

**Problem set 1:**

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**Question 1:**

A)

The following is the unemployment rate of male and female (for 15-74 years old) from 1989-2018

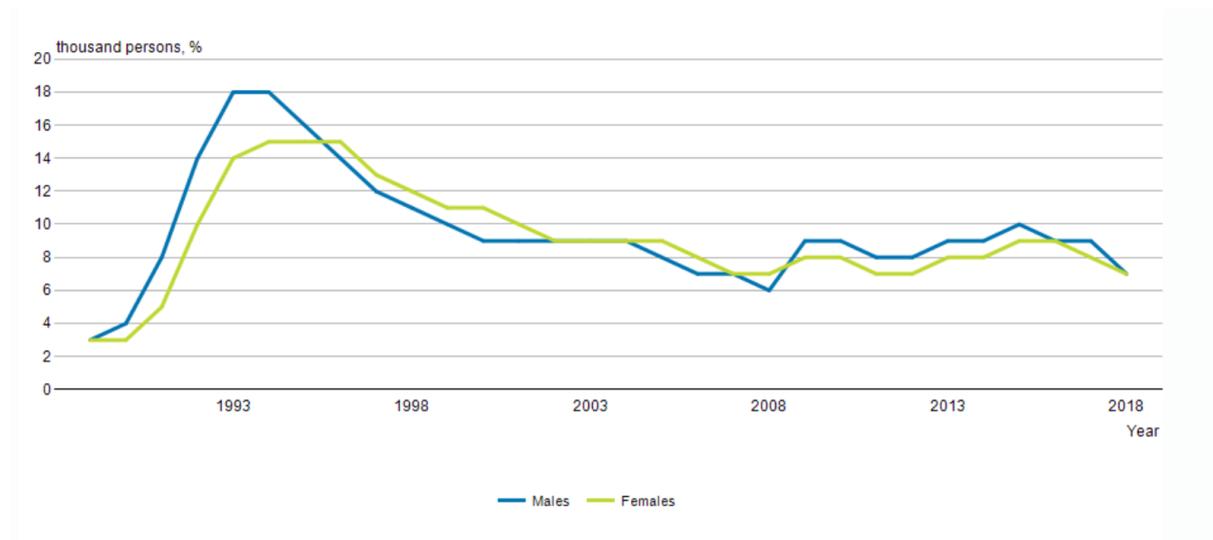


Figure 1

B)

average employment rate in 2000-2015 (for 15-74)	60.8
average unemployment rate in 2000-2015 (for 15-74)	8.4
average participation rate in 2000-2015 (for 15-74)	66.3

C)

Countries	average employment rate	average unemployment rate	average participation rate
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Finland	60.8	8.4	66.3
Norway	69	4	71
Spain	48	16	58

Average employment rate: Norway is the highest with 69%, after that it is Finland with 60.8% and Spain with the 48% is the last.

Average unemployment rate: Norway is the best with only 4%, after that it is Finland with 8.4% and at last, it is Spain with 16%.

Average participation rate: Norway has the highest rate 71%, after that Finland with 66.3% and after that Spain with 58%.

The reason for these differences:

**Unions:**

The first thing we consider is the effect of the unions.

Following figure depicts the share of employees covered by collective bargaining agreements:

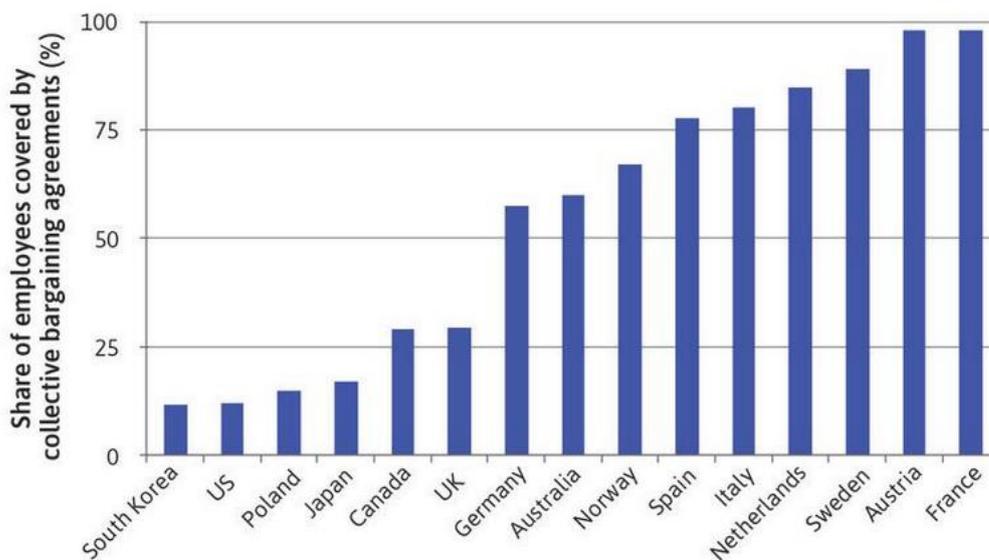


Figure 2

As you see Spain has higher share of covered workers (even higher than Norway).

In the next figure, we see the Unemployment rate as a function of the share of the covered workers for different countries:

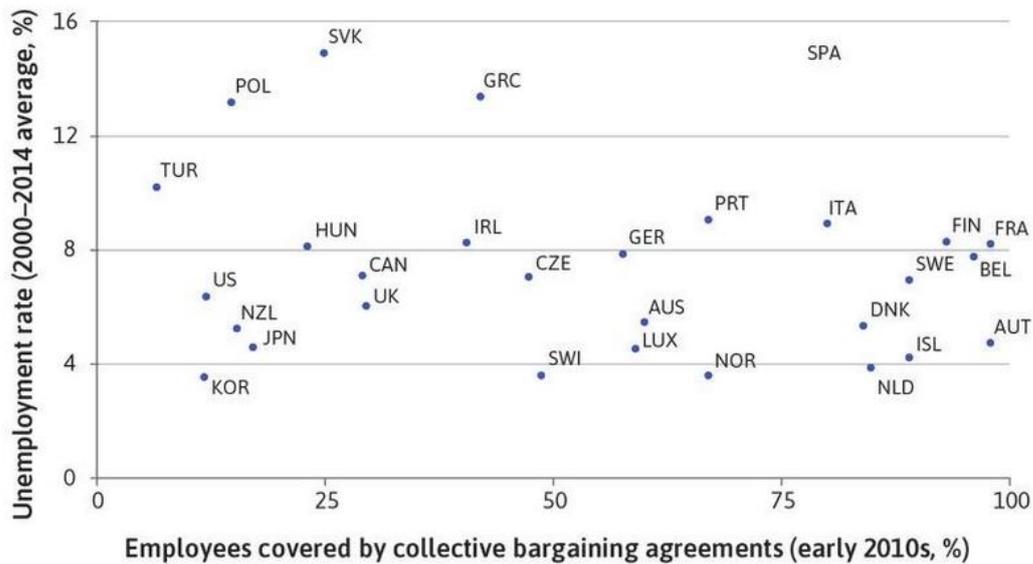


Figure 3

Consequently, Union effect can explain the lower unemployment rate of Finland comparing to Spain (Since Finland has much higher share of covered employees), but it cannot explain why Norway is doing so good (considering the fact that Norway has lower share of covered employees compared to Spain and Finland but it has lower unemployment rate than both of them).

Effect of policies:

**Education and training:** they can increase the productivity of the labour and as we know it can cause for the real wage to increase and the unemployment to decrease.

**Wage subsidy:** As we will see shortly (question 2), wage subsidy can move the equilibrium to up and right, so it will increase wage and decrease unemployment. Although, it will make the government to collect tax to pay the subsidy.

There are many important policies that can have major impacts on the unemployment and real wages such as Immigration policies, policies to enhance women's employment opportunities, reduction of discrimination and many more.

**Question 2:**

A)

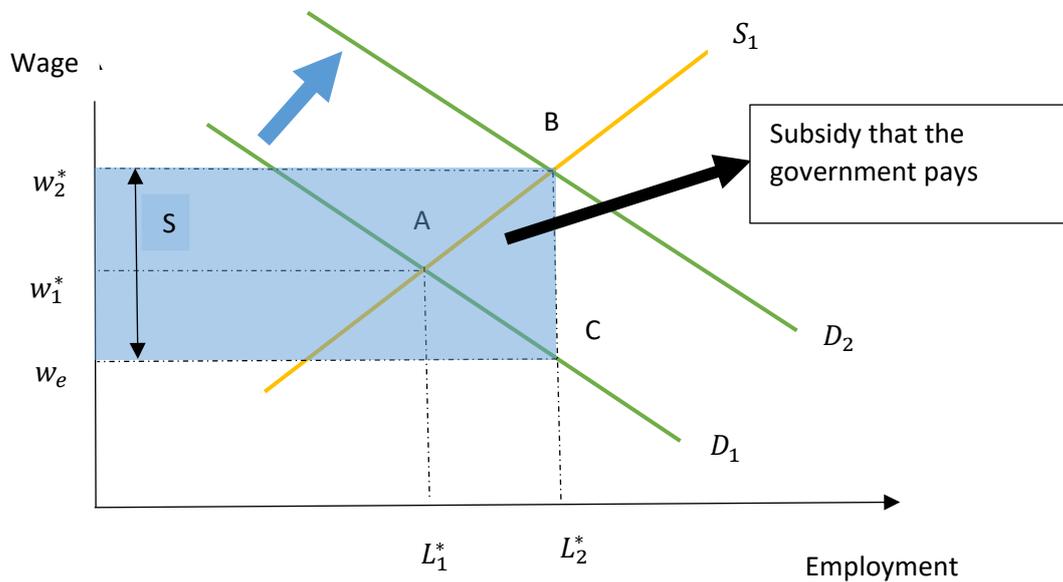


Figure 4

As it is shown in the Figure 4, by introducing the wage subsidy by the government, the equilibrium point moves from A to B. This means that equilibrium wage (wage received by the workers) will increase to  $w_2^*$ , and the equilibrium employment (number of employed people) will increase to  $L_2^*$ .

The wage cost before the wage subsidy introduction is:

$$wage\ cost = w_1^* \cdot L_1^*$$

But after the wage subsidy introduction, it is:

$$wage\ cost = w_2^* \cdot L_2^* - S \cdot L_2^* = w_e \cdot L_2^*$$

where S is the fixed subsidy amount for each worker.

And Finally, the total cost of subsidy for the government is:

$$Cost\ of\ subsidy = S \cdot L_2^*$$

B)

Yes. The effect of the subsidy in here is to move the new labour market equilibrium up and right, so it increases the wage and employment; just like the effect that we have in Unit 9 (the labour market model)

C)

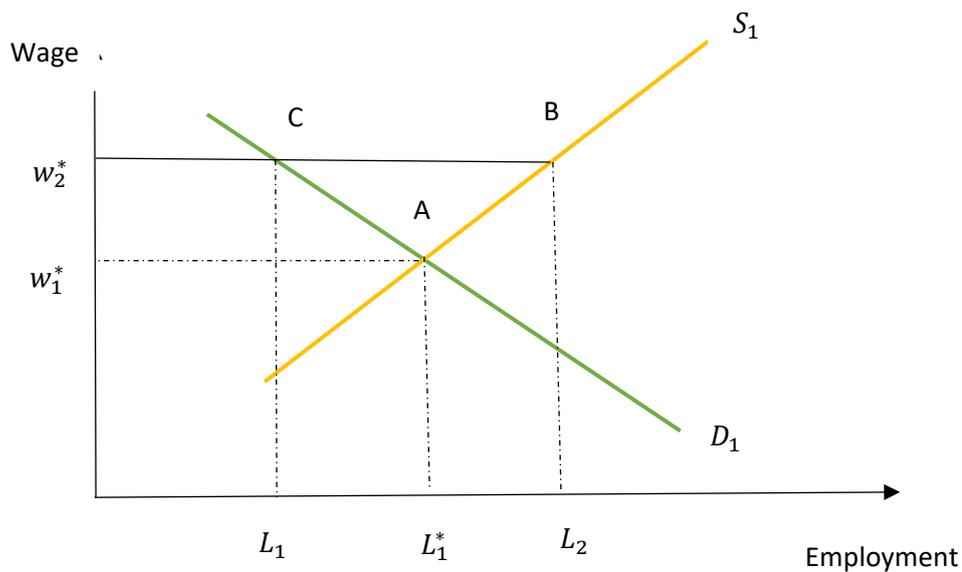


Figure 5

So, consider the case when we set a minimum wage  $w_2^*$ . Unlike the previous case, we do not have an equilibrium at point B or C. In this amount of the wage, labour supply ( $L_2$ ) is greater than the labour demand ( $L_1$ ), and this means that we will have unemployment as a result of this policy.

It should be obvious that in this case the government does not pay any subsidy so there is no need for the government to collect extra tax.

### Question 3:

A)

The real concern is that the worker will change his behavior after the employment and it will be the same as the best response function. We can not conduct a perfect monitoring protocol so he will shirk in his job, because he is under the best response function.

Yes. The firm is doing the best it can, given the effort levels being supplied at the current wage. Similarly, workers are supplying the exact level of effort that is compatible with the going wage. This means that we have a Nash equilibrium here.

B)

According to the literature, Nash equilibrium is a stable state of a game, in which no participant can gain by any change of strategy, if the strategies of the others remain unchanged.

As it was mentioned in the last part (part A): Assuming other players do not change their strategies, none of the participants can gain by any deviation from their own strategies, and this is equivalent to the Nash equilibrium.

C)

According to the question, Innovation does not have any effect on the size of the labour force, labour productivity ( $\lambda$ ) and the firm's profit margin, but it does increase unemployment (by making it less unpleasant).

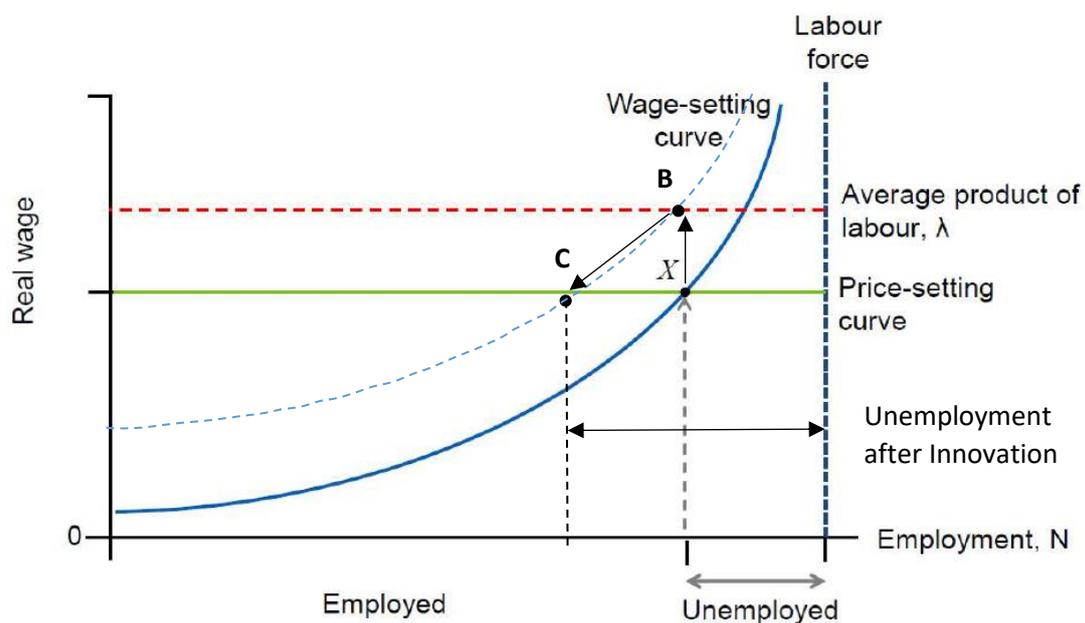


Figure 6

As you see in Figure 6, at first firms will increase the real wage of their workers, because unemployment is more pleasant now and they have to persuade workers to continue working efficiently for them, so we move to point B, But Point B is not an equilibrium, and the firms are not satisfied with their markups. The firms try to increase their prices so the real wage will drop. Consequently, lower output and demand and finally higher unemployment. So the firms move from B to C, which is the new equilibrium point.

D)

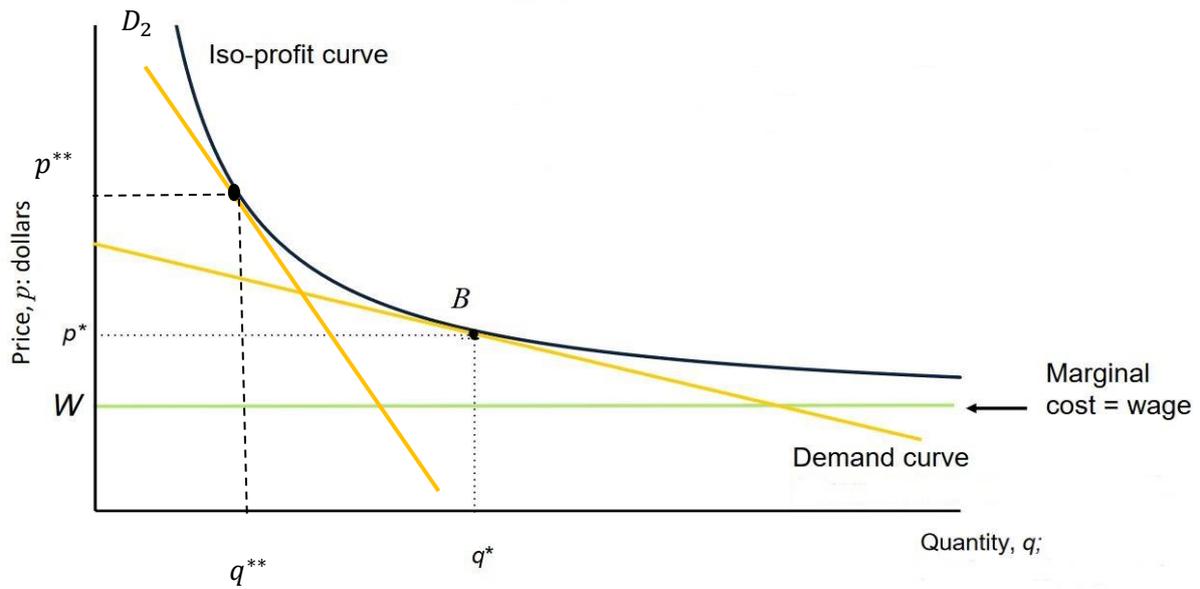


Figure 7

If we decrease the competition in the market, the demand curve will be steeper ( $D_2$ ). Then, the equilibrium price will increase (From  $p^*$  to  $p^{**}$ ) so the profit per worker or markup will be increased.

Since the nominal wage is constant, the real wage decreases and the price setting curve will move downward.

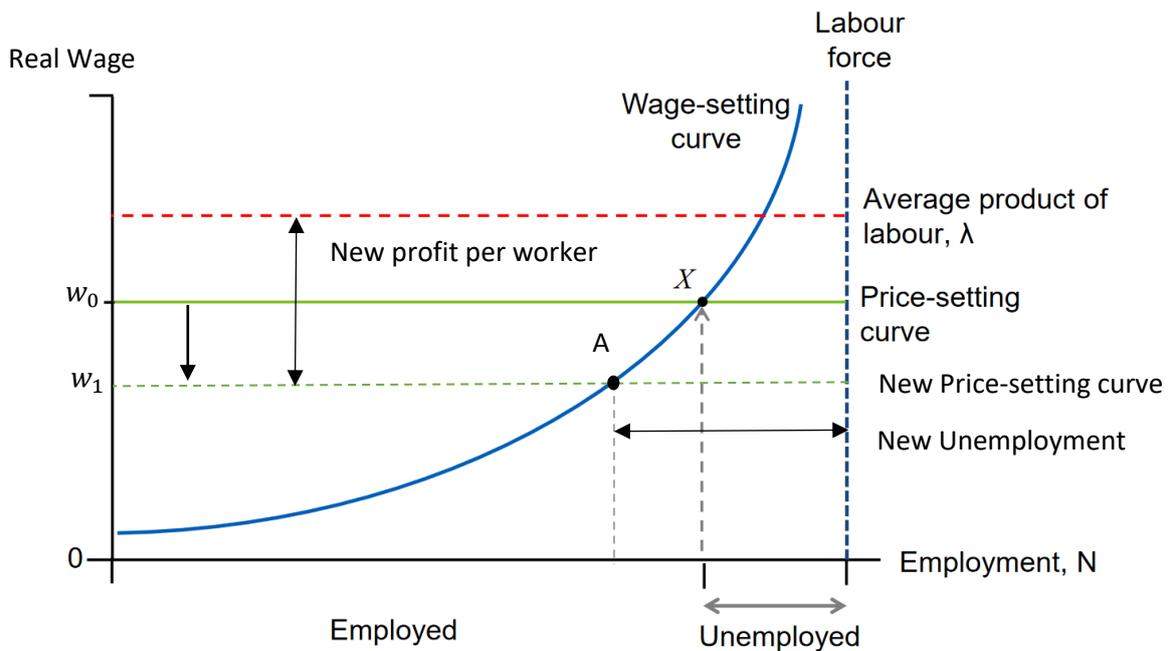


Figure 8

**Question 4:**

A)

There are two effects: First, it makes people more cautious because of the risk of losing income or even jobs. In such a situation, one might expect more saving in case such eventualities occur.

Second, falling prices may cause people to postpone their spending in the hope of better prices later. Demand curves may shift to the left across the economy as a result of the lower spending.

B)

This reduction in spending would reinforce the low aggregate demand and slow down or halt any adjustment back to the Nash equilibrium.