

QUEEN'S UNIVERSITY
FACULTY OF ARTS AND SCIENCE
DEPARTMENT OF ECONOMICS

ECON 320

Final Examination

April 22, 2009

Professor Beverly Lapham

INSTRUCTIONS:

The examination is three hours in length.

Justify your answers for full credit.

There are FIVE questions and points are distributed as follows:

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|----------|----------|
| 1. A. 10 | 4. A. 10 |
| B. 5 | B. 10 |
| 2. 10 | C. 10 |
| 3. A. 10 | D. 5 |
| B. 10 | 5. A. 5 |
| C. 5 | B. 10 |

CALCULATORS: Allowable calculators – Casio 911
Blue sticker
Gold sticker

No other aids are allowed in the examination.

PLEASE NOTE: Proctors are unable to respond to queries about the interpretation of exam questions. Do your best to answer exam questions as written.

1. Consider the static model with uncertainty in which a single household values consumption and leisure. There is a single firm which uses labour to produce a final good. The household and firm must commit to a level of labour input after receiving a signal (bad or good) about labour productivity but before observing actual productivity (low or high).
 - 1.A. Use an indifference curve diagram to depict expected and actual labour input, expected and actual output, and expected and actual utility when the signal is good and actual productivity is low.
 - 1.B. Explain how this model can generate acyclical hours over the business cycle.

2. Consider a two-period model of a small open economy *without* capital. There is a single household in period 1 that only lives for one period. There is another household in period 2 that only lives for one period. Both households value consumption of a final good and leisure. There is a government who lives for two periods, spends in both periods, and finances its expenditures using lump-sum taxes imposed on the household. The government does not need to balance its budget each period but it must balance its lifetime budget. Explain whether or not you expect Ricardian Equivalence to hold in this economy and justify your answer.

3. Consider our two-period model of a small open economy *with* investment in capital and an initial capital stock. There is a single household that lives for two periods and that values consumption of the final good only. There is no government.
 - 3.A. Consider a technology shock **in period 1** which causes the trade balance in period 1 to fall. Use our savings and investment diagram to demonstrate the effect of this technology shock on savings, investment, and the trade balance and explain your answer. Use an indifference curve diagram to demonstrate the effect of this technology shock on household consumption in each period and on household utility and explain your answer.
 - 3.B. Consider a technology shock **in period 2** which causes the trade balance in period 1 to fall. Use our savings and investment diagram to demonstrate the effect of this technology shock on savings, investment, and the trade balance and explain your answer. Use an indifference curve diagram to demonstrate the effect of this technology shock on household consumption in each period and on household utility and explain your answer.
 - 3.C. Using your answers above, explain why your textbook states that “There is no theoretical justification for utilizing the trade balance as a measure of economic welfare.”

4. Consider a small open economy with a single household that lives for two periods and a government that lives for two periods.

The household utility function is given by

$$u(c_1, c_2) = 2 \ln(c_1) + \ln(c_2) + 2g_1 + g_2,$$

where c_t is household consumption in period t and g_t is government spending in period t for $t \in \{1, 2\}$. Note that the household receives no utility from leisure. The household has one unit of time each period.

There is also a firm which uses the household's labour in each period to produce with the following technologies:

$$y_1 = 21n_1 \qquad y_2 = 14n_2,$$

where y_t is output in period t and n_t is labour input in period t for $t \in \{1, 2\}$. Output is non-storable.

The household and the government can borrow and lend from each other and from the rest of the world at an exogenous gross real interest rate equal to $R = 1.2$.

- 4.A.** Suppose the government is spending $g_1 = 2$ in the first period and $g_2 = 3.2$ in the second period. The government is imposing a lump-sum tax equal to $\tau_1 = 3$ in the first period and a lump-sum tax in the second period so as to satisfy the government's intertemporal budget constraint. Determine household consumption in each period. Determine the trade balance for this country in the first period.
- 4.B.** Suppose now that government spending increases in period 1 to $g_1 = 3$ while the first period lump-sum tax level is unchanged and government spending in the second period is unchanged (that is $\tau_1 = 3$ and $g_2 = 3.2$). By calculating the new levels, determine the effect of this increased government spending on household consumption in each period and on the country's trade balance in the first period. Provide an economic explanation for the direction of the changes.

Suppose now that this is a large country in a two country world and label this country as Country 1. Country 1 is trading with another large country, Country 2, which has the same preferences and technologies as Country 1. The only difference between the two countries is that Country 1's government has the spending and taxation scheme described in 4.A. above but the government in Country 2 is not spending or taxing in any period.

- 4.C.** Determine the equilibrium gross real interest rate, R^* , when these two large countries trade.
- 4.D. Without** doing any calculations, speculate on the effect on the equilibrium gross real interest rate of the increase in government spending in Country 1 in period 1 described in 4.B.

5. Suppose we have a small open economy with investment in physical capital. There is a single household with preferences over consumption of the final good in each period given by the following utility function:

$$u(c_1, c_2) = \ln(c_1) + 3 \ln(c_2).$$

The household has one unit of time each period.

The final good is produced in each period using labour and capital with the following production technologies:

$$y_1 = z_1 k_1^{0.8} n_1^{0.2} \qquad y_2 = z_2 k_2^{0.8} n_2^{0.2},$$

where $z_1 > 0$ and $z_2 > 0$ are exogenous technology parameters. The capital stock in period one is exogenous and is equal to $k_1 = k = 1$. Capital completely depreciates between period one and two.

The household can borrow and lend from the rest of the world at a gross real interest rate equal to $R \geq 1$.

- 5.A. Derive investment demand for the household as a function of exogenous parameters. You should see that the investment demand function is independent of z_1 and increasing in z_2 . Provide an **economic explanation** for why this is so.
- 5.B. Suppose now that $z_1 = 20$, $z_2 = 5$ and $R = 2$. Calculate the level of the trade balance in period 1 for this country. Is this country a borrower, a lender, or neither in period 1? Justify your answer.