SAMPLE FINAL EXAMINATION
To see the general style
December ?, ????: 2:00 pm – 5:30 pm

This is a 3½ hour test. There are six parts. Points are proportional to minutes. Please write each part in a separate blue book. Put your name, college, TA, and class on each blue book. All questions are required.

Your examination will be judged on the soundness of your macroeconomic analysis and the quality of your writing. Long and rambling answers will be penalized. Illegible answers will also be penalized. This is a closed-book exam. No electronic equipment of any kind is allowed.

Part I. Warm-up Exercises (30 minutes total)

A. Macro ABCs. (15 minutes)

For each pair, define both concepts and explain how they are related.

1. Current account: financial account of the balance of payments
2. Taylor rule: LM curve
3. Standard (Laspeyres) CPI as produced by the BLS: Chain (Törnqvist) CPI as advocated by the Deficit Commission

B. The Fed at Work (15 minutes) Limit to one bluebook page.

In its statement after the last Federal Open Market Committee (FOMC) meeting on November 3, 2010, the FOMC issued the following statement (in part):

To promote a stronger pace of economic recovery…, the Committee intends to purchase a further $600 billion of longer-term Treasury securities by the end of the second quarter of 2011, a pace of about $75 billion per month.

The Committee will maintain the target range for the federal funds rate at 0 to 1/4 percent and continues to anticipate that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant exceptionally low levels for the federal funds rate for an extended period.

(http://www.federalreserve.gov/newsevents/press/monetary/20101103a.htm)

The first paragraph of this is called “quantitative easing,” or QE. Explain the mechanisms by which QE will lead to the FOMC’s stated objective (in italics).
Part II. Balancing the budget and the economy (30 minutes).

Consider the following economy (assume that there is excess capacity and that the price level is fixed in a closed economy):*

Output: \( Y = C + I + G \)
Consumption: \( C = 150 + \frac{3}{4}(Y - T) \)
Investment: \( I = 150 - 75r \)
Government purchases: \( G = 300 \)
Interest rate: \( r \) is the real interest rate
Fed policy rule: \( r = 0.01(Y - 700) \)

1. Marginal income taxation: Suppose \( T = \frac{1}{3}Y \)
   a. Derive the IS curve (\( Y \) as a function of \( r \))
   b. Derive the government-purchases multiplier.
   c. Find the equilibrium interest rate \( r \), level of output \( Y \), taxes \( T \), and deficit (\( G-T \)).
   d. Suppose \( G \) increases to 400. Find the new equilibrium output \( Y \) and interest rate \( r \). By how much did output change?

2. Lump-sum taxation: Suppose \( T = 300 \)
   a. Derive the IS curve.
   b. Derive the government-purchases multiplier.
   c. Find the equilibrium interest rate \( r \), level of output \( Y \), taxes \( T \), and deficit (\( G-T \)).
   d. Suppose \( G \) increases to 400. Find the new equilibrium output \( Y \) and interest rate \( r \). By how much did output change?
   e. Is the change in output the same as in part 1? Explain.

3. Fiscal stimulus with a balanced budget
   a. Using the lump-sum taxation model in part 2, suppose both \( G \) and \( T \) increase to 400. Find the new equilibrium output \( Y \) and interest rate \( r \).

[Hint: if you get non-integer solutions, keep as fractions not floating point.]
Part III. Life and growth in Boolaland (25 minutes total).

A. In the economy of Boolaland, output is produced according to the following production function:

\[ Y = K^{2/3} \ L^{1/3}. \]

Capital (K) depreciates 3% per year and the population = number of workers (L) grows at 7% per year. The savings rate in the country is 20%.

a) Find the per-worker production function, \( y = f(k) \).

b) What is the numerical value of capital per worker in steady state?

c) What are the steady state numerical values of per worker GDP and per worker consumption,

d) Compute the numerical value of the rental rate of capital, average labor productivity, and the wage rate (hint: note that per capita values and per worker values are the same).

B. Many economists argue that rapid population growth hurts development in low-income countries. In consequence, the government of Boolaland implements a fertility policy that reduces the growth rate of L from 7% to 2%.

e) Graphically show the old steady state (before the implementation of the policy) and the new steady state levels of output per worker and capital per worker

f) Find the steady state numerical values of per worker consumption and per worker GDP after the implementation of the fertility policy.

g) Compare the values found in part f) with those found in part c). Was the policy successful in increasing the standard of living?

h) Compute the steady state growth rate of GDP before and after the fertility policy. How did the fertility policy change the growth rate of GDP?
Part IV. A Chilly Economic Situation (20 minutes).

Consider Snowland, which is a small open economy with full employment.

Here is the initial situation: Output is 5000, government purchases are 1000, and lump-sum taxes are 1000. Consumers spend 250 plus 75 percent of disposable income. Investment is equal to 1000 at a real interest rate of zero and declines by 50 for each percentage point increase in the real interest rate. Inflation is always zero. Net exports are 500 – 500R, where R is the real exchange rate. The risk-free world interest rate is 5 percent per year, and Snowland is initially a model Scandinavian risk-free country.

a. Solve for Snowland’s national saving, investment, trade balance, and equilibrium exchange rate.

b. Suppose now that the new Hot Dog Party (HDP) comes to power, raising G to 1250 to fulfill a campaign pledge “A hot dog in every pot, and a party for every dog.” Solve for national saving, investment, the budget deficit, the trade balance, and the equilibrium exchange rate. Explain what you find.

c. There is a crisis of confidence because the bond vigilantes fear that the HDP will bankrupt the country. The risk premium on Snowland’s bonds rises by 5 percentage points, and the HDP reduces G back to 1,000 to promote fiscal stability. Solve for national saving, investment, the budget deficit, the trade balance, and the equilibrium exchange rate. Explain what you find.

Part V. Monetary targets (15 minutes)

Many central banks have dual mandates (inflation and unemployment), while some have only an inflation target. Assume that the economy is initially in an optimal state (where all variables are at their targeted levels), and there is a war in the Mideast, with sharply rising oil prices. Describe how central banks would respond:

1. In countries with dual mandates.
2. In countries with inflation targets.

In your answer, you can assume that your countries are closed economies.
Part VI. Deficits, debt, and the recession (15 minutes). Limit to 1 bluebook page.

You walk into a room for an important job interview with an economics consulting firm. OMG! You discover that there is nothing in the room except a bluebook, a pencil, and a sheet of paper. The paper says:

You have 15 minutes to answer the following question: Suppose you are asked to design a fiscal program that will get us out of the current deep recession without raising the long-run debt-GDP ratio. How would you do this? We have asked one of our Board members, who teaches macroeconomics at Yale, to read your answer and advise us on your qualifications in macroeconomics.

[There are different acceptable ways to answer this question, but you should use good macroeconomic analysis.]

Part VII. A Consuming Question. (25 minutes) Answer all parts.

Assume that Jean, who behaves according to the Fisher model of consumption, can borrow and lend money at the interest rate \( r = 20\% \). Jean’s income is $100 in the first period and $200 in the second.

a. Graph the budget constraint. Be sure you indicate the income level in each period and the slope of the budget constraint.

b. Assume that Jean has target consumption for period 2 of $224. Compute Jean’s consumption and saving in the first period.

c. The government announces a tax cut before the election. In the first period, it will transfer $10 to each citizen, but in the second period (after the election), it will impose a lump-sum tax of $11. Graph the budget constraint before and after the policy is implemented. Again, indicate the income level in each period and the slope of the budget constraint.

d. Again assuming target consumption of $224 for period 2, what is the impact of the government policy on the consumption and saving in each period?

e. After the government policy is implemented, the interest rate suddenly increases from 20% to 25%. What is the impact of this interest rate increment on the consumption and saving in each period?
Part VIII. The trilemma of exchange rates and adjustment (20 minutes). Limit to 2 bluebook pages

Ireland and Poland are interesting cases. Both are in the European Union, both are on the periphery of Europe, and both are small open economies. Ireland is in the Eurozone and has the Euro as its currency, while Poland’s zloty operates with a floating exchange rate. In the period before the crisis, both countries had low interest rates. When the recession hit in 2008-2010, both had sharp reductions in aggregate demand in part driven by adverse shifts in the net-exports curve. Ireland has had a deep recession, while Poland depreciated its currency and has nearly full employment. The New York Times had a story on December 7, 2010, which described the Polish situation:

Like the Irish a couple of decades ago, the Poles are a hardy people battered by history but on the verge of prosperity. Foreign capital is pouring in and investment banks are opening offices, lured by resilient growth…. And Poland now, like Ireland then, has its own currency. Being outside the euro zone is working to Poland’s economic advantage. Poland is currently that rare species: a financially vibrant member of the European Union. It is to Poland’s benefit not to be bound by a common currency, at a time when euro zone countries like Ireland will have trouble using cheap exports to grow their way out of trouble.

(a) Explain reasons why the macroeconomic adjustments of Ireland and Poland might differ in the current recession.
(b) Define Mankiw’s “Impossible Trinity.” Explain how it applies in this situation.