Econ 305   Prof. Kasa
Intermediate Macroeconomic Theory   Spring 2010

FINAL EXAM
(Solutions)

Answer the following questions True, False, or Uncertain. Briefly explain your answers. No credit without explanation. (8 points each).

1. Higher taxes increase the unemployment rate.

   UNCERTAIN. *This could be true if taxes are only levied on labor income. The value of being employed is reduced (V_e shifts down), and the reservation wage increases. As a result the equilibrium unemployment rate rises. However, if taxes are levied on both labor income and unemployment benefits, then the unemployment rate would not likely be affected, since both V_e and V_u shift down, and the reservation wage does not change. (See Figures 16.16 and 16.17 in the text). Note, some students might use the neoclassical labor market model of chapter 9 to analyze this question. However, that model only determines* employment/hours, *not unemployment, so it cannot really be used to answer this question. Still, if students mistakenly discuss the effects of taxes on employment rather than unemployment (and the analysis is correct), give them some partial credit.*

2. Flexible exchange rates lead to more stable output.

   UNCERTAIN. *From the perspective of the neoclassical model in chpt 14, the exchange rate regime does not influence output, so the answer would be false. However, from a Keynesian perspective, the answer could be true if most shocks are 'real' (ie, shift the IS curve). On the other hand, the answer would still be false even in a Keynesian model if most shocks are monetary (ie, shift the LM curve).*

3. Higher inflation increases output.

   UNCERTAIN. *It depends on whether the inflation is expected or unexpected and on whether the model is neoclassical or Keynesian. In the neoclassical model, this would certainly be false if the inflation is anticipated (see Figure 15.5 in the text). However, it could be true, even in a neoclassical model, if the inflation is unexpected (see the discussion of the Friedman-Lucas supply curve). Finally, in the Keynesian model, even if the inflation is expected it could have some positive effect on output if wages are slow to respond. By lowering real wages, inflation causes the demand for labor to increase.*

4. Positive productivity shocks lead to current account deficits.

   UNCERTAIN. *It depends on whether the shock is temporary or permanent. A purely temporary shock will not influence investment; it will simply increase current output. As a result, saving will increase, investment will remain the same, and therefore the current account will increase (ie, surplus), not decrease. However, if the shock is permanent, or expected to occur in the future, then investment will increase and saving will decrease (in anticipation of the higher future income) and the current account will decrease. (Note, in class I said that to a first-order approximation, a permanent shock would not influence the intertemporal pattern*

of output, and would therefore not change saving. However, since it does increase investment, which increases the future capital stock, output will tend to be higher in the future relative to the present, in which case saving would actually decline. Either way, the current account would register a deficit. They do not need to point out this additional effect for full credit.

5. Productivity shocks cause business cycles.

   Obviously this is UNCERTAIN, *since economists themselves have been arguing about it for the past 25 years! In principle, persistent productivity shocks produce responses within the neoclassical model that replicate many of the observed features of business cycles. This suggests that such a model in combination with persistent productivity shocks could explain why we experience business cycles. The problem is identifying the shocks. In practice, measured Solow residuals can be misleading indicators of productivity shocks, due to the fact that they tend to have a significant endogenous component due, for example, to endogenous factor utilization rates. If this is the case, the causation might run the other way. Output fluctuations due to some other factor (e.g., demand shocks) might cause productivity to move procyclically. (They don't need to discuss the effects of productivity shocks within the Keynesian model, but as noted in the text (pgs. 430-431), productivity shocks are not a promising explanation for business cycles in the Keynesian model, since they cause employment to move countercyclically, which is strongly contradicted by the data).*

   The following questions are short answer. Briefly explain your answer. Clarity will be rewarded.

6. (20 points). Suppose Canada adopted the U.S. dollar as its currency. Use the Mundell-Fleming model to describe how this would change the way U.S. macroeconomic policy affects Canada.

   This question is straight from the notes. If Canada adopts the U.S. dollar then obviously it has a fixed exchange rate with the U.S. This will then mean that U.S. monetary policy will now get transmitted 'positively' to Canada, while fiscal policy will get transmitted 'negatively'. Currently, with a flexible rate, U.S. monetary policy gets transmitted negatively, while fiscal policy is transmitted positively. They do not need to use graphs for full credit, but if they don't, then they should explain in words <u>why</u> the transmission effects are reversed. For example, with fixed rates (ie, a common currency), a U.S. monetary expansion lowers U.S. rates and raises U.S. output. If Canada is fixed to the U.S., then obviously rates must decline in Canada as well, which then causes Canadian output to increase along with U.S. output. On the other hand, if there is a U.S. fiscal expansion, then U.S. interest rates will tend to rise. This will force rates to rise in Canada as well, but without the fiscal expansion to offset it, so that Canadian output declines while U.S. output expands.

7. (20 points). During the 1970s inflation rose dramatically in both the U.S. and Canada, and then decreased sharply in the early 1980s. Compare and contrast two possible explanations for why this occurred. Which do you think is more persuasive? Why?

   Again, this is straight from the notes (the last lecture slides), as well as the text (chpt 17, which discusses this question in terms of a 'commitment story' and a 'learning story'). If the central bank cannot commit to its policies, then inflation turns out to be an increasing function of the difference between the natural rate and the Central Bank's target unemployment rate.

(They do not need to derive an exact expression for this, although it is derived in the notes for the case of quadratic preferences. However, they should explain intuitively why there tends to be an inflation bias when the Central Bank lacks commitment). Because equilibrium inflation is a positive function of the natural rate of unemployment, anything that causes this to rise and then fall could in principle explain the observed pattern of inflation during the past 40 years. For example, demographic changes associated with the baby boom are widely suspected of first raising and then lowering the natural rate during the past 40 years. Likewise, labor market policies have also tended to generate this pattern, since unemployment benefits became more generous during the 1970s, and then more strict in the 1990s (in both the U.S. and Canada). There are two main problems with this story: (1) It doesn't really get the timing right. Inflation was rising during the late 1960s, well before the productivity slowdown and the influx of the baby boomers into the labor market. Likewise, inflation came down well before unemployment insurance became stricter during the mid-1990s. (2) The commitment story relies on the assumption that Central Banks are short-sighted, and cannot sustain a reputation for low inflation. With repeated play, a patient Central Bank should be able to sustain low inflation, despite the short-term temptation to generate a surprise inflation. Both the U.S. and Canadian central banks have a signficant amount of political independence, which should support the the low inflation outcome, despite the formal absence of a commitment mechanism.

As a result, many economists have argued in favor of a 'learning story'. Inflation rose during the 1960s because central banks mistakenly believed there was an exploitable trade-off between inflation and unemployment. Once they discovered this was not the case, they gave up attempts to manipulate the unemployment rate, and simply kept inflation low.

In class, I also discussed a couple of other possible explanations, which some students might refer to. (1) Revenue: Since inflation is a tax, and yields revenue to the government, another possible explanation is that revenue requirements rose and fell during the 1970s and 1980s. However, this is not at all a convincing story for the U.S. and Canada, since seignorage revenue is insignificant. (2) Lack of Control: Central Bankers like to argue that they had no control over the inflation of the 1970s. Oil and other commodity prices rose, and these 'cost shocks' caused inflation to rise uncontrollably. Most economists do not find this very convincing. Cost shocks may make it more painful in some sense to maintain low inflation, but the rise in inflation was still a <u>choice</u> to accommodate. Besides, there have been other episodes of rapidly rising oil prices that did not lead to such high inflation. Still, if the students discuss one of these other stories, don't deduct marks if they duly point out the weaknesses of these arguments.

8. (20 points). Recently there has been a lot of debate about the size of the so-called 'multiplier' (i.e., how much output increases in response to a temporary one unit increase in government spending). Some estimates imply it is zero, and others claim it is well above one. What does the neoclassical (market-clearing) model predict about the size of this multiplier? Under what conditions will it be large and under what conditions will it be small? Illustrate your analysis using labor market and goods market diagrams. Now repeat the same analysis from the Keynesian perspective, using IS-LM and and AD-AS curves. Under what conditions will the multiplier be large in a Keynesian model? Why do you think Keynesians tend to believe the multiplier is large, while neoclassical economists tend to believe it is small?

This is clearly the hardest question, and I do not expect anyone to provide a complete analysis. (I'm not sure I can either!). Therefore, you should be generous with the partial credit. The

new edition of the text actually contains a detailed discussion of the multiplier in the context of the neoclassical model, so some people might actually nail this part of the question. (See pages 316-321). For full credit, they should provide graphs, like those on page 319. The key determinants of the size of the multiplier in the market-clearing model are the strengths of the intertemporal substitution and wealth effects on labor supply. The stronger they are, the bigger the multiplier. From the perspective of the market-clearing model, the only reasons government spending causes output to increase are: (1) it makes people poorer (due to higher taxes), which makes them work harder, and (2) it tends to cause the interest rate to rise temporarily, which causes people to work harder today instead of tomorrow. A larger wealth effect causes a larger rightward shift of the Y^s curve, while a larger intertemporal substitution effect causes the Y^s to be flatter, which means that any given shift in the Y^d curve (due to a temporary increase in G) causes a bigger output change.

From a Keynesian perspective, there are also two key determinants of the size of the multiplier: (1) How much the AD curve shifts right, and (2) How steep the AS curve is. The magnitude of the AD curve shift depends on how much the IS curve shifts, which depends positively on the marginal propensity to consume, and on the relative slopes of the IS and LM curves. If LM is steep (due perhaps to a low interest sensitivity of money demand) then interest rates rise a lot after the increase in G, which tends to reduce investment. If investment is sensitive to the interest rate (so that IS is flat) then any given rightward shift of IS produces less of an output response, since crowding out is greater. In sum, AD shifts a lot, and the multiplier tends to be larger when: (1) the marginal propensity to consume is large, (2) money demand is sensitive to the interest rate, so that LM is flat, and (3) investment is not sensitive to the interest rate, so that crowding out is minimal. The multiplier will also tend to large when the AS curve is flatter, so that any given rightward shift of AD causes output to rise a lot. In the simplest Keynesian models, AS slopes up because rising prices lower real wages, which increases the demand for labor (employment is demand determined in the simplest Keynesian models). Clearly, the strength of this effect depends on the slope of the labor demand curve (ie., the curvature of the production function). If labor demand is flat, a given reduction in real wages will produce a large increase in labor demand, which causes a large increase in output (ie., the AS curve is flat, and the multiplier is large).

Keynesians tend to estimate large multipliers because they assume output is demand determined, and they do not worry about things like intertemporal budget constraints. In fact, in simple Keynesian models, people may feel <u>wealthier</u> after increases in government spending. Keynesian models typically assume that Ricardian equivalence does not hold, so that financing expenditures by issuing bonds can make current generations feel wealthier (output rises while taxes are paid by somebody else). Hence, there tends to be far less crowding out in Keynesian models.