

ECON4330

Proposed exam questions

Spring 2022

1 Technology Innovation [40 Points]

Suppose the Home country is poor but suddenly discover a pathbreaking technology to produce electricity at a low price for 50 years. It can produce so much electricity that it could become an energy exporter.

Consider two scenarios.

- Scenario 1: The country can export and import as much as it wants.
- Scenario 2: The country does not participate in international trade.

Discuss the economic consequences for the home country of scenario 1 and 2. What does this mean for the NFA, consumption and imports of this country.

Explain your results. Keep your answer concise. There is no benefit from long but imprecise answers.

Guide

Follow the logic in the lecture.

Note the exporting energy means $CA > 0$ so that a positive NFA is accumulated over time.

Scenario 1: $CA > 0$ and a growing NFA means wealth accumulation which allows to increase consumption and imports. Since the exports end after 50 years, consumption is smoothed.

Scenario 2: $CA = 0$ and a constant NFA in this case. Thus no wealth accumulation and consumption and imports are unchanged.

2 Mundell-Fleming-Tobin Model [30 Points]

Assume the following (reduced-form) model

$$Y = C(Y, E, i) + G + X(E, Y), \quad (1)$$

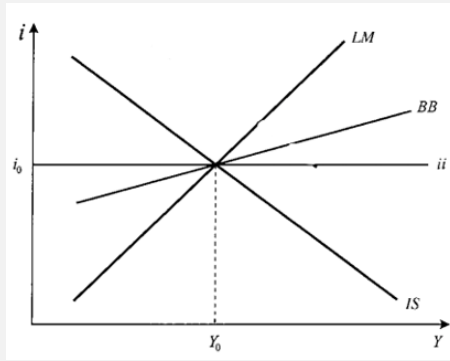
$$\frac{M}{P} = m(i, Y), \quad (2)$$

$$\frac{B}{P} = W_p(E) - f(i, E) - m(i, Y), \quad (3)$$

$$F_g + F_p(i, E) + F_*, \quad (4)$$

where (1) is the IS curve, (2) is the LM curve, (3) is the BB curve, and (4) is the FX curve. Further, assume a fixed exchange rate regime where the interest rate is exogenous.

- (a) Sketch the MFT model graphically. Explain the slope of the LM curve.

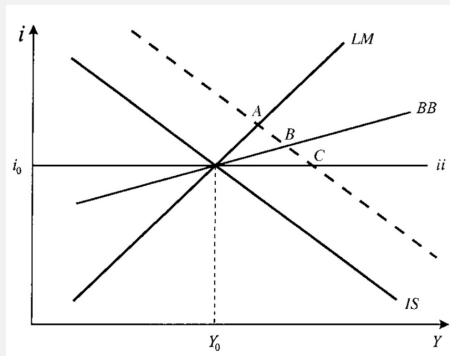


An increase in the interest rate reduces demand for money.

(b) Explain what sterilization of the money market is.

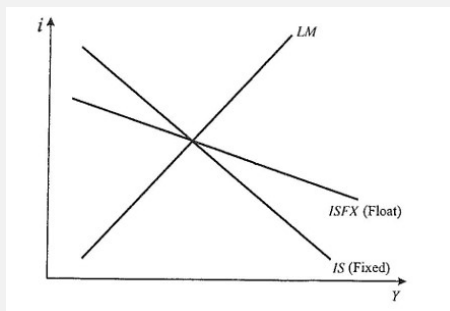
Monetary policy regime through which the CB shields domestic money market from FX market shocks/adjustments by intervening in the bond market.

- (c) Assume an exogenous increase in government expenditure, G , and compare sterilization with fixed interest rate.



The new equilibrium with sterilization is A, without sterilization is B, and fixed interest rate is C. Sterilization leads to a higher interest rate and dampened effect on Y contrary to fixing the interest rate.

- (d) Now assume a floating exchange rate regime. Sketch the difference from fixed exchange rate and explain why the relationship between i and Y (the IS curve) looks different under the floating and fixed exchange rate regime.



It combines the IS equation and the FX equation. The $ISFX$ curve is flatter is because an increase (decrease) in the interest rate leads to an appreciation (depreciation) of the domestic currency.

3 Mean-Variance Model of Portfolio Choice [30 Points]

Assume a representative investor who maximize the utility function

$$U(\pi) = E(\pi) - \frac{R}{2}\text{Var}(\pi) \quad (5)$$

subject to

$$\pi = (1 - f)i + f(i^* + \Delta e) - p \quad (6)$$

where R is the relative risk aversion, π is the real rate of return, f is the share of foreign currency in portfolio, Δe is the log changes in exchange rate (depreciation) and p is the price level (inflation), i is the domestic currency rate of interest and i^* is the foreign currency rate of interest.

- (a) Find $E(\pi)$ and $\text{Var}(\pi)$.

$$E(\pi) = (1 - f)i + f(i^* + \mu_e) - \mu_p$$

$$\text{Var}(\pi) = f^2\sigma_{ee} + \sigma_{pp} - 2f\sigma_{ep}$$

- (b) Show that the optimal share of foreign currency is given

$$f = \frac{\sigma_{ep}}{\sigma_{ee}} + \frac{i^* + \mu_e - i}{R\sigma_{ee}}. \quad (7)$$

The FOC is

$$\frac{dE(\pi)}{df} - \frac{1}{2}R\frac{d\text{Var}(\pi)}{df} = 0$$

Insert the derivatives

$$-r - R(f\sigma_{ee} - \sigma_{ep}) = 0$$

$$f = \frac{\sigma_{ep}}{\sigma_{ee}} - \frac{r}{R\sigma_{ee}}$$

- (c) Explain what is meant by inflation hedging and how this is incorporated into equation (7).

Inflation hedging is incorporated through $\frac{\sigma_{ep}}{\sigma_{ee}}$, also called the *minimum variance portfolio*. As long as there is a positive covariance between depreciation and inflation, you want to invest in foreign assets to hedge against inflation risk.

- (d) Why does the relative risk aversion, R , have a negative relationship with the share of foreign currency, f ?

The second part of equation (7), $-\frac{r}{R\sigma_{ee}}$, is the speculative portfolio reflecting the investors target "high expected return". The return-driven investment share is scaled down by the degree of risk aversion, R .

- (e) What happens as $R \rightarrow 0$?

Risk neutrality. This would bring us back to the case of perfect capital mobility where $r = 0$ is the only equilibrium (UIP).