

## Final Exam: 260B Open Economy Macroeconomics

Prof. Bergin, Fall 2012

Instructions: Answer question 1 and any two of the remaining three questions. If you attempt all four questions, indicate which three you would like graded. (All questions have equal points.)

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### Question 1: Small Open Economy with Investment

Consider a two-period small open economy with one world good and no uncertainty. The global financial market has a noncontingent real bond with an exogenous return ( $r_1$ ). The representative agent in the small open economy receives an exogenous endowment in period one ( $Y_1$ ), which can be used to fund consumption ( $C_1$ ), purchase of the world bond ( $B_1$ ), or invest ( $I_1$ ) in real capital. Period 2 has no endowment, but output is a function of capital created the previous period ( $K_2 = I_1$ ). Government spending is exogenous each period ( $G_1, G_2$ ).

$$\max_{C_1, C_2, I_1} U(C_1) + \beta U(C_2)$$

$$s.t. Y_1 - I_1 - G_1 - C_1 = B_1 \quad \text{period 1 budget constraint}$$

$$Y_2 + (1 + r_1)B_1 - G_2 - C_2 = 0 \quad \text{period 2 budget constraint}$$

$$Y_2 = A_2 K_2^\alpha, \quad A_2 > 0 \quad 0 < \alpha < 1$$

$$K_2 = I_1$$

$$\text{where } U(C_t) \equiv \log C_t, \quad \beta \neq \frac{1}{1 + r_1}$$

- Find the first order conditions for consumption and investment.
- Interpret the first order conditions. How is the investment decision affected by the level of productivity for the future period, and how is it affected by the world interest rate on global bonds? Explain the economic intuition for each of these.
- Find an expression for the current account in period 1 as a function of exogenous terms ( $Y_1, A_2, r_1, G_1, G_2$ ).
- In terms of comparative statics, how would the current account in period 1 be affected by a higher level of government spending in period 1, all else constant (higher value, lower, no change, ambiguous; and explain)? How about a higher level of government spending in period 2?
- In terms of comparative statics, how would the current account in period 1 be affected by a higher level of productivity in the future period ( $A_2$ )? Explain the various channels at work by which this productivity term affects the current account in this model.
- In terms of comparative statics, how would the current account in period 1 be affected by a higher level of the world interest rate ( $r_1$ )? (For this case assume no government spending:  $G_1 = G_2 = 0$ ). Explain the various channels at work, and the direction of the effect each has on the current account.

Bonus: Might it be optimal for a country to choose zero investment, and just earn revenue through bond accumulation without any production in period 2?

## **Question 2: Interest Rate Parity Under Capital Controls**

Consider an intertemporal model of a small open economy where households solve the following problem, where  $B$  represents nominal bonds in the home currency,  $B^*$  represents nominal bonds in a foreign currency, with  $i$  and  $i^*$  the corresponding nominal interest rates,  $e$  is the nominal exchange rate (home currency units per foreign),  $P$  is the price level,  $Y$  is endowment, and  $C$  is consumption. Assume a capital tax of fraction  $\tau$  on home returns from foreign currency bonds. This capital tax is time-varying and is chosen by the government after the equilibrium of other variables is revealed.

$$\begin{aligned} & \text{Max}_{C_s, B_s, B_s^*} E_t \sum_{s=t}^{\infty} \beta^{s-t} U(C_s) \\ & \text{s.t. } P_s Y_s + (1+i_{s-1})B_{s-1} + e_s (1+i_{s-1}^*)(1-\tau_s)B_{s-1}^* = P_s C_s + B_s + e_s B_s^* \end{aligned}$$

- Set up the dynamic programming problem and derive first order conditions for consumption and bond holdings.
  - Derive the uncovered interest rate parity condition implied by this model. Identify and interpret the risk premium in this condition.
  - Discuss how this risk premium potentially could explain the puzzling result of the Fama regression (testing a simplified version of interest parity). How would the risk premium need to behave in that case?
  - Is there a design of the capital tax policy that could eliminate the risk premium on foreign bonds relative to home bonds from the perspective of the home agent? If so, specify the policy rule the government should use to set the capital tax ( $\tau_s$ ) each period.
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## **Question 3: International Output Comovement**

- What are the empirical facts regarding the cyclical comovement of GDP internationally? How do these facts relate to the recent financial crisis?
  - Explain using examples from papers read in class how financial market integration (asset trade) can either work to lower international GDP comovement or to raise it (cite a paper for higher comovement and one for lower). Explain why financial integration works different in the two papers.
  - Explain using examples from papers read in class how goods market integration (goods trade) can either work to lower international GDP comovement or to raise it (cite at least one paper total), and explain the distinction between the two cases.
  - Evaluate the relative merits of the financial versus the goods market argument in terms of explaining relevant stylized facts. Which argument do you think is stronger?
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## **Question 4: International Price Puzzle and Monetary Policy**

- Explain the empirical evidence regarding purchasing power parity and the implied behavior of the real exchange rate.
- Explain how a micro-founded model of price stickiness studied in class can potentially explain this international price puzzle (cite at least one paper).
- Discuss if this failure in purchasing power parity provides a welfare justification for monetary policy to target the exchange rate. Cite a paper discussed in class and explain the argument.