
   a. From Table A of this document, report the following labor market indicators from the household survey (using seasonally adjusted data) for January 2006: i) the working age population (i.e. the non-institutionalized civilian population; ii) the labor force; iii) the unemployment rate; and the iv) the labor force participation rate. What was the annual growth rate of employment from December 2005 to January 2006?

      i) 227,553,000
      ii) 150,114,000
      iii) 4.7%
      iv) 66%

      The annual growth rate of employment from Dec. 2005 to January 2006 is the monthly rate \( \frac{(143074 – 142779)}{142779} = 0.21\% \) times 12: 2.5%. An easier question is: what was the annual growth rate in employment from January 2005 to January 2006: \( \frac{(143074 – 140234)}{140234} = 2.0\% \)

   b. Suppose that economists estimate the rate of frictional unemployment to be 2.6% and the rate of structural unemployment to be 2.1% in January 2006. What is the natural rate of unemployment and cyclical unemployment rate in January 2006?

      Natural rate of unemployment = 2.6 + 2.1 = 4.7%
      Cyclical unemployment = 0.0%

2. Suppose you run a widget company. The going wage for a worker is $40 per day, and the price of widgets is $0.50 per widget. Given your current capital stock and technical know-how, workers each day can produce widgets according to the scale below.

<table>
<thead>
<tr>
<th># workers</th>
<th>Total product (widgets/day)</th>
<th>marginal product</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>190</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>270</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>340</td>
<td>70</td>
</tr>
<tr>
<td>5</td>
<td>400</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>450</td>
<td>50</td>
</tr>
</tbody>
</table>
a. To maximize profits, how many workers would you hire per day? Explain your reasoning.

*Since the real wage is 80 widgets (40/0.5), the real marginal cost your firm of a worker is 80 widgets. Thus, profits will increase by hiring one more worker as long as his or her marginal product exceeds this marginal cost. Thus, hire 3 workers.*

b. Suppose the market wage falls to $30 per day. How would this affect your demand for labor?

*The real wage falls to 60 widgets; thus hire 2 additional workers, or 5 total.*

c. Suppose the market wage is $40 but the price of widgets is $0.40. How many workers would you hire?

*1 worker.*

3. Predict the effects on equilibrium real wages and employment in the US of the following events, assuming that all else is equal.

a. New advances in robotics enhance the productivity of the average worker.

*Since the productivity of the average worker rises, the aggregate demand for labor would likely increase, causing real wages and employment to rise.*

b. The US government restricts all immigration into the country.

*If the new policy prevents new workers from entering the country, then the supply of labor would be prevented from shifting to the right, so that real wages would be higher and employment lower than if there were no restrictions. This is essentially the same as saying that the immigration policy shifts the aggregate supply of labor to the left, causing real wages to rise and employment to fall.*

c. The labor force participation rate rises.

*Since all else is assumed equal (in particular, the working age population), the rise in the participation rate increases the supply of labor, leading to lower wages and higher employment.*

d. Leisure becomes more valuable to households.

*Since the value of leisure is the opportunity cost of working, the increase in the value of leisure reduces the supply of labor (the supply of labor shifts left), raising the real wage and reducing employment.*

e. There is a large upward surge in the capital stock.

*Capital tends to increase the marginal product of workers. Thus, the demand for labor would increase, real wages and employment would rise.*

f. The price level rises. (Hint: be careful here.)

*Ceteris paribus, nothing would happen to real wages and employment. The higher price level will initially reduce real wages, increasing the quantity demanded but decreasing the quantity supplied of labor. The resulting shortage of labor will drive nominal wages up until the real wage returns to its original equilibrium value.*
4. Headlines proclaim that a severe shortage of nurses threatens health care. If indeed there is a shortage in the market for nurses, what would you predict will happen to the wages paid to nurses (at least in the long-run), and why?

*Real wages (total compensation) would likely rise.*

5. Suppose the labor market is initially in equilibrium, so that the labor force is fully employed. Now, the demand for labor falls due to an overall shortfall in the demand for output. If wages do not quickly adjust to this shift, what will likely happen to employment and unemployment in the short-run?

*Starting from full employment, the fall in labor demand will create a surplus of labor. If the real wage is “sticky” (i.e. slow to adjust to this disequilibrium surplus), firms will have incentives to reduce employment. However, households still want to supply the original amount of labor, so employment falls and unemployment rises. This unemployment would be classified as cyclical unemployment.*

6. Classify each of the following as frictional, structural or cyclical unemployment.
   a. Jack, a bricklayer, has been unemployed since June because of a slowdown in residential construction. *Cyclical unemployment*
   b. Jill, a computer programmer, quit her old job last month, and will start work at a new company (at higher pay) next month. *Frictional unemployment*
   c. Joe, an unemployed coal miner, has searched in vain for the past six months for a new job, but is unable to find work. *Structural unemployment*

7. Assume that the aggregate labor market is initially in equilibrium at a real wage of $20 per hour, not including benefits. Now suppose the government passes a law that requires firms to pay, in addition to workers' wages, their health insurance premiums, which are 10% of the wage. Predict the effect this law will likely have on the observed equilibrium real wage and employment.

*The law, to the extent that it is enforced, would most likely increase the supply of labor and decrease the demand for labor. From the labor supplier’s point of view, if you are willing to work 8 hours at a wage of $20 with no benefits worth $2, you would be willing to work 8 hours at a wage of $18 with $2 in benefits; labor supply shifts to the right. At the same time, if firms are willing to employ a given number of workers at $20 without having to pay benefits, those same firms would be willing to hire this same number of workers only if it had to pay $18 in wages plus $2 in benefits. Thus, the equilibrium real wage (not including benefits) will fall by $2 (to $18), while employment would remain unchanged.*