Macroeconomics Field Exam

August 2020

Department of Economics

UC Berkeley

(3 hours)

Answer two out of three parts

The exam is open-book

Part I (Nakamura): 90 points = 90 minutes

1. (**30 points**) **Phillips curve** *[No more than a page]*
    a. Many different "Phillips curves" have been estimated in the literature. What are the key features of a "Phillips curve" relationship? What parameters do researchers focus on estimating?
    b. What empirical challenges arise in estimating the Phillips curve?
    c. Provide a short and selective description of what you see as the main conclusions of the papers we discussed on the Phillips curve. Focus on the conclusions you find most convincing.
    d. What does your assessment of the literature imply about how you would have expected inflation to respond during the COVID crisis? How well does this line up with what actually happened?

2. (**20 points**) Compare Kaplan & Violante (2014) and Angeletos et al. (2001).
    [No more than half a page]

[References: Kaplan, G., & Violante, G. L. (2014). A model of the consumption response to fiscal stimulus payments. *Econometrica*, *82*(4), 1199-1239.

Angeletos, G. M., Laibson, D., Repetto, A., Tobacman, J., & Weinberg, S. (2001). The hyperbolic consumption model: Calibration, simulation, and empirical evaluation. *Journal of Economic Perspectives*, *15*(3), 47-68.]

    a. What are the main similarities between the two papers?
    b. What are the main differences?

3. (**20 points**) A recent literature in macroeconomics has focused on the "Forward Guidance Puzzle." To what extent do you agree with the following statement: "The *Forward Guidance Puzzle* fundamentally arises from partial equilibrium, as opposed to a general equilibrium, features of monetary models." *[No more than half a page]*

4. (**20 points**) To what extent do Elsby et al. (2013) and Karabarbounis and Neiman (2014) come to different conclusions about how to interpret time-variation in the labor share. What leads them to these different conclusions? Which arguments do you find most convincing. *[No more than half a page]*

[*References*: Elsby, M. W., Hobijn, B., & Şahin, A. (2013). The decline of the US labor share. *Brookings Papers on Economic Activity*, *2013*(2), 1-63.

Karabarbounis, L., & Neiman, B. (2013). The global decline of the labor share. *The Quarterly Journal of Economics*, *129*(1), 61-103.]

Part II (Obstfeld): 90 points = 90 minutes

1. **(20 points)** It is sometimes claimed that when a country fixes its exchange rate, it is *always* vulnerable to speculative attacks, because speculator expectations can be self-fulfilling. Please discuss whether you agree, with reference to at least two formal models of currency crisis.

2. **(35 points)** Describe what has happened to global real interest rates since the 1980s.

   (a) To what extent are trends different between countries, and why might there be commonalities and differences?
   (b) What are the leading reasons economists have suggested for falling real interest rates?
   (c) What do very low real rates imply for central banks' ability to maintain their inflation targets and for the international transmission of monetary policies?
   (d) Do you believe that low real interest rates reflect a long-term problem of "secular stagnation"?

3. **(35 points)** Consider a two-country discrete-time economy with a complete set of contingent claims.

   (a) Derive a relationship between the rate of depreciation of the nominal exchange rate, and the domestic and foreign nominal (in their respective currencies) stochastic discount factors; Does this relationship hold in expectations, or almost surely (i.e. for all states and periods)?
   (b) Using the previous expression, derive a parity condition between the expected rate of depreciation of the nominal exchange rate, the difference between nominal domestic and foreign one-period risk-free interest rates, and a risk premium that you will characterize.
   (c) The empirical literature has in the past assumed: (1) that expectations are rational and (2) that the risk premium is constant over time. Explain how these additional restrictions allow one to test empirically the parity condition. Discuss the classical results from this literature and discuss possible explanations for its findings.

Part III (Yuriy Gorodnichenko): 90 points = 90 minutes

Short questions (True/False + a brief explanation; explanation determines the grade; each question is 3 points):

1. U.S. business cycles are characterized by unpredictable duration but predictable through-to-peak changes.

2. Non-residential fixed investment is a leading business cycle indicator.

3. Available evidence from the Great Recession suggests that fiscal policy has a limited impact on economic activity.

4. Raising an inflation target is potentially an effective way to stimulate aggregate demand.

5. Macroeconomic volatility increased since the 1980s which spurred reckless lending by bank and subsequently led to the Great Recession.

6. Gold standard is a monetary regime superior to inflation targeting.

7. Optimal rate of inflation in the New Keynesian models largely depends on the cost of unemployment.

8. Aggregate consumption is best modelled as a random walk.

9. An upward-sloping labor demand could allow demand shocks to be a major source of business cycles.

10. The Hodrick-Prescott filter can generate spurious business-cycles in the data.

Longer questions (each question is 15 points)

1. Suppose you are interested in estimating the effects of monetary policy on the real economy. You have two imperfect measures of policy shocks. The first measure (ϵ_t^{MP1}) likely provides a more complete measure of policy changes but it is available at a lower frequency and so may be correlated with the state of the economy (i.e., it may be endogenous). The second measure (ϵ_t^{MP2}) provides a narrower picture of policy changes but is less likely to be endogenous. How could you combine these two shocks to have the best shot at recovering the causal effects?

2. Suppose you would like to estimate returns to scale in the aggregate production function. You observe output and inputs.
   a. What regression would you run?
   b. What econometric challenges would you face?
   c. What can you do to address these challenges (if any)?
   d. What is the evidence on returns to scale for the U.S.?

Long question (30 minutes)

On date t_0, the economy is hit by the COVID-20 virus which disrupts supply chains and firms become less productive. Fortunately, Berkeley scientists promise to deliver a highly effective vaccine at date $t_1 > t_0$, a credible promise given their track record during the COVID-19 pandemic. The vaccine is deployed immediately and restores supplies chains. We want to use our basic RBC model to study the effects of this event on macroeconomic outcomes.

Suppose that the economy is in a steady state just before t_0. You can use the following log-linearized equations for changes in the capital stock K and the marginal utility of wealth λ:

$$\Delta \breve{K}_t = \frac{\bar{Y}}{\bar{K}}\left(1 + \frac{1-\alpha}{\alpha + 1/\eta}\right)\breve{Z}_t + \left[\left(\frac{\alpha(1-\alpha)}{\alpha + 1/\eta}\right)\frac{\bar{Y}}{\bar{K}} + \alpha\frac{\bar{Y}}{\bar{K}} - \delta\right]\breve{K}_{t-1} + \frac{\bar{C}}{\bar{K}}\breve{\lambda}_t - \frac{\bar{G}}{\bar{K}}\breve{G}_t$$

$$\Delta \breve{\lambda}_t = -\frac{\alpha\frac{\bar{Y}}{\bar{K}}}{\alpha\frac{\bar{Y}}{\bar{K}} + 1 - \delta}\left[\left(1 + \frac{1-\alpha}{\alpha + 1/\eta}\right)\breve{Z}_{t+1} + \left(\alpha - 1 + \frac{\alpha(1-\alpha)}{\alpha + 1/\eta}\right)\breve{K}_t + \frac{1-\alpha}{\alpha + 1/\eta}\breve{\lambda}_{t+1}\right]$$

where G is government expenditures, C is consumption, Y is output, Z is the level of technology, α is the elasticity of output with respect to capital, η is the Frisch elasticity of labor supply, δ is the depreciation rate, hats indicate that a variable is measured in percent deviations from a steady state and the rest of the model is given by familiar constraints and first-order conditions:

$$L_t^{\frac{1}{\eta}} = \lambda_t W_t$$
$$C_t^{-1} = \lambda_t$$
$$\lambda_t = \beta R_{t+1}\lambda_{t+1}$$
$$Y_t = Z_t K_{t-1}^{\alpha} L_t^{1-\alpha}$$
$$Y_t = C_t + I_t + G_t$$
$$K_t = (1 - \delta)K_{t-1} + I_t$$
$$MPL_t = W_t$$

where W is wages, R is the gross interest rate, I is investment, L is employment.

(a) Draw the phase diagram in (K, λ) space and briefly explain the slopes of $\Delta \breve{K}_t = 0$ locus, $\Delta \breve{\lambda}_t = 0$ locus, and the saddle path (if any). (3 points)

(b) Using the phase diagram show the effects of the new virus and vaccine. Briefly explain the path of $(\breve{K}, \breve{\lambda})$. If necessary, make (and state) additional assumptions to resolve ambiguity. (7 points)

(c) Describe the response of other macroeconomic variables using the table below. Justify each entry (+/- or up/down/left/right arrows) in the table. Make sure that you use the labor market diagram and the factor price possibility frontier diagram to explain the dynamics for employment and wages. (10 points)

Variable	Impact response, t_0	Transition path for $t \in (t_0, t_1)$	New vaccine is developed, t_1	Transition path for $t \in (t_1, \infty)$	Steady state response, $t = \infty$
λ					
K					
C					
L					
Y					
I					
W					
R					

(d) Draw impulse responses to each variable in the table above. (10 points)

(e) **BONUS** Suppose that while the vaccine is being developed (that is, between t_0 and t_1), the government decides to support employment by increasing its spending on Space Forces. What would be the effect of this policy on the labor market between t_0 and t_1? (10 points)