Retake Exam "International Monetary Economics II"

April 8, 2009

Question 1 (45%)

1. Which financial market situation has been compared to "water flowing uphill" in the past ten years or so? Explain what it was that made water flow the "wrong way".

2. During the EMS-crisis in 1992, Great Britain, among others, suffered a speculative attack on its currency.
   i. Why? Why not e.g. Germany?
   ii. If the subsequent devaluation of the Pound Sterling was beneficial to the U.K. economy (as most analysts agree it was), why did the British government try so hard to avoid it for so long?

3. Why do we see a backward-bending IS-curve in the context of 3rd-generation currency crisis models and what does the bend imply for the scope of macroeconomic policy?

4. Discussing persistent inflation differentials within the European Monetary Union (EMU) since 1999, a report issued by the European Commission identifies a "real interest rate effect" and a "competitiveness effect" of such differentials. Gauging their macroeconomic repercussions, the report says that these two effects pull in opposite directions, but also that in due course, "the competitiveness channel will inevitably overtake the interest rate channel."
   i. How do the two effects operate and in what sense do they pull in opposite directions?
   ii. What do the two effects imply for the EMU's self-equilibrating capacity?
   iii. Why is the competitiveness effect thought to prevail in the long run? Discuss.

[Hint: In none of the four parts of this question are you expected to give a formal account of the models underlying your answers.]

Question 2 (25%)

Consider the following model of a small open economy:

(1) $\frac{M(t)}{P(t)} = \alpha_o - \alpha_1 i(t)$ with $\alpha_0, \alpha_1 > 0$

(2) $i(t) = i^* + \frac{\dot{s}(t)}{s(t)}$

(3) $P(t) = s(t) \cdot P^*$

(4) $M(t) = R(t) + D(t)$

(5) $\dot{D}(t) = \mu$ with $\mu > 0$

M: money supply, P: domestic price level, P*: foreign price level, i: domestic nominal interest rate, i*: foreign nominal interest rate, D: domestic credit held by central bank, R: foreign currency reserves, s: exchange rate

i. Derive the relationship between M(t), $s(t)$, and $\dot{s}(t)$ that is implied by the model.
ii. From the relationship derived in i.,
   a. determine M(t) for the case of a fixed exchange rate regime [denote the fixed exchange rate by $\bar{s}$];
   b. derive a rational-expectations floating-rate solution for $s(t)$ [denote it by $\tilde{s}(t)$].
iii. Assuming the country is initially on a fixed-exchange-rate regime,
   a. calculate the exact time (Ω) when the regime breaks down.
   b. What are the key determinants of Ω?

Question 3 (30%)

Paul Krugman proposed this model to study the prospect of a dollar crisis:

(1) $x = x(D, \dot{x}^e)$

(2) $\dot{D} = B(x, D, \dot{x})$

x: real exchange rate, measured so that "up is up", hence $\dot{x}^e$: expected rate of real dollar appreciation

D: US net external debt

i. Explain the meaning of the two equations and the signs of their partial derivatives.
ii. Demonstrate, by means of an appropriate diagram, that the equilibrium of this model is a saddle point.
iii. Consider now the situation of the U.S. in recent years (before the outbreak of the current crisis). Can this situation be represented as one of equilibrium in terms of the above model, or if not, what type of disequilibrium? Use your diagram to explain your answer.
iv. Right now, the U.S. government is dramatically increasing its budget deficit. Starting from the position identified in iii., trace out the implications of this policy change over time, assuming
   - the current policy stance is maintained indefinitely;
   - the current policy stance is reversed in due course.

   [You are not expected to discuss the crisis that prompted this change in fiscal policy]

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Solution Outline

Question 1

1. "Water flowing uphill" refers to the observation that capital-rich advanced economies, the U.S.A. in particular, received large net capital flows from poorer, but fast growing emerging economies such as China. Basic economic logic would instead suggest that mobile capital should flow from capital-rich countries to regions where capital is scarce and hence returns on investment are high. Among the considerations explaining this seeming paradox are the following:
   - the highly developed financial markets of advanced economies as attractive destinations for the abundant supply of savings from emerging economies;
   - the low saving rate of the U.S.
   - the accumulation of foreign exchange reserves in emerging economies which is motivated by
     i a strategy of export-led-growth, based on an undervalued currency;
     ii a desire to self-insure against currency speculation of the type that destabilized much of Asia in 1997/98.

2. i. In the EMS-crisis in 1992, markets understood that the policy of maintaining the prevailing official STG/DM parity was extremely costly to the United Kingdom because it forced the Bank of England to accommodate the rising German interest rate level while Britain suffered from a severe recession at the same time. Thus, foreign exchange traders began to speculate that the U.K. would succumb to the temptation of lowering its interest rates and letting the Pound Sterling float downward freely in order to stimulate the economy. Germany, in turn, was in midst of a boom which, if anything, would have required a currency appreciation. The Bundesbank had no reason to loosen its monetary policy stance.
   ii. The British government had staked its credibility on EMU membership. Abandoning the parity and leaving the exchange-rate mechanism of the EMS thus meant a loss of face. By defending the parity, the government hoped to restore confidence and thereby to bring down the level of interest rates. The economic costs of this strategy increased with the strength of the speculative pressure. The logic of this situation is captured by the 2nd generation currency-crisis models.

3. The open-economy IS curve describes the impact of a change in the rate of interest on output via both the direct interest-rate effect on domestic demand and the indirect

exchange-rate effect on net exports. Normally, these two effects pull in the same direction. However, in a situation of currency mismatch (liabilities denominated in foreign currency, assets in domestic currency), a devaluation is detrimental to banks' or generally investors' balance sheets (depending on foreign currency exposure) and as a consequence also to investment spending. The larger the depreciation (i.e. the lower the interest rate), the more banks and companies suffer from bankruptcy so that GDP, while being stimulated by a small reduction in the rate of interest, will actually decrease if interest rates fall too low. For monetary policy, this means that it can find itself in a situation in which it is unable to stabilize aggregate demand at a full-employment level. Fiscal policy instruments, if available, may have to come to rescue.

4. i. The EMU has one common nominal interest rate and one common currency so that any inflation differential between member countries inevitably creates a real interest rate differential and a change in real exchange rates. If one country experiences a boom and its inflation rate rises above the EMU average, its real interest rate falls (expansionary effect) and its external competitiveness deteriorates (contractionary effect).
   ii. The competitiveness effect counteracts the initial boom and thus contributes to self-equilibration whereas the real interest rate effect is destabilizing as it exacerbates the initial disequilibrium.
   iii. The competitiveness effect is thought to prevail because it is a level effect (competitiveness depends on relative price levels) whereas the real interest rate depends on the (expected) rate of change of the price level. This means that for any given inflation differential, the real interest rate differential remains constant while competitiveness continues to deteriorate for the high-inflation country. However, this does not guarantee automatic self-equilibration. Depending on the relative magnitude of parameters linking output to relative prices and to the real interest rate, it may well be that the resulting dynamic adjustment process is highly unstable.

Question 2

The model:

(1) $\frac{M(t)}{P(t)} = \alpha_o - \alpha_1 i(t)$ with $\alpha_0, \alpha_1 > 0$

(2) $i(t) = i^* + \frac{\dot{s}(t)}{s(t)}$

(3) $P(t) = s(t) \cdot P^*$

(4) $M(t) = R(t) + D(t)$

(5) $\dot{D}(t) = \mu$ with $\mu > 0$

i. Insert (3) and (2) into (1) to find:

$$M(t) = s(t) \cdot P^* \cdot \left[\alpha_0 - \alpha_1 \left(i^* + \frac{\dot{s}(t)}{s(t)} \right) \right]$$

With $\alpha_0 P^* - \alpha_1 P^* i^* = \alpha$ and $\alpha_1 P^* = \beta$, for notational convenience, this simplifies to

(6) $M(t) = \alpha \cdot s(t) - \beta \cdot \dot{s}(t)$

ii. a. With a fixed exchange rate, $\dot{s}(t) = 0$ and $M(t) = \alpha \cdot \bar{s}$

b. Under a pure float, foreign exchange reserves do not change and the exchange rate must obey (6). This allows the conjecture that the market-determined exchange rate $\tilde{s}(t)$ is determined by the money supply in some linear way

(7) $\tilde{s}(t) = a + b \cdot M(t)$

(Since the time derivative of the money supply, given R, is equal to the time derivative of D, $\dot{D} = \mu$, an alternative reasonable conjecture would be that $\tilde{s}(t)$ is a linear function of time). From (6), we have

(6') $\tilde{s}(t) = \alpha^{-1} \cdot \left[M(t) + \beta \cdot \dot{\tilde{s}}(t) \right]$

Given R, (7), in conjunction with (4) and (5) implies

(8) $\dot{\tilde{s}}(t) = b \cdot \dot{M} = b \cdot \mu$

Plugging (8) into (6') yields

(6'') $\tilde{s}(t) = \alpha^{-1} \cdot \left[M(t) + \beta \cdot b \cdot \mu \right]$

(7) is consistent with (6'') if, and only if, $b = \alpha^{-1}$ and $a = \alpha^{-2} \cdot \beta \cdot \mu$.

Summing up:

(9) $\tilde{s}(t) = \alpha^{-1} \cdot M(t) + \alpha^{-2} \cdot \beta \cdot \mu$

iii. The timing of the speculative attack is determined by the no-arbitrage condition $\tilde{s}(t) = \bar{s}$, where $\tilde{s}(t)$ is conditioned on the depletion of foreign exchange reserves ($R = 0$) so that $M(\Omega) = D(\Omega) = D_0 + \mu \cdot \Omega$. Remember from ii.a) that as long as the exchange rate is fixed, $M(t)$ is fixed at its original value $M_0 = R_0 + D_0$. Combining this information with our results from ii., the no-arbitrage condition can be expressed as

$$\bar{s} = \frac{1}{\alpha}(R_0 + D_0) = \tilde{s}(\Omega) = \frac{1}{\alpha}(D_0) + \frac{\beta\mu}{\alpha^2} + \frac{\mu}{\alpha}\Omega,$$

which can be solved for $\Omega = \frac{R_0}{\mu} - \frac{\beta}{\alpha}$.

The initial stock of reserves (R_0) and the speed at which money-financed government debt increases (μ) stand out as key determinants of Ω.

Question 3 (30%)

Krugman's model:

(1) $x = x(D, \dot{x}^e)$

(2) $\dot{D} = B(x, D, \dot{x})$

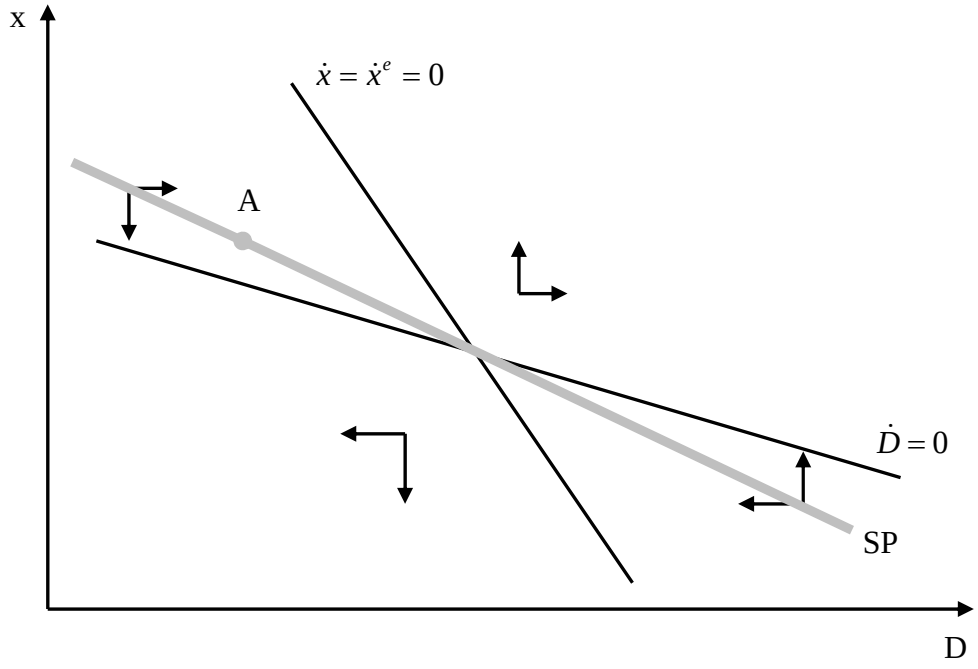
x: real exchange rate, measured so that "up is up", hence

$\dot{x}^e$: expected rate of real dollar appreciation

D: US net external debt

i. Equation (1) is a portfolio-balance equation for the exchange rate. An increase in net debt is an increase in the supply of dollar assets and therefore reduces x. The expected rate of dollar appreciation adds to the relative rate of return on dollar assets and therefore has a positive effect on the demand for such assets and on x. According to equation (2), US net external debt can increase either through a current account deficit and/or by a valuation effect. The current account deficit is positively related to x (competitiveness) and to D (debt service). The valuation effect stems from the fact that US external debt is mainly denominated in dollars while foreign assets are held mainly in foreign currency. As a consequence, dollar appreciation ($\dot{x}$) adds to the net foreign debt build-up ($\dot{D}$).

ii. The phase diagram:



Directional arrows: vertical with respect to $\dot{x} = \dot{x}^e = 0$-line; horizontal with respect to the $\dot{D} = 0$-line. Their direction follows from i.

iii. In view of the large pre-existing current account deficit, the situation of the US before the current crisis cannot be represented as an equilibrium in the above model. A point on the saddle path to the left of the equilibrium (like A) might best represent the US before the crisis.

iv. An increase in the budget deficit is tantamount to a fall in national saving and translates into a larger current account deficit at any given value of x and D. This effect can be represented by a downward shift of the $\dot{D} = 0$ locus. If the policy change is permanent, the system moves onto the new saddle path SP' (B') and converges to a new equilibrium below and to the right of the old one (B). If the policy change is temporary, the economy will first jump part of the way towards SP' to a point like C', then follow the "new" laws of motion along the trajectory AC'C'' back onto SP (point C''). In the long run, the system will end up in its original equilibrium point C. (Note: The exact location of C'' can be on either side of C, depending on the strength and duration of the fiscal boost).