Written Exam for the M.Sc. in Economics winter 2014-15

International Monetary Economics

Master's Course

February 17, 2015

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

This exam question consists of 4 pages (including this page) in total

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Number of questions: This exam consists of 2 questions.

1. **The UIP and the Risk Premium**
   Consider the UIP relation
$$E_t s_{t+1} - s_t = i_t - i_t^*$$
   where notation is standard. Combining UIP with CIP $f_t^{(1)} - s_t = i_t - i_t^*$ we find that
$$E_t s_{t+1} = f_t^{(1)}$$

   (a) Explain the rationale behind UIP and CIP and what the combined relation implies.

   (b) Summarize the empirical evidence on UIP and CIP.

   (c) Consider the following Euler equations derived from a 2 country, 2 goods, 2 assets infinite horizon endowment model with cash-in-advance constraints:
$$U_{Y_t} = \gamma \mathrm{E}_t \left[(1 + r_t) U_{Y_{t+1}} \right]$$
   and
$$U_{Y_t} = \gamma \mathrm{E}_t \left[(1 + r_t^*) U_{Y_{t+1}} \right].$$
   where notation is standard. Show that
$$\mathrm{E}_t \left[(r_t - r_t^*) \frac{U_{Y_{t+1}}}{U_{Y_t}} \right] = 0 \tag{1}$$

   (d) Assume that PPP holds ($S_t = \frac{P_t}{P_t^*}$) and write the Fisher equation as $1 + r_t = (1 + i_t) \frac{P_t}{P_{t+1}}$. Show that the equation (1) can be written as
$$\mathrm{E}_t \left[\frac{F_t^{(1)} - S_{t+1}}{P_{t+1}} \frac{U_{Y_{t+1}}}{U_{Y_t}} \right] = 0 \tag{2}$$

(e) Assume the following CRRA utility function

$$U(C) = \frac{1}{1-\phi} C_t^{1-\phi} \tag{3}$$

where ϕ is the coefficient of relative risk aversion. Show that equation (2) can be written as

$$\mathrm{E}_t\left[\frac{F_t^{(1)} - S_{t+1}}{P_{t+1}}\left(\frac{1}{C_{t+1}}\right)^{\phi}\right] = 0. \tag{4}$$

(f) In order to derive a risk premium we assume that all variables in equation (4) are joint log–normally distributed. Take logs of equation (4) using that if $z = \ln Z \sim N(\mu_z, \sigma_z^2)$ then $\mathrm{E}[Z] = \mathrm{E}[\exp(z)] = \exp\left(\mu_z + \frac{1}{2}\sigma_z^2\right)$ and show that the equation can be written in the following logarithmic form

$$\mathrm{E}_t[s_{t+1}] - f_t^{(1)} = \phi \mathrm{cov}(s_{t+1}, c_{t+1}) - \frac{1}{2}\mathrm{var}(s_{t+1}) + \mathrm{cov}(s_{t+1}, p_{t+1}). \tag{5}$$

(g) What can we learn about the risk premium and deviations from UIP from the expression above? Can the risk premium explain large portions of the excess returns? Explain!

2. **Second generation currency crisis model**

Consider the Obstfeld second generation currency crisis model comprised of the following equations:

$$\mathcal{L} = \theta \dot{p}^2 + (y - \tilde{y})^2 + C(\dot{s}) \tag{6}$$

$$y = \bar{y} + \dot{p} - \dot{p}^e - v \tag{7}$$

$$\tilde{y} - \bar{y} = k > 0 \tag{8}$$

$$s = p - p^* \tag{9}$$

where notation is standard.

(a) Explain the underlying rationale behind these equations.

(b) Explain the assumed sequencing of events in the model and how currency crises are generated.

(c) Under the assumption that the shocks are uniformly distributed we can derive the following expression for the expected exchange rate

$$\mathrm{E}(\dot{s}) = \frac{1}{1+\theta}\left\{\left[1 - \frac{\bar{v} - \underline{v}}{2V}\right](\dot{s}^e + k) - \frac{\bar{v}^2 - \underline{v}^2}{4V}\right\} \tag{10}$$

where $\bar{\upsilon} = \sqrt{\bar{C}(1+\theta)} - k - \dot{s}^e$ is the devaluation trigger, $\underline{\upsilon} = -\sqrt{\underline{C}(1+\theta)} - k - \dot{s}^e$ is the revaluation trigger and V $(-V)$ is the largest (smallest) possible value of υ, and where the cost functions of devaluations and revaluations are defined as

$$\begin{aligned} C(\dot{s}) &= 0 \quad \text{if} \quad \dot{s} = 0 \\ C(\dot{s}) &= \bar{C} > 0 \quad \text{if} \quad \dot{s} > 0 \\ C(\dot{s}) &= \underline{C} > 0 \quad \text{if} \quad \dot{s} < 0. \end{aligned}$$

such that a devaluation or a revaluation will occur if

$$\frac{(\dot{s}^e + \upsilon + k)^2}{1+\theta} > C(\dot{s}).$$

Illustrate the model in the E($\dot{s}$)–$\dot{s}^e$–plane. Provide a detailed discussion about how this graph is constructed.

(d) Can this model be used to explain the ERM crisis (Britain's exit from the ERM in 1992)? If so why? If not why not?

(e) Can this model be used to explain the Asian crisis? If so why? If so why not?