

**Swiss Program for Beginning Doctoral Students in Economics 1999**

**Final Exam in Macroeconomics**

**Wednesday, March 8, 2000, 08.30h - 11.30h**

1. You are allowed to use all material that you want (lecture notes, books, etc.) with the exception of PC's.
2. Please **do not** mention your name on top of the pages, but use your identification number from the enclosed list. The reason is that the exams will be graded anonymously. Please use **a pen** rather than a pencil so that your answers can be read without problems.
3. Good luck!

ID-Number: \_\_\_\_\_

**Studienzentrum Gerzensee**  
**Macroeconomics Doctoral Course 1999**  
Final Examination

There are five questions on this examination, which are worth 20 points each. Within each question, each part is worth the same fraction of the 20 point total.

You have three hours to complete the examination. Please budget your time carefully and write legibly.

- (1) *Intertemporal Models of the Current Account.* Consider a 2-period model of a Small Open Economy where individuals value consumption in the 2 periods, denoted  $c_1$  and  $c_2$ , and where production in the 2 periods,  $y_1$  and  $y_2$ , requires capital alone.
- (a) Draw the autarky equilibrium in a graph where  $c_1, y_1$  are on the horizontal axis and  $c_2, y_2$  are on the vertical axis.

- (b) Suppose that the autarky interest rate is below the world interest rate. Show on the graph what happens if the small country opens itself to trade in financial assets with the rest of the world. Specifically, show what happens to consumption  $c_1$  and  $c_2$ , saving, investment, and the current account in period 1.

- (c) Now consider a 2-country world in which the home country has a low autarky interest rate and the foreign country has a high autarky interest rate. Suppose these two countries are allowed to borrow and lend from each other. Use the Metzler diagram to illustrate the world equilibrium and the determination of the world interest rate. Describe what happens to saving, investment, and the current account in each country.

- (d) Use the Metzler diagram to analyze the effects of an anticipated future decline in productivity in the foreign country. That is: describe what happens to saving, investment, and the current account in each country. Characterize the form of the small country's optimal demand for capital.

(2) *Expectations and Exchange Rate Dynamics*. This question concerns the Dornbusch model.

(a) Write down the key elements of the model. What “stylized facts” was this model designed to explain?

- (b) Describe the two alternative ways for clearing the goods market in the presence of sticky prices that are described by Dornbusch in this model.

- (c) Draw the graph that illustrates the equilibrium in this model; describe each of the elements on this diagram and discuss possible transition paths for an economy not at the long run equilibrium.

- (d) Use the diagram to illustrate the effects of a monetary expansion and show how the increase in money can lead to exchange rate 'overshooting.' Carefully describe the economic forces that lead to the overshooting phenomenon.

- (e) Dornbusch describes a variant of his model in which the exchange rate does not overshoot. Describe the essential elements of the model without overshooting, and discuss the main economic forces that mean that overshooting does not occur.

- (3) *Asset Pricing*. Models of intertemporally optimal consumption-portfolio decisions lead to restrictions of the following form,

$$E_t \frac{\partial U(\dots, c_t, c_{t+1}, \dots)}{\partial c_t} = E_t \{ [1 + r_{t+1}] \frac{\partial U(\dots, c_t, c_{t+1}, \dots)}{\partial c_{t+1}} \}$$

if an agent can costlessly trade a specific financial asset each period. In this expression,  $E_t$  denotes a conditional expectation given information that the agent has at date  $t$  about events in future periods,  $\frac{\partial U(\dots, c_t, \dots)}{\partial c_t}$  denotes the effect of a small change in consumption at date  $t$  on life time welfare;  $\frac{\partial U(\dots, c_{t+1}, \dots)}{\partial c_{t+1}}$  denotes the effect of a small change in consumption at date  $t+1$  on lifetime welfare; and  $1 + r_{t+1}$  is the gross real return on the asset between  $t$  and  $t+1$ .

- (a) Explain why this restriction should hold for every asset which can be traded.

- (b)** Define the “equity premium puzzle.” Use the above equation to describe why there is such a puzzle, given the behavior of consumption and returns on certain assets.

(c) Describe and critically appraise a potential resolution of the equity premium puzzle

- (4) *Sticky prices and cyclical variation in real marginal cost*: Under certain conditions, the Calvo model of sticky prices implies that there is an approximate inflation relation of the form

$$\pi_t = \beta E_t \pi_{t+1} + \theta(\psi_t - \bar{\psi})$$

where  $\pi_t$  is the inflation rate at date  $t$ ,  $E_t \pi_{t+1}$  is the expected future inflation rate,  $(\psi_t - \bar{\psi})$  is the gap between real marginal cost and its average level, and  $\theta$  is a parameter.

- (a) Briefly describe the key aspects of model economies which lead to this inflation relation. Briefly describe the analytical steps that are involved in its derivation.

- (b) When this inflation relation is derived from an underlying microeconomic model, how is  $\theta$  linked to deeper parameters of the economic environment such as the elasticity of demand and the frequency of price adjustment?

- (c) How could one estimate the parameters  $\beta$  and  $\theta$  via an instrumental variables procedure, which did not require specification of a complete macroeconomic model? Why might this approach be econometrically desirable?

- (d) If the monetary authority acted to make inflation always zero, what would this specification imply about the behavior of real marginal cost? Could this behavior of real marginal cost be consistent with a macroeconomic model in which there were important real disturbances, such as changes in productivity and government purchases, which would lead to fluctuations in output?

- (5) *Fiscal Theory of the Price Level*. Suppose that there is a “money in the utility function, flexible price economy” of the variety studied by Brock, Woodford and others in the readings for this course. Assume that money pays no interest.
- (a) Explain the nature of the “real demand for money” function in this setup. How does it depend on consumption and the nominal interest rate?

- (b) If the nominal interest rate is held constant at the level  $R$ , then why is the price level indeterminate?

(c) How does the fiscal theory of the price level propose to resolve this indeterminacy?