

Exam 2. Econ520. Fall 2021

Professor Lutz Hendricks

UNC

Instructions:

- Answer all questions.
- Write legibly.
- If you need more space, attach additional pages. Number your answers. Do not write on the back of the pages.
- *Explain* your answers – do not just state them.
- *Show* your derivations – do not just state the final result.
- Do not refer to any notes or books. You may use a calculator.
- The total time is 180 minutes.
- The total number of points is 180.

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1 Short Questions

1. [15 points] With floating exchange rates and perfect capital mobility, what does a positive interest rate differential ($i > i^*$) indicate about investor's expectations about the exchange rate? Explain.

Answer _____

UIP requires expected returns to be the same in two currencies. The total return is interest plus currency appreciation. If one interest rate is higher than the other, that currency (in this case: the home currency) must be expected to depreciate.

However, if the domestic currency is riskier than the foreign currency, $i = i^* - RP$ may hold and investors may not expect any change in currency values.

2. [15 points] How would you expect foreign export subsidies to affect U.S. real wages? Explain who likely gains and who loses and why.

Answer _____

This has the same effect as higher productivity of the foreign country. The prices of imported goods fall. In the extreme case where the home country fully specializes in the export good, wages are completely determined by the productivity in that sector. Hence, the real wage in that sector (wage / price of the export good) remains the same. Then the overall real wage must rise (the price index falls).

More generally, some workers who produce goods that compete with the now cheaper imports see their real wages fall (their productivity is unchanged, but the price of the good they produce declines). All other workers see their wages rise.

3. [15 points] Explain in words why the central bank loses control over the money supply under fixed exchange rates. Be specific about what happens if the central bank tries to change the money supply.

Answer _____

If the peg is credible, it fixes the expected exchange rate. Investing in either currency involves no capital gains or losses. UIP then forces the interest rates in both countries to be the same. But if the Fed wanted to change the money supply, the interest would have to change. Capital flows would result, forcing the Fed to buy back any money it previously issued.

4. [15 points] It is often said that correlation does not imply causation. This question asks you to apply this saying to a specific case.

In the data, countries with tropical climates and thus lots of tropical diseases are typically poorer than more northern, cooler countries. Why does this not prove that climate causes cross-country income differences? Be specific.

Answer _____

Causality is not correlation, even if one of the variables is clearly exogenous. The issue is omitted variables. There may be variables that are correlated with climate (perhaps by chance or for [colonial] historical reasons) and that cause variation in income.

2 Economic Growth

1. [15 points] Explain why long-run growth is not sustainable with capital accumulation only. Explain why it is sustainable through knowledge accumulation? What is the fundamental difference?

Answer _____

The difference is rivalry. Both types of capital are accumulated subject to diminishing returns. Without some other force to counteract diminishing returns, the marginal product of capital goes to zero as capital is accumulated. Eventually, the MPK is too small to support growth. Nonrival knowledge capital introduces increasing returns. Recall the example of a drug manufacturer. The increasing returns offset the diminishing returns that set in as knowledge is accumulated.

2. In the Romer model, the production of ideas follows $\dot{A} = BL_A^\lambda A^\phi$ with $\phi < 1$.

- (a) [15 points] Derive the balanced growth rate of ideas

$$\bar{g} = \frac{\lambda}{1 - \phi} n \quad (1)$$

where n is the population growth rate.

Answer _____

See the slides.

- (b) [25 points] Intuitively, why does the balanced growth rate of ideas depend on the population growth rate? Use a graph to illustrate your answer.

Answer _____

Graph $g(A)$ against A (downward sloping).

With constant population, inputs to R&D are constant. Diminishing return then imply that the growth of A slows down over time. We move down the $g(A)$ line in the graph. To offset this, it is necessary to constantly increase R&D inputs. The rate at which this can be done is the population growth rate. In the graph, this is the rate at which the $g(A)$ curve shifts out.

3 Open Economy AS/AD Model

Recall the model equations:

$$UIP : i = i^* + RP \quad (2)$$

$$LM : M/P = YL(i) \quad (3)$$

$$AD : Y = C(Y - T) + I(Y, i) + G + NX(Y, Y^*, \bar{E}P/P^*) \quad (4)$$

$$AS : Y = F\left(\frac{1}{1+m} \frac{P}{P^e}, z\right) \quad (5)$$

The exchange rate is fixed. I modified the model by adding a risk premium (RP) to UIP. Assume that the economy starts in a medium run equilibrium. Suppose the risk premium increases.

1. [25 points] Graph and explain the **short-run** effects on output, prices, money supply, and net exports.

Answer _____

Short run: AS unchanged. AD shifts left as $i \uparrow$ and $I \downarrow$. Y and P fall. NX improves because $Y \downarrow$ and $P \downarrow$.

The money supply must have decreased (see money market clearing with lower money demand and lower prices). This happens because the Fed must lean against the capital outflows that happen as long as the interest rate is below $i^* + RP$.

2. [25 points] Graph and explain the **medium-run** effects on output, money supply, prices, and net exports.

Answer _____

Medium run: $Y = Y_n$ from AS. P must fall more as AS shifts toward that point. NX must rise, so that AD stays at Y_n even as $I \downarrow$. The higher interest rate reduces money demand. Lower prices increase real money supply. Therefore, M must fall to clear the money market.

3. [15 points] Briefly explain what happens during the **transition** from short to medium run.

Answer _____

Transition: Wage setters adjust price expectations downward. Wages fall, which allows prices to fall. That improves the trade balance and increases Y until $Y = Y_n$. Along the way, the Fed keeps buying foreign exchange (so that M declines).

End of exam.