Economics 304 **Fall 2013**
Problem Set #2 **Solutions**

1. Box 5.4 discusses the effect of minimum-wage laws on the natural unemployment rate. In this problem we explore this relationship in more detail.

    a. The minimum wage in Oregon is $8.95 per hour; the distribution of average hourly earnings for Oregon workers (as of 2012) has the following properties:

Mean	$21.75
10th percentile	$9.30
25th percentile	$11.49
Median (50th percentile)	$17.14
75th percentile	$26.59
90th percentile	$39.66

    Given the actual wage distribution, is the minimum wage irrelevant for the Oregon labor market?

    It appears that only a small percentage of Oregon workers are actually making the minimum wage (surely less than 10%). However, the minimum wage probably affects those at the bottom end even if they make a bit more, because they may be in jobs that start at the minimum and have wage increases through longevity and good performance.

    b. Consider a model of a segmented labor market, in which there are two distinct markets for, respectively, skilled and unskilled labor. Suppose that the market-clearing wage lower than the minimum wage in the unskilled market is but higher in the skilled market. Draw diagrams of the two markets noting the market-clearing wage and the minimum wage in both.

    The unskilled market has a minimum wage above the market-clearing wage, at which there is an excess supply. In the skilled market, the minimum wage lies well below the market-clearing level.

    c. In the short run, there is no spillover in labor supply between markets because it takes time to acquire skills and skilled workers would not choose to work at unskilled jobs. However, there may be spillovers in labor demand. How would the presence of the minimum wage affect the skilled labor market if skilled and unskilled workers are substitutes in production? What if they are complements?

If skilled and unskilled workers are substitutes, then making unskilled workers more expensive (as the minimum wage does) will increase the demand for skilled workers as firms substitute skilled for unskilled. This will raise the wage and employment levels of skilled workers. If skilled and unskilled workers are complements, then the opposite will happen: a higher minimum wage will lower the demand (and wage and employment) for skilled workers because the unskilled workers whose work they complement are now more expensive.

d. In the long run, workers choose whether or not to acquire skills. Why might the presence of the minimum wage discourage skill acquisition? Why might the presence of the minimum wage encourage skill acquisition? Show the effects on the skilled and unskilled labor markets in each case: where the discouraging effect dominates and where the encouraging effect dominates.

   A higher unskilled wage (if you find a job) would discourage skill acquisition. However, if you cannot find a job due to unemployment, this might raise the incentives to acquire skills. In the former case, the supply of skilled workers falls (raising skilled wages) and in the latter case the supply of skilled workers rises (lowering skilled wages).

e. Based on your answers to the previous parts of this question, why do labor unions (whose members are usually skilled workers) lobby in favor of increases in the minimum wage?

   If skilled workers are substitutes for unskilled and the higher minimum wage discourages skill acquisition, then skilled workers are unambiguously better off with a higher minimum wage: there is more demand and less supply in the skilled market.

2. Suppose that you are tasked with estimating the natural rate of unemployment for Oregon. Why might the natural rate in Oregon differ from that in other states or the aggregate United States? How would you go about estimating the Oregon natural rate? (I don't expect too much detail about statistical or econometric methods. Focus on the general approach you think is appropriate and the variables that you might consider.) Once you got an estimate, how would be it be useful?

   One could estimate an econometric model at the state level, explaining unemployment across states over time by state-level variables such as minimum wage, unionization rates, industry composition, tax rates, demographics of the labor force, and a business-cycle indicator to capture the effects of national short-run macroeconomic fluctuations. (I explored models of this kind in a research project undertaken in the summer of 2013.)

3. The long-run analysis in Chapter 6 puts the Cambridge "k" in a central role in money demand.
   a. In what units is k measured?

k is measured in years. *M* is in dollars; *PY* is in dollars per year. To make the units balance, *k* must be years. It is the average "holding period" of a dollar.

b. Explain (as in footnote 4) how *k* is related to "money velocity."

k is the reciprocal of *V*.

c. What are the units of velocity?

Velocity is measure in "times per year." It is how many times per year the average dollar is spent.

d. The derivation of equation (6.5) is based on the assumption that *k* (and velocity) is constant. Given the pace of financial innovation in recent decades—introduction, spread, and interconnection of ATMs, development of phone-based and later online banking, etc.—would you expect that *k* would generally increase or decrease over time?

Innovations such as ATMs allow us to hold smaller money balances: to hold our money less long or turn it over more quickly. This leads to a general decline over time in *k* or an increase in *V*.

e. Given your answer to the previous question, how would this affect the steady-state rate of inflation, given the rates of money growth and real GDP growth?

Taking the growth rate of $M = kPY$,

$$\frac{\Delta M}{M} = \frac{\Delta k}{k} + \frac{\Delta P}{P} + \frac{\Delta Y}{Y}$$
$$\pi = \frac{\Delta M}{M} - \frac{\Delta k}{k} - \frac{\Delta Y}{Y}.$$

Thus, if *k* is decreasing over time (has a negative growth rate), inflation will be larger than it would be if *k* were not changing.