Problem Set #8 Solutions
14.02

Note: there was an earlier version on this solution sheet. Unfortunately, the answers for #13 were backward (they assumed an increase in taxes – not a decrease). This has been changed on this version. Please make a note of this and tell your friends.

1. d. The answers of a and c are empirically true as described in the book. The "separation rate" refers to the rate at which an employed person leaves, quits or is laid off from a job. This has sometimes tended to increase when the unemployment rate has increased.

2. b. Because of the higher proportion of unionized workers in Europe than in the US, collective bargaining is used more often the former case. Collective bargaining is also more important in Japan as worker equity is valued more. Answer c is not correct: the minimum wage si roughly 38% of the average wage. Most workers do not have their wages set by collective bargaining (the percentage of unionized workers if roughly 11% of those employed although not all collective bargaining is done through unions).

3. a. Note, we did not ask about unemployment. If the markup goes down, real wages, $\frac{W}{P}$, increase as the price-setting curve shifts up in real wage-unemployment rate space. Thus, everything else constant, the unemployment rate will decline and the natural level of employment will increase. Note, this answer assumes that the labor force is constant. One can see that b and c are incorrect since the former is causing and increase in the natural rate of unemployment (due to a shift to the right in the wage-setting curve) and the latter says nothing about the long-term or natural rate of unemployment.. .

4. d. The wage-setting line will be downward sloping. As the unemployment rate increases, there is more competition for jobs and an increase in job applications. Firms, therefore, can offer lower wages since they can easily replace workers or find workers to fill job openings.

5. d. Those persons considered "out of the labor force" are neither employed, nor are they unemployed. The government considers a person unemployed if he/she is not working, but is seeking employment. In addition,

those who are temporarily laid-off are not considered "out of the labor force" because they still hold a job, but are not actually working at it presently.

6. b. See the AS relation. When output increases, the unemployment rate falls. This, in turn, causes wages, and thus prices, to climb. The expected price level next year, according to our relation, does not change. Markups are not impacted. This assumes nothing about the aggregate labor force. Note though that if the price level this period is equal to the expected price level next period, c. may also be a correct response.

7. e. A change (let's say a contraction) in monetary policy will lead to a shift to the left in the AD curve. The flatter is the AS curve, the further to the left is the short-run equilibrium output. So, with a relatively flat AS curve, short-run output changes a lot with monetary policy, but prices will only change slightly.

8.a. The price-setting curve will be horizontal, intersecting the vertical axis at the point where W/P (real wages) equal $\frac{1}{1+\mu}$.The wage-setting curve will be downward sloping. The intersection of the price-setting and wage-setting curves corresponds to the value on the x-axis that is considered the natural rate of unemployment. See page 308 for the actual diagram.

b. An increase in the minimum wage will cause "z" to increase. The lowest wage that a worker can receive increases. Thus, a worker has the "bargaining power" as legislated by the government to demand higher wages. This increase leads to a shift up (or to the right) in the wage-setting curve. According to the graph, equilibrium unemployment will increase, but real wages will stay the same. Why? Well, real wages will stay the same in this model because firms keep prices at a constant markup over wages. When wages increase by a certain proportion, firms change prices accordingly. The eq. unemployment rate, conversely, will increase. For every level of real wage, there is now a higher unemployment rate (in the wage-setting relation). To hold the real wage constant, unemployment must increase.

c. An elimination of anti-trust law enforcement would constitute an okay for firms to engage in monopoly practices such as price fixing or price discrimination. The less competitive industry become, the higher are the prices that firms can charge to customers (there are no competitors to force a decrease in prices). Markups will therefore increase, causing the price-setting curve to shift down. Real wages decline and the eq. unemployment rate increases.

Real wages decline because firms are able to charge higher premiums over costs (or wages) on their products. Unemployment increases in order to keep nominal wages constant in the face of a price increase.

d. The price-setting curve shifts down. The wage-setting curve shifts to the right. The result is an unambiguous increase in the natural rate of unemployment for the reasons discussed in b and c. In addition, real wages decline.

9.True. This is somewhat definitional. The natural level of output is that level at which the unemployment rate is at its natural rate. When output is too low relative to its natural level, unemployment, u, is too high. You can see this in the following equation:

u=$\frac{U}{L} = 1 - \frac{Y}{L}$.

When Y=Y* then u=u*. If Y¡Y*, then u¿u*. If unemployment is too high and N=Y, then there must be lower than "natural" output.

10. a. A decrease in G initially leads to a shift in (to the left) in the AD and IS curves. The decrease in price increases the real money supply, thereby causing the LM curve to shift out (or to the right) slightly. The short-run equilibrium has lower interest rates, lower output and lower prices.

b. An increase in unemployment benefits causes "z" to increase. Consequently, the AS curve shifts in towards a new natural rate as prices increase and output declines. The LM curve shifts in as P increases (or M/P declines). The AD will shift to the right due to an increase in transfer caused by the increase in unemployment benefits. Thus, the IS curve shifts out and to the right..

c. The LM curve shifts out (to the right) causing interest rates to decline and output to increase. The AD curve shifts out (to the right). Prices increase. In the long-run, things will be different.

11. According to the wage-setting curve, the unemployment rate should be negatively correlated with the real wage. The figures below do not appear to show such a correlation. Why? First, there are other factors which have caused the real wage to decline steadily through the 1980s and 1990s. One reason could be that the markup could have steadily increased also, causing the price-setting curve to repeatedly shift down. This could have been happening at the same time unemployment benefits were decreased, minimum wages were held constant and worker bargaining power declined. The

correlation between real wages and unemployment, under these conditions, might be slightly positive. Another reason could be that if real wages are dropping and workers are becoming more productive, firms may be hiring more workers at lower nominal wages.

Year	Real Hourly Wages	UE Rate
1980	7.78	7.1
1981	7.69	7.6
1982	7.68	9.7
1983	7.79	9.6
1984	7.80	7.5
1985	7.77	7.2
1986	7.81	7.0
1987	7.73	6.2
1988	7.69	5.5
1989	7.64	5.3
1990	7.52	5.5
1991	7.45	6.7
1992	7.41	7.4
1993	7.39	6.8
1994	7.41	6.1

Another explanation could be the following: Some of you might have noticed that the graph contains two clusters of points – one high and to the right composed mainly of 1980s points and one lower and to the left composed mainly of 1990s points. This could have been due to a simulanteous shift down of both curves (PS and WS). One could hypothesize that the WS curve would shift down due to the lessened importance of unions. One could imagine the PS curve shifting down as a result of an increased markup (if anti-trust enforcement grew more lax in the 1990s). This is just a hypothesis – not a story that has been empirically substantiated. One should be able to find many holes in this argument.

12. a. P_t=P_t^eF(u,z)(1+u) where $P_t^e = P_{t-1}$.Price depends on expected price insofar as the expected price level partially determines wages which then, in turn, influence current prices. Wages this period are set partially on what wage-setters believe prices will be this period. If their only information about current prices comes from prices last period, then last period's prices will help to determine this period's wages. Since current prices, are influenced

by current wages through the markup relation, expected prices thus feed into current price-setting behavior.

b. See a for the explanation of price dependence. AS relation:

$P_t = P_{t-1} F(1 - \frac{Y}{L}, z)(1+u)$ where $P_t^e = P_{t-1}$.

When Y increases, the unemployment rate falls. Lower unemployment rates put upward pressure on wages. Higher wages, according to the price-setting relation, lead to higher prices if the markup is held constant. Thus Y and P are positively correlated and the AS curve slopes upward.

c. When P increases, the real money supply (M/P) must fall if M is held constant. This results in the LM curve shifting back to the left. Output therefore declines and interest rates increase. Y is therefore negatively correlated with P in the AD relation through the money supply.

d. A permanent decrease in bargaining power is seen as a decrease in "z." Through the AS relation, you can see that wages will decline as will prices. The AS curve will shift out in the short-run to where prices are lower and output is higher. In the long-run, the AS curve will shift further out to its new equilibrium output level (the natural level of output). This point represents a lower natural rate of unemployment as well.

e. The natural rate of unemployment has changed. It has declined due to less bargaining power of workers.

13.a. AD will shift out. Prices will rise and output will rise.

b. In the long-run, the AS will shift back to the point at which $Y=Y^*$ and $u=u^*$. There will be no upward or downward pressure on prices. Prices will be higher but output will be at its original level.

c. The IS curve shifts out (to the right) and the LM curve shifts in slightly due to the rise in prices. Output will be higher as will interest rates.

d. The LM curve will shift all the way back out to $Y=Y^*$ due to the rise in prices.