14.02 Principles of Macroeconomics
Fall 2009

Quiz 3
Thursday, December 3rd
7:30 PM – 9 PM

Please answer the following questions. Write your answers directly on the quiz. You can achieve a total of 100 points. There are 5 multiple-choice questions, followed by 2 free response questions. You should read all of the questions first.

Good luck!

NAME: ______________________________

MIT ID NUMBER: ______________________________

TA: ______________________________

CLASS TIME: ______________________________

EMAIL: ______________________________

(Table is for corrector use only)

	1	2	3	4	5	6	7	8	Total
Multiple Choice Questions									
Long Question 1									
Long Question 2									
Total									

1 Multiple Choice (30 points)

1. [6 points] An increase in domestic prices:

   (a) Depreciates the domestic currency.

   (b) Appreciates the domestic currency.

   (c) Has an ambiguous effect on the domestic currency.

2. [6 points] In the short run, a contractionary monetary policy in an open economy...

   (a) Contracts output and generates a depreciation.

   (b) Contracts output and generates an appreciation.

   (c) Expands output and generates a depreciation.

3. [6 points] There is a 30% tax levied on income above $15,000. A person with income of $18,000 faces:

   (a) A marginal tax rate of 30% and an average tax rate of 30%.

   (b) A marginal tax rate of 30% and an average tax rate of 25%.

   (c) A marginal tax rate of 30% and an average tax rate of 5%.

4. [6 points] Consider a 2 country world, countries A and B. If under autarky the interest rates satisfy $r^A > r^B$, after integration:

   (a) Savings and investment in country A decrease.

   (b) Savings decrease in country A and country B.

   (c) Savings in country A and investment in country B decrease.

5. [6 points] Deposit insurance...

   (a) Is a succesful tool in preventing bank runs but it is costly for the government.

   (b) Is a succesful tool in preventing bank runs and it may not be costly for the government.

   (c) Has not proven to be a succesful tool in preventing bank runs.

2 Barro 1979 (35 points)

Consider the 2 period consumption model. Denote c_t consumption and y_t income at time $t = 1, 2$. Consumers and government may save and borrow at period $t = 1$ at a given interest rate r. Each period, the government collects lump sum taxes t_t and government expenditures are g_t. Income, taxes and government expenditures are exogenous for the consumer. Utility for consumers is given by $U(c_1, c_2) = u(c_1) + \beta u(c_2)$. Assume $\beta(1 + r) = 1$.

1. [2 points] Obtain the intertemporal budget constraint for the consumer.

2. [2 points] Obtain the intertemporal budget constraint for the government.

3. [6 points] Combine the previous expressions to sketch a proof of the statement "The timing of taxes does not affect consumption choices as long as the present value of consumption is not affected".

4. Let us consider the case in which taxation is no longer a one-to-one transfer of purchasing power from consumers to the government. In particular, assume that when taxes t_t are collected, an amount $\gamma(t_t) = bt_t^2$ of income is wasted, where b is a positive constant. We may think of this as collection costs or "deadweight losses." The marginal loss given by $\gamma'(t) = 2bt$ is increasing in t.

   (a) [3 points] Obtain the intertemporal budget constraint for the consumer.

(b) [2 points] Obtain the intertemporal budget constraint for the government.

(c) [5 points] Does the Ricardian equivalence still hold? Explain.

(d) [4 points] Suppose that the consumer could choose the timing of taxes subject to the intertemporal budget constraint for the government. Recall that under the assumption $\beta(1+r) = 1$, $c_1 = c_2$. State the maximization problem to determine the optimal choice of t_1 and t_2. No need to solve.

(e) [2 points] Interpret the following two conditions that determine optimal tax collection.

$$\begin{aligned} 2bt_1^* &= 2bt_2^* \\ g_1 + \frac{g_2}{1+r} &= t_1^* + \frac{t_2^*}{1+r} \end{aligned}$$

(f) [4 points] Solve for the optimal tax path.

(g) [5 points] Use your results to justify how a government should finance a temporary increase in government expenditures (e.g. wartime).

3 Open Economy (35 points)

Consider a world economy with two countries. The home country is characterized by:

$$
\begin{aligned}
C &= c_0 + c_1 Y \\
I &= c_2 \\
X &= \frac{d_1 \tilde{Y}}{e} \\
\frac{M}{e} &= d_2 Y
\end{aligned}
$$

where $C, Y, \tilde{Y}, I, M, X, e$ denote aggregate consumption, domestic output, foreign output, investment, imports, exports and the real exchange rate, respectively. Assume $c_0,\ c_2 > 0,\ 0 \leq c_1 \leq 1,\ 0 \leq d_1 \leq 1,$ $1 - c_1 + m > 0,\ 0 \leq d_2 \leq 1.$

The foreign country is characterized by

$$
\begin{aligned}
\tilde{C} &= \tilde{c}_0 + \tilde{c}_1 \tilde{Y} \\
\tilde{I} &= \tilde{c}_2 \\
\frac{\widetilde{M}}{\tilde{e}} &= d_1 \tilde{Y} \\
\tilde{X} &= \frac{d_2 Y}{\tilde{e}}
\end{aligned}
$$

Assume that parameters in the foreign economy satisfy assumptions analogous to the ones for the domestic economy.

We will assume throughout the question that the real exchange rate (e) is exogenously given.

1. [5 points] Find the equilibrium level of output in the domestic goods market as a function of $e, G, \tilde{Y}$ and parameters. Find the multiplier. Find equilibrium in foreign goods market as a function of $\tilde{e}, \tilde{G}, Y$ and parameters.

2. [3 points] How do net exports depend on the real exchange rate in this model?

3. [3 points] State a condition relating e and $\tilde{e}$.

4. [6 points] Solve for domestic output as a function of $e, G, \tilde{G}$ and parameters.

5. [6 points] How is domestic output affected by a real depreciation of the home goods relative to the foreign goods? What about foreign output? Explain.

6. [6 points] Suppose that each country may either "not act" or "attempt to depreciate." If a country attempts to depreciate and the other country does not act, then the depreciation is achieved. However, if both countries attempt to depreciate, there is no change in the real exchange rate. Show that each country will choose to "attempt to depreciate".

7. [6 points] In light of the previous result, interpret the following paragraph of the article "Currency war fears after Swiss devaluation" (12th March 2009)

   Analysts have warned of the emerging threat of currency wars following a Swiss market intervention. The Swiss franc fell by as much as 3.2 per cent against the euro to 1.53 - the biggest decline since 1999 - after the country's central bank said it was taking deliberate measures to weaken its currency. The move raises fears of retaliatory measures by other countries seeking to give their exporters a competitive edge.

   [Hint: if prices are sticky, the real and nominal exchange rates move together]

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