

Economics 100B Fall 2005 Midterm 2 Review Solutions
Chapter 7
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1. The main purpose of this problem is to apply the use of Okun's Law to a given set of data.

(a) The size of the labor force equals the sum of the number of employed persons plus the number of unemployed persons.

Therefore, the labor force = 225 million + 25 million = 250 million people.

(b) The employment-population ratio is the number of employed individuals divided by the entire population of the economy.

Here, the employment population ratio is 225 million / 300 million = $\frac{3}{4}$ = 75%.

(c) The unemployment rate is the fraction of the labor force that is unemployed.

In this example, the unemployment rate is (25 million / 250 million)*100 = 10%.

(d) The size of the output gap is calculated using Okun's Law.

Okun's Law: Output Gap = $-2*(u - u^*)$ where u is the current unemployment rate and u^* is the natural rate of unemployment.

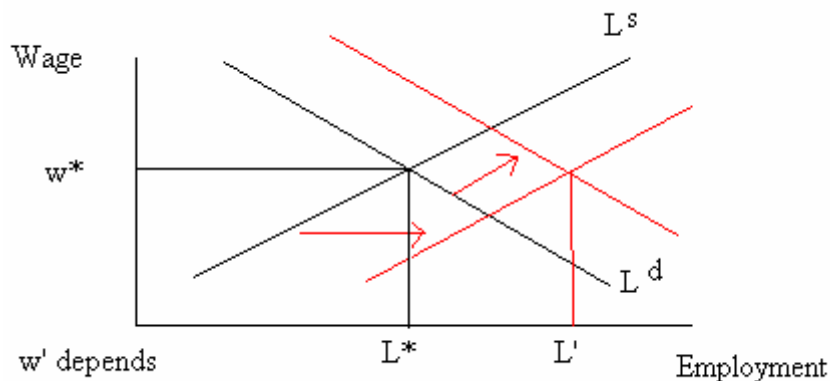
We first calculate the natural rate of unemployment, which equals (10 million / 250 million)*100 = 4%.

Next, we plug into Okun's Law, 4% as the natural rate of unemployment and 10% as the current rate of unemployment.

Therefore, Output Gap = $-2*(10 - 4) = -2*(6) = -12$. Thus, the output gap is negative and is measured at 12%.

2. Given reductions in the corporate income tax and the individual marginal income tax, both labor supply and demand will be influenced. First, let us consider the influence of the corporate income tax. A decline in the corporate income tax will cause a shock to labor demand – a positive shock. This tax reduction will allow corporations and firms to hire additional workers since they now face lower costs from taxes. The result is an outward shift of the labor demand curve.

Now let us analyze the influence of a decrease in the individual marginal income tax. This tax shifts the labor supply curve and will cause a positive shock to labor supply. For any given wage, individuals will get more money after taxes because the tax is smaller. The result is an outward shift of the labor supply curve. Graphically, the labor supply and demand model looks as follows.



From the graph, it is clear that the employment level will increase and the employment-population ratio will increase. However, it is important to note that the change in the wage rate is uncertain. Depending on the magnitude of change for labor supply and labor demand, the equilibrium wage rate can go up, down, or remain the same. Wages will go up if the shift in labor demand dominates. Wages will go down if the shift in labor supply dominates. Wages will remain the same if both shifts are equal. The after tax wages will also depend on the size of the shifts.

Because of the increase in the number of people working, the unemployment rate will go down. The decline of unemployment and the increase of the labor force lower unemployment in the short run. In the long run, the number unemployed and the labor force will remain unchanged if the tax cuts remain – thus causing the unemployment rate to stay at this lower level.

3. This question is designed to analyze labor supply and labor demand using a mathematical context.

(a) The equilibrium of the model is found by setting labor supply equal to labor demand. Therefore, $L^S = L^D$ implies that $200 + 3w = 300 - 7w$. Simplifying, $10w = 100$ or $w^* = 10$. Thus, the equilibrium wage is 10 dollars per hour.

By plugging the equilibrium wage back into either the supply or demand equation we can solve for the number of people employed.

Therefore, $L^S = 200 + 3w = 200 + 3(10) = 230$.

Or, $L^D = 300 - 7w = 300 - 7(10) = 230$.

Thus, 230 people are employed in the economy. In other words, $L^* = 230$.

(b) If the government sets a minimum wage of \$20, the prevailing wage is now greater than the market wage. As a result, the equilibrium wage will be $w^* = 20$ and will have increased from before.

The equilibrium level of employment can be calculated by substituting the minimum wage into the supply and demand equations.

Therefore, $L^S = 200 + 3w = 200 + 3(20) = 260$.

Or, $L^D = 300 - 7w = 300 - 7(20) = 160$.

At this minimum wage rate, the labor demand is less than the labor supply. This creates a surplus of workers. The demand level is less than supply and thus the demand for labor will prevail. The economy will now have a higher unemployment level because the economy hires fewer workers than those willing to work at this wage. Additionally, the employment-population ratio will go down.

In order to determine whether this is a good or bad policy, we can analyze the data in the following manner. Previously, 230 workers were earning 10 dollars. Thus, the total income of the society was $230 * 10 = \$2300$. Now, 160 workers are earning 20 dollars. The total income in society after the minimum wage is imposed is $160 * 20 = \$3200$. The total income of the society has gone up – which may be a good thing – ignoring the large costs to the many workers who no longer have a job and no income, but want to work. However, given this small amount of data, it is impossible to make an accurate quantitative judgment as to the benefits and costs of the minimum wage.

For this reason, we turn to economic theory. In general, the minimum wage will create deadweight loss. However, the size of the deadweight loss will depend on the elasticity of labor demand. Furthermore, the minimum wage may come with some social benefits. In cases where the social benefits outweigh the deadweight loss, the minimum wage may have a positive result.