Final Exam - *Answers*
April 26, 2004

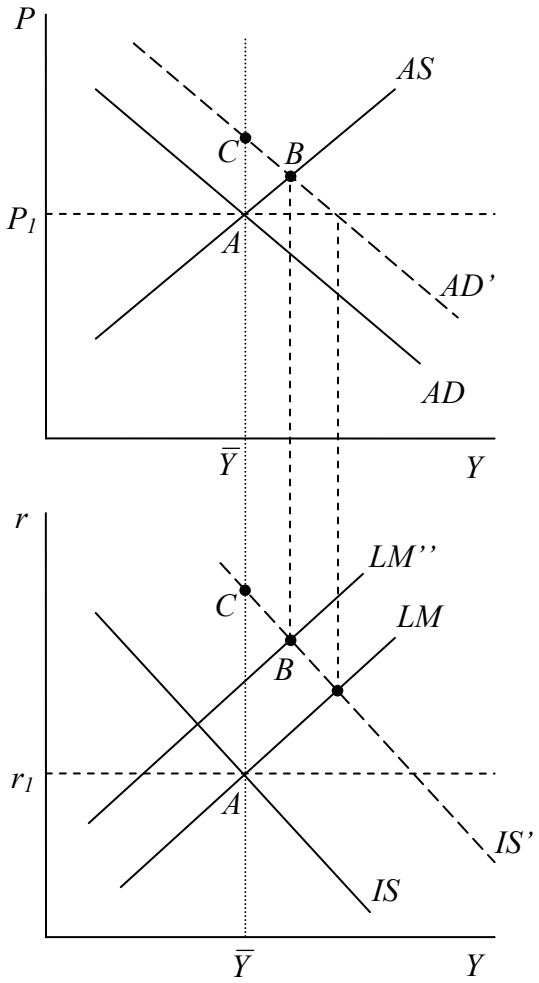
Answer all questions, on these sheets in the spaces provided (use the blank space on page 9 if you need more). In questions where it is appropriate, **show your work**, if you want a chance of partial credit for an incorrect answer. And when asked to **explain**, do so, if you want any credit at all. Point values for the questions are shown; there are a total of 78 points possible.

1. (12 points) Suppose that an economy starts in a long-run equilibrium at points *A* in the AD-AS and IS-LM diagrams shown below. The government then cuts taxes, shifting the IS curve to the new position *IS'* shown.

   a. Show how this policy change shifts the *AD* and/or *AS* curves in the top figure (being sure to make the sizes of any shifts correct for the change shown in the bottom figure). Identify the new short-run equilibrium in the AD-AS diagram and label it *B*. Then add whatever is necessary to the IS-LM diagram to identify the corresponding short-run equilibrium there as well, labeling it also *B*.

   b. Identify the long-run equilibrium in both the top and bottom figures, and label it *C*.

   c. During the transition from the short-run equilibrium at *B* to the long-run equilibrium at *C*, how do the following variables change over time? (Write in the blank: "rises," "falls," "constant," or "ambiguous".)



From *B* to *C*…

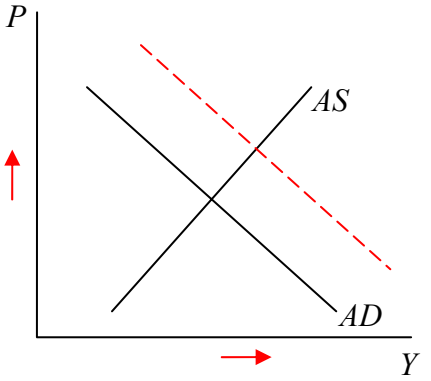
Real GDP	falls
Real investment	falls
Real national savings	falls
Real liquidity preference	falls

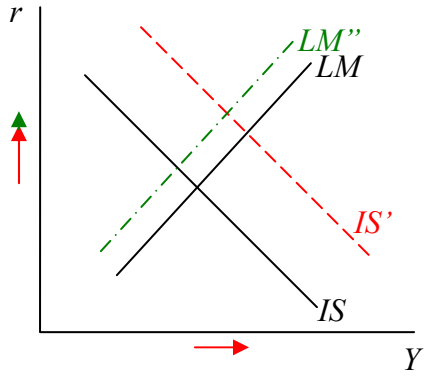
2. (18 points) Start from a very long-run equilibrium with constant prices in a closed economy that has a fixed population and no government. Suppose that households initially have been spending 80% of their disposable incomes on consumption, independently of the interest rate. Suddenly, they decide to start spending 84% instead (a 5% increase), both now and indefinitely into the future. Use appropriate models to determine, **explain**, and compare how this change of behavior will affect
   - Real GDP,
   - The interest rate, and
   - The real level of consumption,

   in each of a) the short run of the AD/AS model, b) the long run of the loanable funds model, and c) the very long run of the Solow growth model. In each case, be sure to say how the variable compares both to what it was originally and to what it becomes in the other two runs. Also, in the case of consumption, compare the change both to zero and to +5%. (I suggest recording these comparisons using ΔY_A, Δr_A, and ΔC_A for changes in the short run, ΔY_B, etc. for the long run, and ΔY_C, etc. for the very long run.) In each part, be sure to indicate clearly the directions of any changes, and also to **explain in words** the reasons for your results.

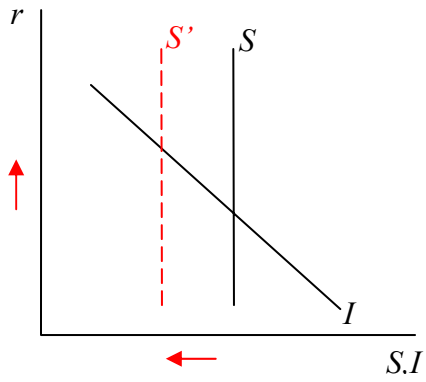
   a. (4 pts) The short run of the AD/AS model.

The increase in consumption out of a given income constitutes and increase in aggregate demand, shifting the AD curve to the right, causing a ***rise in Y*** *and rise in P as shown. Underlying this shift of AD is the rightward shift of the IS curve in the IS-LM diagram below, followed by an upward shift of LM as P rises, both causing the interest rate* ***r to rise*** *as well. As for C itself, it would have risen by 5% if Y had not changed at all. Since Y rises,* ***C must rise by more than 5%.***



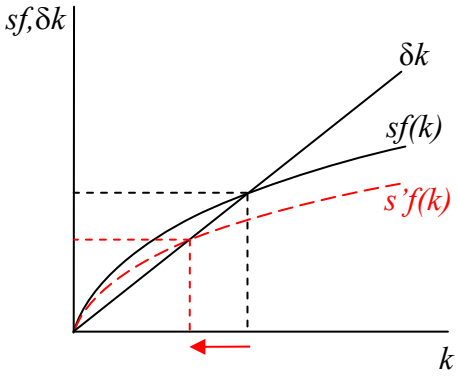


b. (4 pts) The long run of the loanable funds model.



In the long run of the loanable funds model, output is given by the production function and the available factors of production. Therefore there is ***no change in real GDP****. In the equilibrium of savings and investment (the loanable funds market), the savings curve is vertical since consumption and thus savings is just a fraction of income, independent of the interest rate. The rise in consumption reduces saving, shifting the S curve to the left and causing a* ***rise in the interest rate****, as shown. (This rise in r must be larger than in the short run, since with lower income savings falls by more, requiring a higher interest rate to lower investment by more.) Since real income is unchanged,* ***real consumption rises by just the initial 5%*** *(to 84% of the unchanged income).*

c. (5 pts) The very long run of the Solow growth model.



Starting from a steady state in the Solow growth model as shown (with population growth rate n=0 since population is fixed), the rise in consumption means a fall in saving and thus a fall in steady-state income per capital, y. With a fixed population a fall in y=Y/L is also a fall in Y, so ***real GDP falls****. The* ***interest rate rises****, as it did in the long run, either because of the same need to equate savings and investment, or because the marginal product of capital rises when the capital per worker is reduced. (The size of the increase is ambiguous.) Consumption is now the larger percentage, 84%, of a smaller income, leaving consumption ambiguous (though at most rising by less than 5%). (If in the initial equilibrium saving was less than the golden rule – i.e., the marginal product of capital was greater than δ, then per consumption falls. Otherwise it may rise or fall.)*

d. (5 pts) Comparisons: $\Delta Y_A > \Delta Y_B = 0 > \Delta Y_C$;

$$0 < \Delta r_A < \Delta r_B, \; 0 < \Delta r_C;$$

$$\Delta C_A > \Delta C_B = 5\% > \Delta C_C$$

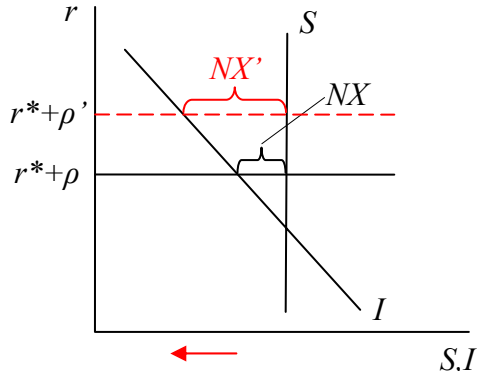
3. (24 points) Suppose that the rest of the world were suddenly to have doubts about the desirability of holding U.S debt. In this question you will explore the effects of such a change by answering specific questions about the effects of changes in various models that we have studied. In each case, in order to make the question compatible with the small-country models that we have mostly studied, suppose that instead of perfect capital mobility equating the domestic interest rate to the foreign one ($r=r^*$ as we have before), we now have instead that the domestic interest rate equals the foreign one plus an exogenous risk premium, ρ: $r = r^* + \rho$. This loss of confidence in U.S.-issued financial assets therefore takes the form of an increase in the required risk premium, ρ. (Formally, therefore, the effects on the economy are the same as would have resulted in the old model from a rise in r^*.)

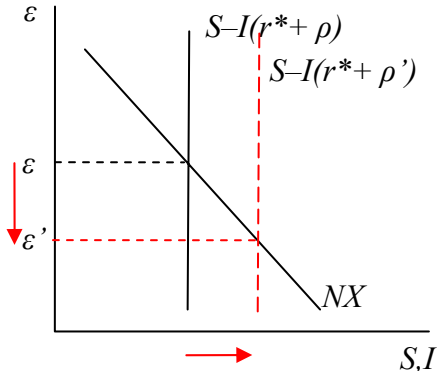
   a. First determine and explain the long-run effects of the rise in ρ using the long-run model of a small open economy that appeared in Chapter 5 and that is reproduced here. (The equations are just to remind you and to make sure that we are all talking about the same model. I assume you know what the symbols represent.)

$$Y = \overline{Y} = F(\overline{K}, \overline{L}) \qquad NX = NX(\varepsilon)$$
$$C = C(Y - \overline{T}) \qquad S = Y - C - \overline{G}$$
$$I = I(r) \qquad Y = C + I + \overline{G} + NX$$

   Use whatever tools you deem appropriate to find and explain how the rise in ρ will affect the following variables: Output (Y), investment (I), net exports (NX), and the real exchange rate (ε).

*Output is fixed by the fixed factor endowments and the production function, so **output does not change**, and therefore neither do C and S. Everything else depends on the equilibrium condition, which from the equations can be written as NX=S–I, and graphed as shown. The rise in risk premium raises the domestic interest rate, **reduces investment** and **increases net exports** (or reduces the trade deficit). This increase in net exports is brought about by a **depreciation of the real exchange rate**, as shown.*





b. Now do the analysis for the short run, using the Mundell-Fleming model with a fixed price level, first with a floating exchange rate and then with a pegged exchange rate. The equations of the model are again shown below, except that I leave it to you to know which variables are exogenous and which endogenous.

$$Y = C\big(Y - T(Y)\big) + I(r) + G + NX(\varepsilon)$$
$$M / P = L(r, Y)$$
$$r = r^* + \rho$$

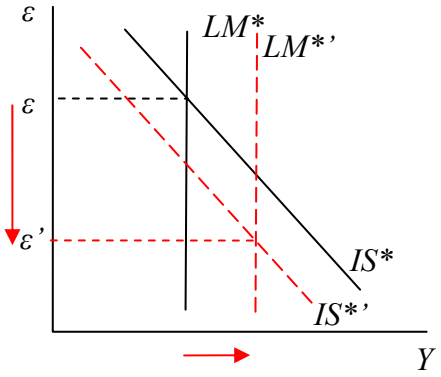
As in part (a), find and explain how the rise in ρ will affect the following variables: Output (Y), investment (I), net exports (NX), and the real exchange rate (ε), first for the case of a floating exchange rate and then for the case of a pegged exchange rate. (Space for the pegged-rate case is on the next page.)

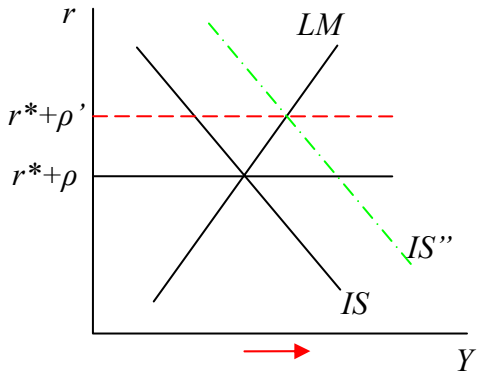
Floating Exchange Rate:

With a floating exchange rate, the money supply is fixed and output is therefore determined in the money market, with net exports and the exchange rate adjusting as necessary to clear the goods market. The rise in ρ raises r, requiring a ***higher Y*** *to offset the decline in money demand.* ***Investment falls****, however, so* ***NX must expand****, requiring a* ***real depreciation*** *of the currency.*

All this can be seen graphically in either of two ways. On the left below is the IS-LM* diagram from Mankiw, in which the LM* curve is vertical (see first sentence above). The rise in ρ and thus r simultaneously shifts the LM* curve to the right (reduced money demand) and the IS* curve to the left (reduced investment).*

Alternatively, you can use the original IS-LM diagram, but have the IS curve shift endogenously, via a change in the exchange rate, to attain equilibrium at the required interest rate. In that case the rise in ρ and thus r requires a rightward shift of IS, again requiring a real depreciation.

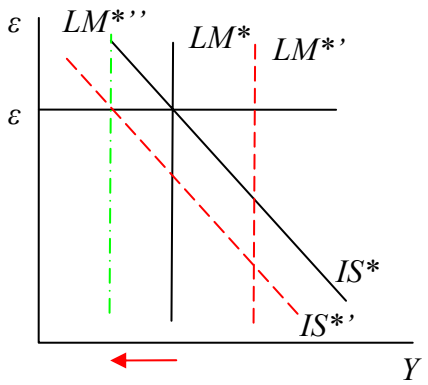


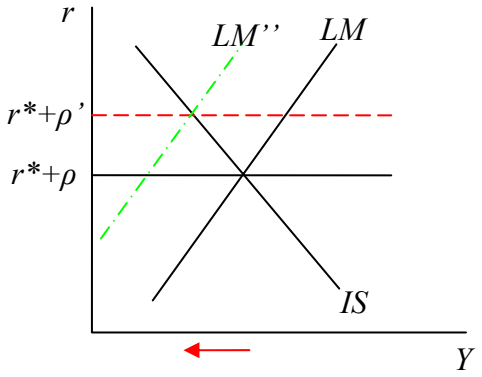


Pegged Exchange Rate:

With a pegged exchange rate, it is the money supply that must adjust (due to exchange-market intervention without sterilization), along with output, to achieve equilibrium in both the goods and money markets, since neither the interest rate nor the exchange rate can move. Output is now essentially determined in the goods market, since it is the only variable free to move in the goods-market equation. The rise in ρ and thus r causes a ***fall in investment****, and since no other component of demand can adjust,* ***output must fall****. The* ***exchange rate and net exports are unchanged****, since the former is pegged and the latter (by assumption) depends only on the former.*

Graphically the same figures can be used as for the floating-rate case, but now there is an endogenous shifting of a curve in both. On the left below, because the exchange rate cannot fall, the LM curve is shifted endogenously to the left so as to intersect IS* at the constant exchange rate. On the right, it is now LM rather than IS that adjusts to clear both markets at the new interest rate.*





4. (18 points) Explain, in two or three sentences for each, what each of the following are, what they have to do with the issue of how and whether macroeconomic policies should be used, and also whether they seem to be more relevant, in the United States, for monetary policy or for fiscal policy.

   a. Inside lags – *These are the delays between economic shocks and the taking of policy in response to them. The longer they are, the more likely that the policy will be used after it is needed, making matters worse. They are especially severe for fiscal policy, which must work its way through Congress.*

   b. Outside lags – *These are the delays between policy actions and their effects on the economy, and they too make it more likely that a policies effects will not be felt until after they are needed, also making matters worse. Monetary policy seems to have longer outside lags than fiscal policy, because of the time needed for firms to decide on an begin investment projects after a change in interest rates.*

   c. Time inconsistency – *The tendency for policymakers to want to commit to policies for the future that, when the future arrives, they have incentive to change reverse. This makes policy difficult because these commitments therefore are not believed and are not effective. This is a problem for all macro policy, but is probably more serious for fiscal policy than monetary policy because of the greater political vulnerability of Congress and the President.*

   d. Leading indicators – *These are data that tend systematically to move earlier in time than the major fluctuations in the economy, thus helping economic forecasters and policymakers to predict the economic future and tailor their policies more accurately to what is needed. These seem to be equally relevant for monetary and fiscal policies.*

   e. Political expediency – *The incentive for policymakers to use macroeconomic policies – usually expansionary ones – to improve their chances for re-election, ignoring any long-term adverse effects that may make these policies undesirable. This is more likely to affect fiscal policy than monetary policy, since the governors of the Fed are not elected.*

   f. Automatic stabilizers – *These are built-in mechanisms that cause macroeconomic policy variables (money, taxes, spending) to change with changes in GDP or other cyclical variables in a way that reduces the size of those fluctuations. A prime example is the income tax, and indeed most (all?) automatic stabilizers seem to involve taxes or transfer payments, rather than government purchases or the money stock.*

5. (6 points) True-False. Circle T or F for each of the following statements relating to news articles assigned during the course:

a. (**T**) F Jan 27: The Congressional Budget Office issued its forecast that the U.S. budget deficit would become larger over the next few years, but that it would then disappear entirely about ten years from now.

b. (**T**) F Feb 11: Tax collections by the U.S. federal government, as a percent of GDP, are today at their lowest level in more than half a century.

c. T (**F**) Mar 4: OPEC was prompted by the appreciating U.S. dollar to raise its oil prices in order to keep up.

d. T (**F**) Mar 18: At the meeting of the open market committee of the Fed, it announced an increase in its target for the federal funds rate from 1.00% to 1.25%.

e. (**T**) F Mar 26: Corporate profits posted their biggest increase in almost 20 years.

f. T (**F**) Apr 15: The International Monetary Fund predicted that the United States budget deficit would disappear over time as a result of the increased growth in GDP spurred by the Bush tax cuts.

This extra page is to use in case you run out of room on one of the questions. Label clearly which question(s) you are writing about here.