Think about what happens when firms respond to an increase in demand by increasing production: Higher production leads to higher employment. Higher employment leads to lower unemployment. Lower unemployment leads to higher wages. Higher wages increase production costs, leading firms to increase prices. Higher prices lead workers to ask for higher wages. Higher wages lead to further increases in prices, and so on.

An overview of the labor market

Population, Labor Force, Employment, and Unemployment

We divide the total population into three groups.

- *People under 16 years of age and who are institutionalized*, for example, mental hospital (الأمراض أصحاب العقلية).
- *Out of the Labor Force*: is composed of adults who are potential workers but are not employed and are not seeking work. For example, they are homemakers, full-time students, or retirees (المتقاعدون).
- *The labor force*: the labor force consists of people who are able and willing to work. Both those who are employed and those who are unemployed but actively seeking work.

The labor force consists of persons 16 years of age or older who are not in institutions and who are employed or unemployed but seeking for work (عن يبحث عمل).

Labor Force = Employed + Unemployed

A person who is neither holding a job nor searching for a job is not counted as part of the labor force.

The flows of workers:

Unemployment rate: معدل البطالة

Unemployment is the number of people who do not have a job but are looking for job.
البطالة هي عدد الأشخاص الذين ليس لديهم عمل ولكنهم يبحثون عن عمل.

Unemployment rate = $\frac{Unemplyed}{Labor\ Force}$ x 100

Participation rate: نسبة المشاركة في القوى العاملة

The participation rate defined as the ratio of the labor force to persons 16 years of age and older

Participation Rate = $\frac{Labor\ Force}{Out\ of\ the\ Lbor\ force + Labor\ Force}$ x 100

Example:
Suppose the Palestinian population is 3,800,000 individuals, the number of individuals 16 years and above (manpower) is 2,000,000. Given that the labor force participation rate is 80% and unemployment rate is 16%. Calculate the following:

a. The number of people in the labor force.

Participation Rate = $\frac{Labor\ Force}{Out\ of\ the\ Lbor\ force + Labor\ Force}$ x 100

80% = $\frac{Labor\ Force}{2{,}000{,}000}$

$Labor\ Force$ = 2,000,000 * 0.8 = 1,600,000

b. The number of people who are unemployed.

Unemployment rate = $\frac{Unemplyed}{Labor\ Force}$ x 100

16% = $\frac{Unemplyed}{1{,}600{,}000}$

Unemployed = 16% * 1600,000 = 256,000

c. The number of employed people.

L.F = Employed + Unemployed

1,600,000 = Employed + 256,000 → Employed = 1,344,000

d. How many individuals are outside the labor force

The number of individuals 16 years and above = L.F + out of the labor force

2,000,000 = 1,600,000 + out of the labor force

Out of the labor force = 2,000,000 - 1,600,000 = 400,000

المؤشرات الرئيسية للقوى العاملة (18 سنة فأكثر) في فلسطين حسب المنطقة والجنس، تشرين أول– كانون أول 2020

Main Indicators of Labour Force (18 Years and Above) in Palestine by Region and Sex, October– December, 2020

Indicator	Region and Sex									المؤشر
	Palestine		فلسطين	Gaza Strip		قطاع غزة	West Bank		الضفة الغربية	
	المجموع Total	اناث Females	ذكور Males	المجموع Total	اناث Females	ذكور Males	المجموع Total	اناث Females	ذكور Males	
Labour Force Participation Rate	**44.7**	17.5	71.2	**35.9**	14.0	57.4	**50.1**	19.7	79.6	نسبة القوى العاملة المشاركة
Employment Rate	**76.9**	62.6	80.3	**57.1**	39.6	61.3	**85.5**	72.6	88.6	نسبة العمالة
Unemployment Rate	**23.1**	37.4	19.7	42.9	60.4	38.7	14.5	27.4	11.4	نسبة البطالة
Percentage of Employment by Economic Activity										**نسبة العاملين حسب النشاط الاقتصادي**
Agriculture, Fishing and Forestry	**6.4**	6.4	6.4	**7.7**	3.8	8.3	**6.0**	7.0	5.8	الزراعة والصيد والحراجة وصيد الأسماك
Mining, Quarrying and Manufacturing	**13.4**	6.6	14.6	**7.8**	4.7	8.3	**15.0**	7.0	16.5	التعدين والمحاجر والصناعة التحويلية
Construction	**18.2**	0.8	21.4	**4.1**	-	4.7	**22.3**	1.0	26.5	البناء والتشييد
Commerce, Restaurants and Hotels	**19.8**	9.2	21.8	**17.0**	2.8	19.2	**20.6**	10.7	22.6	التجارة والمطاعم والفنادق
Transportation, Storage and Communication	**6.0**	2.4	6.7	**8.2**	1.9	9.2	**5.4**	2.5	6.0	النقل والتخزين والاتصالات
Services and Other Branches	**36.2**	74.6	29.1	**55.2**	86.8	50.3	**30.7**	71.8	22.6	الخدمات والفروع الاخرى
Percentage of Employment by Selected Occupations										**نسبة العاملين في بعض المهن المختارة**
Craft and Related Trade Workers	**19.7**	3.3	22.8	**9.9**	7.1	10.3	**22.6**	2.4	26.6	الحرف وما إليها من المهن
Elementary Occupation Workers	**19.1**	5.2	21.6	**17.4**	4.0	19.4	**19.6**	5.3	22.3	المهن الأولية
Percentage of Employment in Israel & Settlements	**14.4**	0.9	16.9	**0.1**	-	0.1	**18.6**	1.1	22.0	**نسبة العاملين في إسرائيل والمستعمرات**
Percentage of Employment by Employment Status										**نسبة العاملين حسب الحالة العملية**
Employers	**5.8**	2.2	6.4	**2.9**	1.7	3.0	**6.6**	2.3	7.5	أرباب عمل
Self - Employed	**17.1**	11.1	18.2	**11.9**	12.3	11.8	**18.6**	10.8	20.1	العاملين لحسابهم الخاص
Wage Employees	**74.0**	79.5	73.0	**83.6**	83.6	83.6	**71.3**	78.5	69.8	المستخدمين بأجر
Unpaid Family Members	**3.1**	7.2	2.4	**1.6**	2.4	1.6	**3.5**	8.4	2.6	أعضاء الأسرة بدون أجر
Average Weekly Work Hours*	**40.7**	34.4	42.3	**33.9**	30.3	34.4	**43.2**	35.3	45.6	**معدل ساعات العمل الأسبوعية***
Average Monthly Work Days*	**22.3**	23.0	22.1	**21.1**	25.4	20.5	**22.7**	22.5	22.8	**معدل أيام العمل الشهرية***
Median Daily Net Wage in NIS*	**100.0**	115.4	100.0	**46.2**	107.7	40.0	**115.4**	115.4	115.4	**الأجر الوسيط اليومي بالشيكل***
Average Daily Net Wage in NIS*	**108.8**	111.9	108.1	**65.7**	100.5	60.6	**124.4**	114.2	127.5	**معدل الأجرة اليومية بالشيكل***

Note:

*: Workers in Israel and Settlements are excluded

(-) in tables means observations are too small.

ملاحظة:

*:لا يشمل العاملين من فلسطين في إسرائيل والمستعمرات

(-) تعني عدم وجود عدد كافي من المشاهدات.

Wage Determination تحديد الاجور

The relation between wages and unemployment:

Wages are set in many ways. They are set by *collective bargaining* that is, bargaining between firms and unions. Wages are either set by employers, or by bargaining between the employer and individual employees. The higher the skills needed to do the job, the more likely there is to bargaining.

Workers are typically paid a wage that exceeds their *reservation wage*, the wage that would make them indifference to working or becoming unemployed. In other words, most workers are paid a high enough wage that they prefer to be employed than rather unemployed.

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

To think about these facts, economists have focused on two broad lines of explanation. The first is that even in the absence of collective bargaining, workers have some bargaining power, which they can and do use to obtain wages above their reservation wages. The second is that firms themselves may, for a number of reasons, want to pay wages higher than the reservation wage.

Bargaining:

How much *bargaining power* a worker has depends on two factors. The first is how costly it would be for the firm to replace him, were he to lave the firm. The second is how hard it would be for him to find another job, were he to leave the firm. The more costly it is for the firm to replace him, and the easier it is for him to find another job, the more bargaining power he will have.

How much bargaining power a worker has depends on labor market conditions. *When the unemployment rate is low*, it is more difficult for firms to find acceptable replacements; at the same time, it is easier for workers to find other jobs. Workers are in a stronger bargaining position, and may be able to obtain a higher wage. *When the unemployment are is high*, finding good replacements is easier for firms while finding another job is harder for workers. Being in a weak bargaining position, workers may have no choice but to accept a lower wage.

Efficiency Wages

Regardless of workers' bargaining power, firms may want to pay more than the reservation wage. They may want their workers to be productive, and a higher wage can help them achieve that goal. If, for example, it takes a while for workers to learn how to do a job correctly, firms will want their workers to stay for some time. But if workers are paid only their reservation wage, they will be indifferent between their staying or leaving. In this case, many of them will quit, and the turnover rate will be high. Paying a wage above the reservation wage makes it more attractive for workers to stay. It decreases turnover and increases productivity.

Most firms want their workers to feel good about their jobs. Feeling good promotes good work, which leads to higher productivity. Paying a high wage is one instrument the firm can use to achieve these goals. Economists call the theories that link the productivity or the efficiency of workers to the wage they are paid *efficiency wage theories*.

Like theories based on bargaining, efficiency wage theories 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. A low unemployment rate makes it more attractive for employed workers to quit: When unemployment is low, it is easy to find another job. That means, when

unemployment decreases, a firm that wants to avoid an increase in quits will have to increase wages to induce workers to stay with the firm. When this happens, lower unemployment will again lead to higher wages. Conversely, higher unemployment will lead to lower wages.

Wages, Prices, and Unemployment

We capture our discussion of wage determination by using the following equation:

$$W = Pe\ F(u, z) \quad (-,+)$$

The aggregate nominal wage *W* depends on three factors:
The expected price level Pe
The unemployment rate u

A catchall variable z that stands for all other variables that may affect the outcome of wage setting

The expected price level (P^e):

Why does the price level affect wages?

The answer: both workers and firms care about *real wage*, not *nominal wages*.

Workers care not about how many dollars they receive, but about how many goods they can by with their wages. In other words, they care about their wage in terms of goods, about (W/P).

In the same way, firms do not care about the nominal wages they pay workers, but about the nominal wages they pay in relation to the price of the output they sell. So firms also care about W/P.

- If both workers and firms expected the price level were going to double, they would agree to double the nominal wage, keeping the real wage constant.

- An increase in the expected price level leads to an increase in nominal wage. ($P^e \uparrow \rightarrow W \uparrow$).

The Unemployment Rate (u)

The minus sign under *u* in wage determination equation indicate that an increase in the unemployment rate decreases wage.

If wages as being determined by bargaining, then higher unemployment weakens workers bargaining power, forcing workers to accept lower wages. If we thing of wages as being determined by efficiency wage considerations, then higher unemployment allows firms to pay lower wages and still keep workers willing to work.

- An increase in unemployment rate (u) leads to a decrease in nominal wage (W). ($u \uparrow \rightarrow W \downarrow$).

- A decrease in unemployment rate (u) leads to an increase in nominal wage (W). ($u \downarrow \rightarrow W \uparrow$).

The Other Factors (z)

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

The factor z, representing the *unemployment insurance (benefit)* or the *minimum wages*.

Unemployment insurance (مخصصات البطالة): the payment of unemployment benefits to workers who lose their jobs. The more unemployment benefit, the more wages at a given unemployment rate. For example, suppose unemployment insurance did not exist. Workers would then be willing to accept very low wages to avoid remaining unemployed. But unemployment insurance does exist, and it allows unemployed workers to hold out for higher wages.

- At a given unemployment rate, higher unemployment benefits increase the wage.

Minimum wages (الحد الادنى للاجور)*:* an increase in minimum wage increase wages just above the minimum wage, leading to an increase in the average wage (W), at a given interest rate.

- At a given unemployment rate, higher minimum wage increase the wage.

Price Determination:

Prices depend on cost. Costs depend on the nature of the production function (the relation between the inputs used in production and the quantity of output produced, and on the price of these inputs.

We assume here that firms produce goods using labor as the only factor of production and according to the production function:

$$Y = A N$$

Where Y is output, N is employment, and A is labor productivity (output per worker).

Given the assumption that labor productivity (A) is constant, we can make one further simplification. We can choose the units for output so that one worker produce one unit of output so that A = 1. With that assumption, the production function becomes: Y = N.

The production function Y = N, implies that the cost of producing one more unit of output is the cost of employing one more worker at wage W. But the cost of producing one more unit of output is referring to marginal cost. (MC = W).

If there were perfect competition in the goods market, the price of a unit of output would be equal to marginal cost (P = MC). But $MC = W \rightarrow P = W$.

But many *goods markets are not competitive*, and firms charge a price higher that their marginal cost. Assume that firms set their price according to: P = (1 + μ) W. where *μ is the markup* of the price over the cost. If goods markets were perfectly competitive, μ would be equal to zero, and the price (P) would equal the wage (W).

The Natural Rate of Unemployment

Assume that nominal wages depend on the actual price level (P), rather than on the expected price level. Under this additional assumption, wage setting and price setting determine the equilibrium rate of unemployment.

The Wage-Setting Relation

Given the assumption that nominal wages depends on the actual price level, rather than on the expected price level, the wage determination becomes:

$$W = P F(u, z).$$

Dividing both sides by the price level (P).

$$\frac{W}{P} = \underset{(-,+)}{F(u,z)} \quad \rightarrow \textit{Wage Setting Relation (WS)}$$

Wage determination implies a negative relation between the real wage (W/P), and the unemployment rate (u): The higher the unemployment rate, the lower the real wage chosen by wage setters.

The relation between the real wage and the rate of unemployment called the *wage setting relation (WS).*

The Price Setting Relation

If we divide both side of the price determination equation, by the nominal wage, we get.

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

To state this equation in terms of the wage rate, we invert both sides:

$$\frac{W}{P} = \frac{1}{1+\mu} \quad \rightarrow \textit{Price Setting Relation (PS)}$$

This equation says: Price setting decisions determine the real wage paid by firms. An increase in the markup leads firms to increase their price given the wage; equivalently, it leads to a decrease in the real wage.

The Wage-Setting Relation, the Price-Setting Relation, and the Natural Rate of Unemployment

The wage setting relation is drawn as the downward sloping curve (WS): the higher the unemployment rate, the lower the real wage.

The price setting relation is drawn as the horizontal line PS. The real wage implied by price setting is (1 / (1 + μ); it does not depend on the unemployment rate.

The real wage chosen in wage setting is a decreasing function of the unemployment rate. The real wage implied by price setting is constant, independent of the unemployment rate.

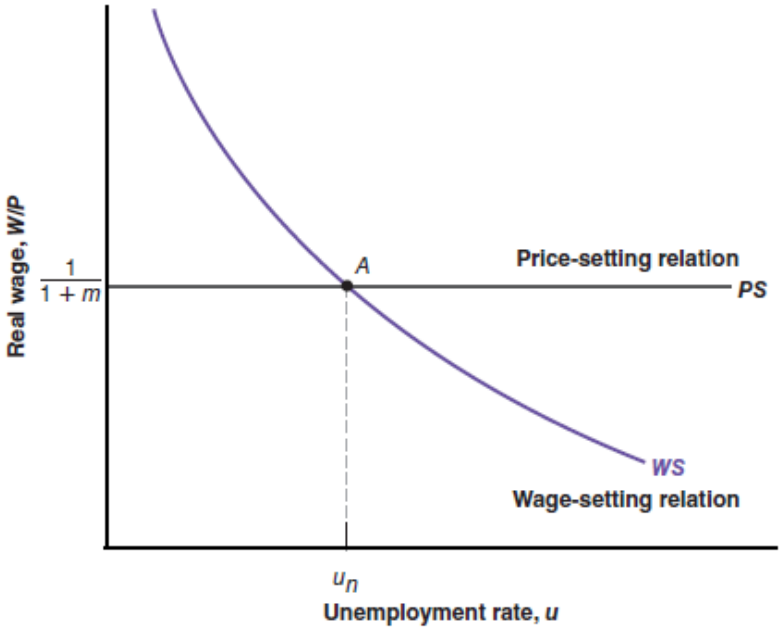
Equilibrium Real Wages and Unemployment

Equilibrium in the labor market requires that the real wage implied by wage setting be equal to the real wage implied by price setting.

Eliminating *W/P* from the wage-setting and the price-setting relations, we can obtain the equilibrium unemployment rate, or natural rate of unemployment (u_n).

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

The equilibrium unemployment rate (u_n) is called the *natural rate of unemployment*.



Example

Suppose that the firms' markup over costs is 5%, and the wage-setting relation is $W = P(1 - u)$.

A. What is the real wage as determined by the price setting equation?

$W/P = 1 / (1 + \mu) = 1 / (1 + 0.05) = 0.952$

B. What is the natural rate of unemployment?

At natural rate of unemployment: $PS = WS$

WS: $W/P = 1 - u$

PS: $W/P = 0.952$

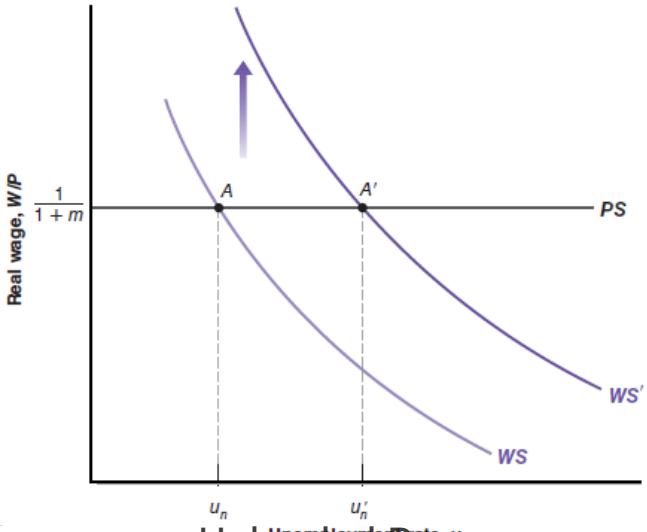
$1 - un = 0.952 \quad \rightarrow \quad un = 1 - 0.952 = 0.048 = 4.8\%$

Unemployment Benefits and the Natural Rate of Unemployment

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

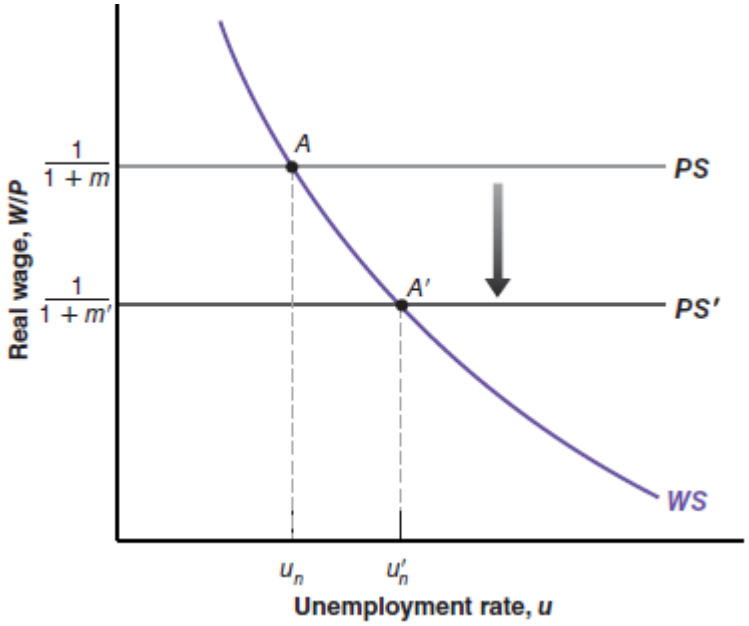
An increase in unemployment benefit (z) makes the prospect of unemployment less painful, it increase the wage set by wage setters at a given unemployment rate. So it shifts the wage setting relation up, from WS to WS'. The economy moves along the PS line, from A to A'. This leads to the natural rate of unemployment.

In words: At a given unemployment rate, 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.



Markup and the Natural Rate of Unemployment

An increase in the μ ($increase\ in\ the\ price\ of\ oil$) implies a decrease in the real wage paid by firms, and so it shifts the price setting relation down, from PS to PS'. The equilibrium moves from A to A', and the natural rate of unemployment increases from u_n to $u_{n'}$



From Unemployment to Employment

Associated with the natural rate of unemployment (u_n) is a natural level of employment (N_n), the level of employment that prevails when unemployment is equal to its natural rate.

Let U denote unemployment, N denote employment, and L the labor force. Then,

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

Rearranging to get employment in terms of the labor force and the unemployment rate gives:

$$N = L(1 - u)$$

If the natural rate of unemployment is u_n, and the labor force is equal to L, the natural level of employment, N_n, is given by:

$$N_n = L(1 - u_n)$$

For example, if the labor force is 100 million and the natural rate of unemployment is 5%, then the natural level of employment is 95 million.

From Employment to Output

Associated with the natural level of employment is a *natural level of output (Y_n),* (and since $Y = N$, then,)

$$Y_n = N_n = L(1 - u_n)$$

The natural level of output satisfies the following:

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

The natural level of output is such that, at the associated rate of unemployment $(u_n = 1 - \frac{Yn}{L})$, the real wage chosen in wage setting is equal to the real wage implied by price setting.