

Final Examination

This exam is 80 minutes long, and is worth 80 points. You are given 88 minutes to complete it. Part I is multiple choice, Part II is a short answer. The points are allocated in proportion to the time you should spend on each problem. **Part I and Part II, Q1 go into bluebook A; Part II, Q2 and Q3 go into bluebook B.**

BEGIN BLUEBOOK A

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PART I: Multiple Choice [40 minutes total, 2.5 points each]. Do NOT explain. (16 problems)

1. In the United States, any deficit run by the federal government must be financed
 - a) by increases in the monetary base arranged by the Fed selling existing bonds or changes in government investment patterns.
 - b) only by increases in the national debt financed by the Treasury's floating new bonds.
 - c) by increases in the monetary base arranged by the Fed selling existing bonds or changes in the national debt arranged by the Treasury buying back existing bonds.
 - d) increases in the monetary base arranged by the Fed buying existing bonds or changes in the national debt arranged by the Treasury floating new bonds.
 - e) by none of the above.

2. When the economy operates at potential GDP,
 - a) unemployment is equal to the natural rate.
 - b) the equilibrium real wage and employment level have been reached in the labor market.
 - c) the labor market is overheated.
 - d) all of the above.
 - e) a and b.

3. Under floating exchange rates,
 - a) domestic inflation rates are inexorably linked across national boundaries.
 - b) domestic inflation in one country can lead to inflation in another, even if the exchange rate moves to preserve purchasing power parity.
 - c) domestic inflation is dictated outside the bounds that would have constrained prices in a fixed-rate regime.
 - d) domestic economies are insulated from the effects of macroeconomic policies in another country.
 - e) domestic economies enjoy much greater freedom to use monetary policy for stabilization purposes.

4. Which of the following is an assumption of the information-based model of supply developed by Lucas?
 - a) Prices and wages are assumed to be flexible.
 - b) People are not fully informed about what is going on in the economy.
 - c) A positive correlation between supply price and quantity is assumed for firms' individual supply curves.
 - d) All of the above are accurate.
 - e) None of the above is accurate.

5. The strong positive correlation between the size of an expected depreciation of a currency and the size of the deviation of the trade-weighted exchange rate from parity
 - a) is a short-term relationship based on interest rate parity.
 - b) is a long-term relationship based on purchasing power parity.
 - c) is a loose relationship that does not really stand up to the weight of empirical testing.
 - d) is a short-term relationship based entirely on the rigidity of prices in the short run.
 - e) none of the above.

6. Suppose two groups of workers are bargaining for two-year contracts, one on even years and one on odd years. Both set wages equal to a constant times a price level in the negotiating year and increase it by last year's inflation in the second year of the contract. The Fed initiates four years of disinflationary monetary policy. You should expect to see
- no recession.
 - some reduction in actual GDP relative to its potential.
 - some increase in unemployment above the natural rate.
 - some pressure to adjust the inflation index of the contract in exchange for increased job security.
 - b, c, and d.
7. According to the real business cycle theory, macroeconomies are always operating where aggregate supply equals aggregate demand. According to this theory, the business cycle is
- nonetheless explained by shifts in aggregate demand.
 - caused by negative correlations between the interest rate and work effort.
 - caused by random shifts in the aggregate production function.
 - nonetheless explained by the severe inelasticity of aggregate supply.
 - almost completely explained by the near-perfect elasticity of both aggregate supply and aggregate demand.
8. A decision on the part of the FOMC to lower interest rates must necessarily be followed by
- Fed open market purchases, which lower the money supply and reduce interest rates.
 - Fed open market purchases, which increase the money supply and reduce interest rates.
 - Fed open market sales, which lower the money supply and reduce interest rates.
 - Fed open market sales, which increase the money supply and reduce interest rates.
 - None of the above.
9. The New Classical models of macroeconomics, as exemplified by the Lucas supply curve,
- replace the flexible price assumption with an assumption of automatic price adjustments.
 - keep the flexible price assumption but incorporate informational difficulties into the representation of their adjustment.
 - keep the flexible price assumption but incorporate a measure of price inertia exerted from the foreign sector.
 - keep the flexible price assumption but modify the model of the money market to incorporate disequilibrium dynamics.
 - none of the above.
10. Which of the following statements is an accurate statement of an implication of the forward-looking theory of consumption?
- The marginal propensity to consume tends to be smaller than it would be otherwise because people view at least part of every income change as temporary.
 - Sensitivity of consumption to the interest rate tends to make the IS curve flatter than it would be otherwise.
 - Sensitivity of saving to the interest rate tends to make the marginal propensity to consume smaller than it would be otherwise.
 - The likely effect of the implied reduction in the short-run marginal propensity to consume tends to make the IS curve steeper than it would be otherwise.
 - All of the above.

11. Suppose that an individual receives an unexpected, one-time windfall of \$1,000. To determine its effect on future consumption,
- preferences about the desirability of both steady consumption and the desired size of the bequest are required.
 - it would be necessary to know the desired size of the bequest, but the desirability of steady consumption is immaterial.
 - it would be necessary to know the value ascribed to steady consumption, but the desired size of the bequest is immaterial.
 - neither the desirability of steady consumption nor the desired size of the bequest is material because \$1,000 is too small a sum to be affected by either.
 - none of the above.
12. Let the consumption function be given by $C = 80 + 0.9YDP$ with permanent disposable income specified according to $YDP = 0.5YD + 0.3YD(-1) + 0.2YD(-2)$. Two years after a permanent increase in income of \$1,000, consumption will have increased by
- \$1,000.
 - \$900.
 - \$800.
 - \$720.
 - \$80.
13. The marginal benefit schedule for capital slopes downward because
- it is the demand curve for capital and all demand curves slope downward.
 - the marginal productivity of labor increases with the quantity of capital.
 - the level of output associated with any quantity of capital declines with the quantity of labor employed.
 - the marginal productivity of capital declines with the quantity of capital.
 - none of the above.
14. Let the level of planned output decline during an economic downturn. To illustrate the effects of this decline, you would expect to see the marginal benefit schedule for capital
- shift up and to the right.
 - shift up and to the left.
 - shift down and to the right.
 - shift down and to the left.
 - move along the demand curve for labor to a lower level of employment.
15. For a firm choosing not to purchase its own stock of capital, total rental costs include which of the following?
- The purchase price of the new piece of capital
 - The real interest rate
 - The rate of depreciation
 - All of the above
 - Only b and c
16. Suppose that the desired capital stock is always equal to three times total output for any year. In that case, the accelerator principle implies that investment should always
- equal some constant multiple greater than 3 times the annual change in GDP to accommodate depreciation.
 - be precisely equal to three times the annual change in GDP regardless of the rate of depreciation.
 - equal some constant multiple less than three times the annual change in GDP to accommodate depreciation.
 - be proportional to the annual change in GDP, but the information provided is insufficient to compute the multiple exactly.
 - none of the above.

PART II: Short Answer (40 minutes total)

1. (16 minutes) Suppose equilibrium income is given by:

$$Y_0 = \tilde{\alpha} \left[\hat{A}_0 + m_w Y_w - \frac{(d + nv)\mu}{h} + \frac{(d + nv)}{h} \left(\frac{M_0}{P} \right) \right]$$

$$\text{where } \tilde{\alpha} \equiv \frac{I}{1 - b(1 - t) + m + (d + nv)k/h}$$

$$\hat{A} \equiv a_0 - bTA_0 + e_0 - dR + GO_0 + g_0 - nq_0$$

Note that in this model,

$$\frac{EP}{P_w} = q_0 + vR \quad \text{and} \quad T = TA_0 + tY, \quad C = a_0 - bTA_0 + b(1 - t)Y$$

1.1. (4 minutes) Work out algebraically the change US income arising from an increase in foreign income. Show your work! Hint: use total differentials.

1.2. (4 minutes) Work out algebraically the change in US interest rate. Show your work! Hint:

$$R = \left(\frac{\mu_0}{h} \right) - \left(\frac{1}{h} \right) \left(\frac{M_0}{P} \right) + \left(\frac{k}{h} \right) Y$$

1.3. (4 minutes) Work out algebraically what the change in the real exchange rate. Show your work!

1.4. (4 minutes) Show the change in net exports (or the “trade balance”). Hint:

$$X = g_0 - mY - n \left(\frac{EP}{P_w} \right)$$

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2. (12 minutes total) Consider the below model. The UIP and an overshooting equation imply that

$$R - R_w = -\frac{\Delta E_{+1}^e}{E} = -\frac{E_{+1}^e - E}{E}$$

$$-\frac{\Delta E_{+1}^e}{E} = \Theta \left[\left(\frac{E}{E_{LR}} \right) - 1 \right]$$

Combining two equations,

$$R - R_w = \Theta \left[\left(\frac{E}{E_{LR}} \right) - 1 \right] \quad (1)$$

Assume that the rest of the world interest rate is a fraction of the US interest rate.

$$R_w \equiv R_{restworld} + \gamma R$$

$$R - R_w \equiv -R_{restworld} + (1 - \gamma)R$$

Plug this into (1)

$$\Theta \left(\frac{E}{E_{LR}} \right) - \Theta = -R_{restworld} + (1 - \gamma)R$$

Solving for E yields,

$$E = \left(\frac{E_{LR}}{\Theta} \right) [(1 - \gamma)R - R_{restworld}] + E_{LR} \quad (2)$$

Multiply both sides by $\frac{P}{P_w}$ and using $E_{LR} = \frac{P_w}{P}$

$$\frac{EP}{P_w} = \left(\frac{E_{LR}P}{P_w} \right) \left(\frac{1 - \gamma}{\Theta} R - \frac{R_{restworld}}{\Theta} \right) + \frac{E_{LR}P}{P_w} = q_0 + vR \quad (3)$$

With this background in mind, answer the following questions.

- 2.1 (3 minutes) Suppose the rate of reversion to purchasing power parity, Θ , becomes infinite. What is the value of the real exchange rate, over all time horizons? Show your work!
- 2.2 (2 minutes) Explain in words what purchasing power parity means?
- 2.3 (3 minutes) Does purchasing power parity hold, given the assumption in 2.1?
- 2.4 (4 minutes) What happens to the price level, the exchange rate and interest rate when the money supply in the U.S. is increased by 10%? Use the time line graphs to illustrate your answer.

3. (12 minutes total) Suppose we have an economy where the central bank follows a Taylor rule:

$$r_t = \pi_t + \beta \hat{Y}_t + \delta(\pi_t - \pi_t^*) + R_t^*$$

And the macroeconomic policy rule is given by:

$$\hat{Y}_t = \frac{-\delta}{\beta + \sigma} (\pi_t - \pi_t^*)$$

Where the IS curve is given by:

$$R_t - R_t^* = -\sigma \hat{Y}_t$$

Note that the target inflation rate is 0.02.

3.1 (6 minutes) Explain using graphs what happens if there is an oil price shock such that in period 2 $Z_t = 0.08$ (but it is 0 in every other period). Be sure to cover period 3 and where the economy ends up in the end.

3.2 (6 minutes) Answer 3.1, but assuming the central bank increases the target inflation rate to 0.10, using graphs. Assume the supply shock and change in target inflation rate both take place in period 2. You can assume price adjustment takes the form:

$$\pi_t = \pi_{t-1} + f\hat{Y}_{t-1} + Z_t$$

Be sure to label the curve shifts clearly.

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