PSET 10 Solutions

Alternative Theories

1. What assumptions are needed in order for the quantity theory of money to hold? Are these assumptions realistic?

The main assumption of the quantity theory of money is that the velocity of money is constant. The equation of the quantity theory of money is: $M \times V = P \times Y$ and implies that the demand for money depends on nominal income ($P \times Y$), but not on the interest rate. This is in sharp contrast with the AS-AD model, where the demand for money does depend on the interest rate.

2. In what sense is the Laffer Curve consistent with the standard microeconomic theory of labor supply?

The Laffer Curve shows that there is a certain tax rate beyond which the supply response is large enough to lead to a decrease in tax revenue for further increases in the tax rate. For tax rates lower than this threshold, an increase in the tax rate causes a rise in tax revenues. The Laffer Curve is consistent with standard micro theory, though whether it is correct is an empirical question. The reason for this is that labor supply may move with changes in tax rates for two reasons: the substitution effect in which the relative value of working goes up as the tax rate falls leads to an increase in labor supply, while the income effect of more wealth due to lower taxes may reduce labor supply, so the assumption in the Laffer curve that higher taxes reduce labor supply (and so lead to less tax revenue than if labor supply stayed constant) will only be true if the income effect is smaller than the substitution effect. In order for revenues to decrease, the reduction in labor supply must be large enough to offset the increase in revenues that comes from higher taxes on current output. Formally, the elasticity of income with respect to taxes must be negative and greater than 1 in absolute magnitude. Empirical evidence suggests that tax rates must be extremely high, relative to current rates, before the reduction in labor supply is large enough to cause tax revenue to decrease when the tax rate rises.

3. What does it mean to say that expectations are rational?

The rational expectations hypothesis assumes that people know the true model of the economy and that they use this model to form their expectations of the future, and then act by taking these expectations into account. Rational expectation implies that people form "consistent" expectations about the future paths of policy rate, for instance, which is not all that convincing in reality.

4. List the assumptions behind real business cycle theory. How would this theory explain a fall in the unemployment rate?

The main assumptions behind the Real Business Cycle theory are complete price and wage flexibility, optimization, and rational expectations. A theory assuming complete price flexibility would imply that there is never unemployment aside from frictional unemployment. However, the RBC theory introduces shocks to the production technology to explain fluctuations in unemployment and output. For example, the recent fall in the unemployment rate can be explained by the RBC theory: a positive technology shock could have increased the marginal product of labor, increasing the real wage and thus the supply of labor, leading to lower unemployment.

Growth Theory

1. In a Cobb-Douglas world, how much does the growth rate of output increase if the growth rate of labor increases by .3 percentage points?

Assuming a Cobb-Douglas technology means that output is:

$$Y = AK^{\alpha}L^{1-\alpha}$$

The growth rate of output is:

$$g_Y = g_A + \alpha g_K + (1 - \alpha) g_L$$

where g indicates the growth rate. This means that if the growth rate of labor increase by 0.3%, that the growth rate of output will increase by $(1-\alpha) \times 0.3\%$.

2. Why are China and India growing faster than the United States and Europe?

Many economists argue that when poorer, less developed countries begin to develop, they typically have higher growth rates as they catch up with the more developed countries. This is due in part to more rapid accumulation of capital in countries with low initial capital stocks since they have yet to face diminishing returns. Also, they may be able to increase productivity more rapidly by importing and applying technologies developed earlier elsewhere while high productivity countries must develop completely new technologies. This is the so-called convergence theory, since it suggests that gaps in

national incomes tend to close over time.

3. What is the difference between embodied technical change and disembodied technical change? Give an example of each.

Embodied technical change results in an improvement in the quality of capital: this happens when technical innovations are incorporated into new machines, with older machines discarded when they become obsolete. Disembodied technical change is not specifically embedded in either labor or capital, but results in a change in the production process. One example could be changes in regulations that affect the production process and thus the productivity of the firms.

4. If France lowers its work week from 35 hours to 32 hours and then keeps it at 32 hours, what effect will this have on its long-run growth rate of output?

Because the work week is kept at 32 hours once it is lowered, this will not have any effect on the long-run growth rate of output.

If assuming Cobb-Douglas production function as in question 1 above, then output is:

$$Y = AK^{\alpha}(LH)^{1-\alpha}$$

where H represents work week, and so the growth rate of output is:

$$g_Y = g_A + \alpha g_K + (1 - \alpha)g_L + (1 - \alpha)g_H$$

In the long run, because work week is kept at 32 hours once it is lowered, $g_H = 0$ so that the law change does not have any effect on long-run output growth rate.