Final Exam Answer Key

Economics 305: Macroeconomic Theory

Spring 2006

1 Short-answer questions (28 points)

a) Equilibrium labour input will be too low (7 points).

b) Money is neutral if its current level has no effect on any real variables. Money is superneutral if its current growth rate has no effect on any real variables (7 points).

c) The Solow model assumes decreasing returns to scale in capital. Given this, an additional unit of capital increases output by a smaller and smaller amount as more capital is accumulated. At some point, new investment is just enough to replace capital lost through depreciation or population growth (7 points).

d) The endogenous growth model does not exhibit convergence in either levels or growth rates of per capita income. An economy's growth rate is determined by its rate of investment in human capital. Because human capital accumulation exhibits constant returns to scale, an economy with higher investment rates will permanently grow faster than an otherwise identical economy with lower investment rates. So rich and poor economies will tend to diverge rather than converge (7 points).

2 Labour force statistics (6 points)

a) The unemployment rate was 7.6% (3 points).

b) The labour force participation rate was 67.5% (3 points).

3 The dot-com boom in a closed economy (12 points)

a)

- Current consumption C goes down (1 point).
- Current investment I goes up (1 point).
- Current labour input N goes up (1 point).
- Current real wages w go down (1 point).
- Current output Y goes up (1 point).
- The current interest rate r goes up (1 point).

b) They all go up (1 point each, for a total of 5 points).

c) The consumer is worse off (1 point).

4 The dot-com boom in an open economy (27 points)

a) The thing to notice here is that the mistaken belief has two effects in the current period. First, the firm wants to increase its investment. This will reduce its current profits paid to the consumer, though it will produce higher future profits as well as a higher present value of lifetime profits. In the closed economy, the consumer must reduce his consumption. In an open economy, he can borrow from abroad in order to maintain his consumption. In fact, because his lifetime income has gone up, he will raise his consumption.

- Current consumption C goes up (2 points).
- Current investment I goes up (2 points).
- Current net exports NX go down (2 points).
- Current labour input N goes down (2 points).
- Current real wages w go up (2 points).
- Current output Y goes down (2 points).
- The current real interest rate r does not change (2 points).

b) As in the closed economy, the open economy starts the second period with extra capital because of the high first-period investment. This extra capital implies increased output (for a given labour input). In the closed economy model, this meant the consumer had higher consumption. However, in the open economy much of the increased investment in the first period was financed by borrowing abroad. This debt must be paid off (by an increase in net exports) in the second period.

Now, to determine the effect on consumption we come to the question of which is bigger, the increase in output due to higher K' or the increase in net exports needed to pay off the debt. It turns out that the increase in net exports is bigger: the marginal product of capital is less than the world real interest rate, so each dollar borrowed to finance the increased investment had a negative net return. The result of this is that the increase in NX' is bigger than the increase in Y', so consumption must go down.

- Future consumption C' goes down (2 points).
- Future net exports NX' goes up (2 points).
- Future labour input N' goes up (2 points).
- Future capital K' goes up (2 points).
- Future output Y' goes up (2 points).

Note that the question didn't ask about real wages. This is because the effect is ambiguous: labour demand increases because of the higher capital (which implies a higher marginal product of labour), and labour supply increases because of the decreased real income. This unambiguously increases total labour input, but could lead to higher or lower wages.

c) The thing I wanted you to notice was that access to international capital markets changes the nature of Canada's response. Instead of temporarily raising savings (working more and consuming less) to finance the increased investment, Canada simply finances investment by borrowing from abroad. It turns out that access to international capital markets is great potential benefit to developing countries because it allows them to raise investment without reducing consumption too much (when you are barely getting by, avoiding even temporary reductions in consumption may be quite valuable). However, when optimism about the returns on that investment turns out to be unwarranted, this international borrowing will be greatly regretted.

There are a wide variety of other correct answers to this question. We will give full credit to any nontrivial answer that makes sense in the light of the model's implications (3 points).

5 "Irrational exuberance" and business cycles (27 points)

The table should look like this (2 points for each cell):

Variable Name	(a) Actual Data	(b) Closed Economy	(c) Open Economy
Consumption	Procyclical	Counteryclical	Countercyclical
Investment	Procyclical	Procyclical	Countercyclical
Employment	Procyclical	Procyclical	Procyclical
Real wage	Procyclical	Countercyclical	Countercyclical

The model performs quite poorly, particularly in the open economy case. In contrast, the RBC model (or the coordination failure model) predict all of these variables will be procyclical, just like in the data (3 points).