14.02 Fundamentals of Macroeconomics
Solutions to Problem Set 5

1a) AS: $P = P^e(1+\mu)F(1-\frac{y}{\alpha L}, z)$

The AS curve slopes up from left to right in (P,Y) space. For given level of P^e, a higher P leads to lower than expected real wages. This leads firms to hire more labor and increase output. If $P = P^e$ then $U = U^n$

b) This depends on the objectives of the unions. If unions seek to push up wages, then a fall in unionization will shift the AS to the right. If unions seek to minimize unemployment and moderate their wage demands, then a fall in union power will cause the AS will shift to the left.

We expect that the welfare reforms will tend to encourage more people to seek work at lower wages. This will shift the AS curve to the right. Firms can now produce output at lower prices.

c) Limiting monopoly power will cause a fall in the parameter μ, leading to a shift down in the AS curve. Intuitively, the change in the law forces firms to charge lower prices for any given level of output.

d) The AS curve shifts up. As expected prices rise, workers seek to bid up wages to compensate. This forces firms to charge higher prices for output.

e) When $P_t > P_t^e = P_{t-1}$, the real wage paid by firms is lower than they had expected. This causes them to hire extra workers which pushes unemployment below the natural rate and output above its natural level.

f) The IS_LM model assumed that prices were fixed, and that firms were willing to satisfy any level of demand at that price level. This is equivalent to assuming that the AS curve is horizontal in (P,Y) space.

2a) AD curve is

$$Y = \frac{c_0 - c_1 T + \frac{a_1}{b_1}\frac{M}{P} + G}{1 - c_1 - a_0 + \frac{a_1 b_0}{b_1}}$$

The AD curve slopes down from left to right in (P,Y) space. As prices fall the level of real balances rises. This causes interest rates to fall which causes investment to rise. Thus a fall in prices will lead to a rise in aggregate demand.

b) If G increases, the AD curve shifts right in (P,Y) space. If the supply curve is horizontal as in the IS-LM model the change in output is

$$dY = \frac{100}{1 - c_1 - a_0 + \frac{a_1 b_0}{b_1}}$$

c) The AD curve will shift to the right. At any given price level, higher money supply will lead to lower interest rates, which in turn lead to higher investment and thus, higher aggregate demand.

d) For any given price the demand for real balances falls. This leads to lower interest rates, which in turn boosts investment and aggregate demand. Therefore the AD curve shifts to the right.

3a) The initial P^e is at the point on the AS curve such that the corresponding level of output is Y^n. The actual price level is above the expected level. The actual output level is above the natural level. The rate of unemployment is below the natural rate. This implies that wages will be rising. The increase in wages will cause producers to raise their prices for any given level of output i.e. the AS curve will shift up. The process will continues until $Y = Y^n$ and $U = U^n$ when there will be no pressure to increase wages.

b) Initially the AS curve does not shift. The AD curve shifts to the right because lower interest rates boost aggregate demand at any price level. The new equilibrium (P', Y') has $P' > P^n$ and $Y' > Y^n$. The economy will adjust as in a) i.e. the AS curve shifts up until there is a new equilibrium with $Y = Y^n$, $P > P^n$

c) In the IS-LM framework, the initial reduction in interest rates shift the LM curve to the right. Overtime, as prices rise, real balances fall and the LM curve shifts back to the initial equilibrium i.e. $Y = Y^n$.

d) In the long run monetary policy has no effect on output, employment or the interest rate, but does change the price level.

e) Initially there is no change in AS. The AD curve shifts down as, for any price level, consumers demand less. The new short run equilibrium (P', Y') is at the intersection of the new AD curve and the (unchanged) AS curve where $P' < P^n, Y' < Y^n$. Because unemployment is above its natural rate there will be pressure to reduce wages. This will enable producers to cut prices and the AS curve will shift down. The process will continue until a new equilibrium is reached where $P'' < P^n, Y'' = Y^n$. The process stops here because unemployment is equal to its natural rate and there is no longer any pressure to reduce wages.

f) In the IS-LM curve the reduction in confidence causes the IS curve to shift to the left. Overtime the decrease in prices causes real balances to rise and the LM curve shifts to the right. The new equilibrium will have $i'' < i^n, Y'' = Y^n$