Macro (and International Macro part I)
Field Exam

August 2016

General Instructions:

- Students taking ONLY the international field exam: this is a 90' exam. Answer **ONLY parts 2 and 3**.

- All other students: this is a three-hour exam. Answer **ALL** parts.

Part 1: Short Questions (True/False/Uncertain + a brief explanation; explanation determines the grade; 90 minutes):

1. Consumption growth between t and t+1 will be unaffected by an anticipated increase in the interest rate on holding assets between t and t+1. (5 minutes)

2. Destruction of a substantial portion of the capital stock would create expected future capital gains. (5 minutes)

3. A temporary increase in the investment tax credit will raise current investment by less than a permanent increase. (5 minutes)

4. Cholesky identification of monetary policy shocks means that monetary policy does not have contemporaneous effects on output and employment but it may have a contemporaneous effect on inflation. (5 minutes)

5. Rational expectations mean that one can use lags of macroeconomic variables as instrumental variables to estimate structural parameters. (5 minutes)

6. Residential investment is a lagging business cycle indicator. (3 minutes)

7. Consumption is a coincident business cycle indicator. (3 minutes)

8. Capacity utilization is approximately as volatile as output. (3 minutes)

9. Inflation is always and everywhere a monetary phenomenon. (5 minutes)

10. Monetary policy shocks account for about 50 percent of variation in output at business cycle frequencies. (5 minutes)

11. The basic real business cycle model predicts that demand shocks should be the main determinant of business cycles because demand shocks generate a positive correlation between wages and output. (5 minutes)

12. Having real rigidity and nominal rigidity in price setting is necessary and sufficient for generating nominal non-neutrality. (5 minutes)

13. The Taylor principle states that a unique, stable rational expectation equilibrium in the basic New Keynesian model can be obtained if, in response to an inflationary shock, the central bank raises the nominal interest rate and lowers the real interest rate. (5 minutes)

14. Relative to VARs, DSGE models are less suitable for counterfactual experiments. (5 minutes).

15. The second order approximation to household utility in the basic new Keynesian model has three terms: variance of inflation, variance of output gap, and variance of the nominal interest rate. The weight on the variance of output gap is the largest. (5 minutes)

16. Because macroeconomic data are so persistent, one cannot estimate macroeconometric models in levels. Instead, one should always use first-differenced series. (5 minutes)

17. A positive government spending shock raises welfare of households in the basic real business cycle model. (5 minutes).

18. Permanent income hypothesis predicts that consumers respond to an income shock when it is realized rather than when it is announced. (5 minutes)

19. Capital utilization should be high when the marginal product of labor is high. (5 minutes)

Part 2: Puzzles. 45 minutes

In a recent text titled "On the Puzzling Prevalence of Puzzles" (August 2, 2016), former Minneapolis Federal Reserve President Narayana Kocherlakota writes:

> "To an outsider or newcomer, macroeconomics would seem like a field that is haunted by its lack of data. In the absence of that data, it would seem like we would be hard put to distinguish among a host of theories with distinct policy recommendations. So, to the novice, it would seem like macroeconomists should be plagued by *underidentification* or *partial identification*. But, in fact, expert macroeconomists know that the field is actually plagued by failures to fit the data – that is, by *overidentification*.
>
> Why is the novice so wrong?
>
> The answer is the role of *a priori* restrictions in macroeconomic theory.[...] The mistake that the novice made is to think that the macroeconomist would rely on data alone to build up his/her theory or model. The expert knows how to build up theory from *a priori* restrictions that are accepted by a large number of scholars.[...] Those restrictions are what give the models their empirical content. As it turns out, the resulting models actually end up with too much content hence, the seemingly never-ending parade of puzzles."

Discuss **three** puzzles of your choosing in international macroeconomics. For each of puzzle you will (a) present the theoretical predictions as sharply (and analytically) as possible; (b) discuss the empirical evidence; (c) discuss possible resolutions of the puzzle in the literature, or your own. Which *a priori* restrictions of the model are responsible for these puzzles in your view?

Part 3: Sovereign Debt and Saving. 45 Minutes

Consider a small economy that lasts two periods. The country begins the first period without foreign assets or debt and receives an endowment $\bar{Y}$. In the second period, it receives a stochastic endowment $Y_2 = \bar{Y} + \epsilon$ where ϵ is distributed on the interval $[\underline{\epsilon}, \bar{\epsilon}]$ with distribution $\pi(\epsilon)$ such that $E[\epsilon] = 0$ (you may assume that $\bar{Y} + \underline{\epsilon} > 0$).

Utility is defined as: $u(C_1) + \beta E[u(C_2)]$ where $\beta < 1$ is the discount factor and the period utility u satisfies $u'(C) > 0$, $u''(C) < 0$ and the usual Inada conditions.

The small country can purchase insurance from risk neutral insurers who compete on date 1 to offer zero-expected-profits contracts for date 2. Denote $P(\epsilon)$ the payment that the country makes to the insurers in state ϵ. Assume also that the country can borrow and lend at a given world real interest rate r. Denote B_2 the amount of foreign assets accumulated at the end of period 1.

1. [**8 minutes**] Suppose first that we have full insurance, i.e. that the country can commit to any repayment schedule $P(\epsilon)$ as long as $P(\epsilon) \leq Y_2 + (1+r)B_2$. Characterize the full insurance allocation.

2. Assume now that the country *cannot* promise to honor its insurance payments. Due to enforcement limitations, the total amount of foreign liabilities (both from the insurance schedule and foreign debt repayment) cannot exceed a fraction η of the country's second period output $\bar{Y} + \epsilon$. Conversely, insurers can compensate themselves by seizing any foreign asset owned by the country.

   (a) [**3 minutes**] Write down the Incentive Compatibility condition that the insurance contract must satisfy.

   (b) [**5 minutes**] Write down the first-order necessary conditions for this problem as well as the complementary slackness condition.

   (c) [**5 minutes**] Show that for all ϵ such that the incentive compatibility constraint does NOT bind, the following holds:

   $$u'(C_1) = \beta(1+r)\,u'(C_2(\epsilon))$$

   where $C_2(\epsilon)$ denotes consumption in period 2, state ϵ. Interpret.

   (d) [**5 minutes**] Assume for the rest of question 2 that preferences are logarithmic: $u = \ln(C)$. Find the largest $\bar{\epsilon}$, called $\bar{\epsilon}_m$, such that full insurance can be achieved. How does $\bar{\epsilon}_m$ vary with the discount factor β?

   (e) [**4 minutes**] Assume that $\bar{\epsilon}_m < \bar{\epsilon}$. Does the country borrow or lend when $\beta(1+r) = 1$ and $\eta = 0$? Why?

3. [**8 minutes**]Assume now that insurers cannot seize the foreign assets of the country and the maximum repayment cannot exceed $\eta \left(\bar{Y} + \epsilon \right).$ The country can still borrow and lend at the world real interest rate r. How does the availability of borrowing/savings affect the optimal insurance contract? Why?

4. [**7 minutes**] Discuss how your answer to question 3 would differ if insurers could not inflict <u>direct punishments</u> but had to rely instead on <u>reputational</u> mechanism. In particular, explain whether insurance can be sustained in equilibrium when insurers cannot seize savings.