrium rate of unemployment reflects the structure of the economy, some authors prefer the name **structural rate of unemployment**.

The natural rate u_n can be changed by modifying z and μ (and possibly A and L). These variables and parameters are affected by institutional and legal changes that target the medium run;

The natural rate u_n is unaffected by fiscal and monetary policy. Note that neither M nor G, T appear in the definition $F(u_n, z) = \frac{A}{1+\mu}$.

Natural employment

Associated with any rate of unemployment is a corresponding level of employment:

$$u = \frac{U}{L} = \frac{L - N}{L} = 1 - \frac{N}{L},$$

which by rearranging yields for N:

$$N = L \cdot (1 - u).$$

Thus, the **natural level of employment** N_n follows from the natural rate of unemployment u_n via

$$N_n = L \cdot (1 - u_n).$$

Natural output

Associated with any rate of employment is a corresponding **natural level of output**, according to $Y = AN$:

$$Y_n = AN_n = AL \cdot (1 - u_n),$$

or $Y_n = L \cdot (1 - u_n)$ if $A = 1$ is assumed. The natural level of output satisfies the following:

$$F(1 - \frac{Y_n}{AL}, z) = F(u_n, z) = \frac{A}{1 + \mu},$$

or, with $A = 1$:

$$F(1 - \frac{Y_n}{L}, z) = \frac{1}{1 + \mu}.$$

In words, the natural level of output is such that, at the associated rate of unemployment, the real wage chosen in wage setting equals the real wage implied by price setting.