

Some Questions from Past Exams

Econ 672

May 2, 2022

This document contains a mix of shorter answer and longer questions from past midterm and final exams. Depending on whether the question is classified as *shorter* or *longer*, the expected level of detail differs substantially. Shorter questions should be answered in about 1–2 bluebook pages; longer questions should be answered in about 5–7 bluebook pages. (This assumes single-spaced normal-sized handwriting.)

Exam questions will **not** be limited to the examples offered here. Choice on exams is often restricted, and PhD students are often required to do more technical questions.

1 Growth

1.1 Solow Model

1. (**Longer Answer**) Present and discuss the Solow growth model.
 - (a) Algebraically derive the fundamental dynamic equation, $\dot{k} = sf[k] - \eta k$. Be sure to define all variables; the variable η can aggregate any underlying values you specify.
 - (b) Graphically illustrate the steady state and the dynamic adjustment process for an economy that is not at its steady state. Make sure your graphs are fully and precisely labeled.
 - (c) Provide a detailed verbal explanation of the nature of the steady state, making explicit reference to your graphs and math. Your explanation should emphasize economic reasoning. This is your chance to demonstrate mastery of the model.
 - (d) Provide a detailed verbal explanation of the dynamic adjustment to the steady state, making explicit reference to your graphs and math. Your explanation should emphasize economic reasoning. This is your chance to demonstrate mastery of the model.
 - (e) In two separate graphs illustrate the predicted steady-state effects of (i) increased saving and (ii) increased population growth. Provide a detailed verbal explanation of each prediction. Your explanation should emphasize economic reasoning. Make sure your graphs are fully and precisely labeled.
 - (f) What is the “golden-rule” of saving? Derive it algebraically. Illustrate it graphically. Explain its economic relevance.
 - (g) According to Mankiw, Romer, and Weil (1992 QJE), how supportive of the core (two-factor) Solow-model predictions are the data? Provide a detailed and explicit discussion of how MRW brought the model to the data and what they found. (Be sure to derive the econometric model and to discuss their data.)
2. (**Longer Answer**) Solow (1956 QJE) briefly considers the effects of taxation. Suppose tax revenues are tY , so that they are proportional to aggregate income.
 - (a) Let aggregate saving be proportional to disposable income, $Y - tY$. How does this change the fundamental dynamic equation of the Solow model, and how does it change the steady state? Illustrate the effects of an increase in t , and provide a full discussion of the subsequent dynamic adjustments.

- (b) Now change the model as follows: suppose that tax revenues are entirely devoted to capital formation. How does this change the fundamental dynamic equation of the Solow model, and how does it change the steady state? Illustrate the effects of an increase in t , and provide a full discussion of the subsequent dynamic adjustments.

1.2 MRW Model

3. (Longer Answer)

- (a) Derive the equations of motions for the Mankiw, Romer, and Weil (1992 QJE) model with human capital. (You may assume a Cobb-Douglas production technology.)
- (b) Graphically illustrate the steady state and the equations of motion for the MRW model with human capital. Carefully explain your illustration.
- (c) Making use of your graph, provide a detailed and explicit discussion of the adjustment dynamics when away from the steady state. Address the dynamic adjustment of both physical and human capital.
- (d) Using your graphical framework, illustrate the effects of changes in saving behavior and of a change in the population growth rate on the steady state of the economy.
- (e) How do MRW measure human capital? Does their addition of human capital to the simple Solow model improve its predictions? Explain in detail.

2 Flexprice Monetary Approach

1. (**Shorter Answer**) Using our static IS-LM representation of the flexprice monetary approach and Classical models, compare their predictions for the effects of two separate experiments: a one-time permanent increase in the money supply, and a one-time permanent fiscal expansion. (Include charts and explanations.)
2. (**Longer Answer**) For this question, you will present and discuss a very simple (crude, static, flexprice) monetary approach to flexible exchange rates.
- What is the “long-run neutrality of money”? Does it have empirical support? (Be specific, citing published evidence where you can.) In this model, is money neutral in the long run?
 - What are the core assumptions and basic predictions of this model? Illustrate these predictions graphically and derive them algebraically. (You may use a loglinear representation of the model, if you wish.)
 - Does this very simple model have any empirical relevance? Explicitly cite specific empirical studies that shed light on this, and explain the contribution of these studies. (This is a chance to illustrate your mastery of required reading.)
 - Consider an unexpected, one-time, permanent increase in the level of the money supply. What consequences are predicted by this model? Support your detailed discussion with carefully labelled graphs.
 - Consider an unexpected, one-time, transitory increase in the level of the money supply. Under regressive expectations, what consequences are predicted by this model? Specifically, how do the predictions of the model differ from the case of a permanent shock?

3 Flexprice Monetary Approach under Rational Expectations

1. (**Shorter Answer**) Give a very brief verbal analysis of the effects of an unanticipated money supply increase in the monetary approach model under rational expectations. Do not use graphs or algebra.

2. (**Shorter Answer**) Give a very brief verbal analysis of the effects of a permanent, unanticipated money supply increase in the flexprice monetary approach model under rational expectations. Do not use graphs or algebra.
3. (**Longer Answer**) Consider the monetary approach to flexible exchange rates under rational expectations. Using recursive substitution, derive the algebraic relationship between the spot rate and expected future fundamentals. Be sure to accompany your algebraic derivation with detailed commentary and justifications. Be sure to discuss the problem of speculative bubbles. Suppose the exchange rate “fundamentals” follow a random walk: algebraically derive the effect on the spot rate of a period t innovation to the fundamentals, illustrate this effect graphically, and provide an intuitive discussion. What does your solution predict about the effects of one-time, permanent, anticipated increase in the growth rate of money? (Provide an extremely detailed verbal and graphical analysis.)
4. (**Longer Answer**) Consider the monetary approach to flexible exchange rates under rational expectations. Using recursive substitution, derive the algebraic relationship between the spot rate and expected future fundamentals. Be sure to accompany your algebraic derivation with detailed commentary and justifications. Include a detailed discussion of speculative bubbles, and provide an explicit example of a “bubble solution” under rational expectations. Next explain how we rule out bubbles to get a “fundamental solution”. Suppose the exchange rate “fundamentals” follow a random walk: what is the effect on the (fundamental solution) spot rate of a period t innovation to the fundamentals? Provide algebra and an intuitive discussion.
5. (**Longer Answer**) Consider our monetary approach model of flexible exchange rates under “rational expectations”.
 - What is the “long-run neutrality of money”? In this model, is money neutral in the long run?
 - Explore the macroeconomic effects of a one-time, permanent, unanticipated shock to the level of the money supply. (Provide a detailed verbal analysis supported by carefully labeled graphs.)
 - Explore the macroeconomic effects of a one-time, permanent, *anticipated* shock to the level of the money supply. (Provide a detailed verbal analysis supported by carefully labeled graphs.)
 - Is empirical work supportive of this model? (Cite specific studies.)

Your explorations should comprise detailed verbal explanations which refer carefully to supporting charts. Include detailed discussions of the effects on the price level, the spot rate, and the real money supply. Your object is *not* to simply describe what happens but to provide economic reasoning for what happens.

6. (**Longer Answer**) Use the method of undetermined coefficients to solve the monetary approach model under rational expectations when fundamentals \tilde{m} are generated by

$$\tilde{m}_t = \mu_0 + \mu_1 \tilde{m}_{t-1} + u_t$$

with $u_t = \rho u_{t-1} + e_t$, and e_t is white noise. What are the short-run and long-run effects on the exchange rate of a shock $e_t > 0$? Offer detailed economic intuition for these effects. How might you attempt to estimate this model? (Discuss data and methods.)

7. (**Longer Answer**) Assume an AR(2) data generating process (DGP) for the “fundamentals” \tilde{m} .

$$\tilde{m}_t = \mu_0 + \mu_1 \tilde{m}_{t-1} + \mu_2 \tilde{m}_{t-2} + u_t$$

Here u_t is white noise.

- Explain how the DGP informs your guess about the functional form of the observable reduced form.
- Use the method of undetermined coefficients to solve the monetary approach model under rational expectations.

- What are the short-run and long-run effects on the exchange rate of a shock $u_t > 0$? Offer detailed economic intuition for these effects.
 - How might you attempt to estimate this model? (Discuss data and methods.)
8. **(Longer Answer)** Assume an AR(1) data generating process (DGP) for the "fundamentals".
- Explain how the DGP informs your guess about the functional form of the observable reduced form.
 - Use the method of undetermined coefficients to solve the monetary approach model under rational expectations.
 - What are the short-run and long-run effects on the exchange rate of a positive shock to the process? Offer detailed economic intuition for these effects.
 - How might you attempt to estimate this model? (Discuss data and methods.)
9. **(Longer Answer)** Use the method of undetermined coefficients to solve the monetary approach model under rational expectations when fundamentals follow the AR(2) process:

$$\tilde{m}_t = \mu_0 + \mu_1 \tilde{m}_{t-1} + \mu_2 \tilde{m}_{t-2} + u_t$$

where u_t is white noise.

10. **(Longer Answer)** Use the method of undetermined coefficients to solve the monetary approach model under rational expectations when fundamentals follow the AR(1) process,

$$\tilde{m}_t = \mu_0 + \mu_1 \tilde{m}_{t-1} + u_t$$

where $u_t = \rho u_{t-1} + e_t$, and e_t is white noise. What is the effect on the exchange rate of a shock $e_t > 0$? Offer detailed economic intuition for this effect. How would you attempt to estimate this model? (Discuss data and methods.)

4 Portfolio Balance

1. **(Longer Answer)**
- What stylized empirical facts was the portfolio-balance model designed to explain?
 - Give a *detailed* graphical and algebraic presentation of dynamic adjustment in the portfolio balance model. (Fully explain all slopes and any shifts.) Discuss the relationship between the LM-PPP graphical apparatus and the dynamic representation in (a, S) -space. (MA students may assume static expectations. Ph.D. students should assume rational expectations and illustrate the use of the adjoint matrix technique.)
 - Give a graphical and intuitive analysis of the short-run, intermediate run (dynamic adjustment), and long-run effects of a one-time, permanent, unanticipated increase in the money supply. Be sure to offer detailed economic reasoning for both short-run and long-run outcomes.
 - Give a graphical and intuitive analysis of the short-run, intermediate run (dynamic adjustment), and long-run effects of a one-time, permanent, unanticipated monetary expansion. Be sure to offer *detailed* economic reasoning for both short-run and long-run outcomes.
 - Give a graphical and intuitive analysis of the short-run, intermediate run (dynamic adjustment), and long-run effects of a one-time, permanent, unanticipated fiscal expansion (which you may assume is effective at raising aggregate demand). Be sure to offer *detailed* economic reasoning for both short-run and long-run outcomes.

5 Purchasing Power Parity (PPP)

1. (**Longer Answer**) Review the theory and empirics of "purchasing power parity" (PPP).
 - (a) What do we mean by "absolute purchasing power parity"? Provide sufficient conditions for absolute purchasing power parity to hold, and show they are sufficient. (Give an algebraic analysis, including a discussion of the monotonicity and homogeneity of price indexes.) Which commodities would you expect to satisfy these conditions?
 - (b) What do we mean by "relative purchasing power parity"? What is the purchasing-power-parity doctrine? Describe the Balassa-Samuelson critique of this doctrine: present this critique algebraically, and discuss its empirical relevance.
 - (c) Empirically, is purchasing power parity a good characterization of the relationship between exchange rates and relative price levels in the short run? In the long run? (Refer to specific studies or data to support your answers.)
2. (**Longer Answer**) Early advocates of flexible exchange rates suggested that the exchange rate would tend to be stable at its purchasing power parity level, but this has not proved to be the case. Define PPP and discuss the possible reasons for its failure. Then suggest a model that can explain large deviations from PPP, give a technically rigorous presentation of the model, and give a detailed intuitive explanation of the source of volatility in your model.
3. (**Shorter Answer**) Define each of the main concepts of purchasing power parity (PPP): commodity price parity, absolute PPP, relative PPP, efficient markets PPP, and long-run PPP. What is the motivation for each concept? What does each one assume? How do they compare and how are they related? Algebraically derive relative PPP from CPP, stating any supporting assumptions.
4. (**Shorter Answer**) (a) Present and discuss the (i) Balassa-Samuelson and (ii) Houthakker-Magee critiques of long-run purchasing power parity (LRPPP). (b) If one assumes that LRPPP holds, how can the Houthakker-Magee result be turned into a theory of "balance-of-payments-constrained growth"? Explain briefly.
5. What do we mean by "purchasing power parity"? Under what conditions should purchasing power parity hold? (Give an algebraic analysis.) Which commodities would you expect to satisfy these conditions? Relate the statistical notion of stationarity to the concept of purchasing power parity. Empirically, is purchasing power parity a good characterization of the relationship between exchange rates and relative price levels in the short run? In the long run? (Refer to specific studies or data to support your answers.)

6 Trade Balance

1. (**Shorter Answer**) Derive the Marshall-Lerner condition for a devaluation to improve the trade-balance.

7 Macro Facts

1. (**Shorter Answer**) Describe the behavior of the US current account since the 1980s. What has been the effect on the net international investment position of the US? What has been the effect on the income account of the US?
2. (**Shorter Answer**) Describe the very long-run behavior of the pound-dollar real exchange rate. Be as specific as possible, paying careful attention to any notable patterns or shocks. Does this behavior seem a good match for long-run purchasing power parity? Why or why not?

8 Overshooting

1. (**Longer Answer**) What is exchange-rate “overshooting” and why is it important? What model assumptions allowed Dornbusch (1976) to predict overshooting?

Give a detailed algebraic exposition, and a detailed graphical analysis, carefully providing full “intuition” for the model.

Give a graphical and intuitive analysis of the short-run, intermediate run (dynamic adjustment), and long-run effects of a one-time, permanent, unanticipated increase in the money supply.

Give a graphical and intuitive analysis of the short-run, intermediate run (dynamic adjustment), and long-run effects of a one-time, permanent, *anticipated* fiscal expansion (which you may assume is effective at raising aggregate demand).

How supportive has empirical work been of the Dornbusch overshooting model (and its variants)? Refer *in detail* to specific studies, including Frankel (1979 AER).

PhD students should provide detailed algebra for a rational expectations analysis of the model dynamics, illustrating the use of the adjoint matrix technique.

2. (**Longer Answer**) How might we explain the correlation between tight money and real exchange rate appreciation associated with the early 1980s? (Develop the Dornbusch (1976) model explicitly, along with a full dynamic analysis.) No algebra is required.
3. (**Longer Answer**) Answer all three parts (a,b, and c) to this question. a. What is exchange rate “overshooting” and why is it important? b. Describe in detail the Dornbusch “sticky-price” model in which overshooting can occur. c. Show how overshooting can occur in this model, and discuss both the short-run and long-run outcomes. (Do *not* assume static expectations; Ph.D. students are encouraged to assume expectations are rational and to provide all relevant algebra.)
4. (**Shorter Answer**) Give a very brief verbal analysis of an unanticipated money supply increase in the Dornbusch overshooting model. Do not use graphs or algebra.
5. (**Shorter Answer**) Give a very brief verbal analysis of the effects of a permanent, unanticipated money supply increase in the overshooting model. Do not use graphs or algebra.

9 Forward Market

1. (**Longer Answer**) What “puzzles” were found in the forward exchange rate data by Fama? (Give a full derivation, integrating discussion of the empirical results.) Is there a necessary conflict between rational expectations and the empirical results? (Explain why Fama thought so, and offer a model based response.)
2. (**Shorter Answer**) Does the forward discount include a risk premium? Provide both theoretical motivation and a discussion of the empirical evidence.