

Midterm 1

Econ 381, Prof. Evans

Testing Center: February 11–13, 2009

INSTRUCTIONS:

- Write your name and section in the upper left-hand corner of this test.
 - Please read each question below carefully, and respond to the questions on a separate sheet of scratch paper. You must show your work.
 - When finished with the test, staple your scratch paper with your answers and your work to this test when you turn it in.
 - You may use a testing center issued calculator.
 - This midterm consists of the following two sections that total 100 points possible:
 - Part 1: Short answer, 40 points possible
 - Part 2: Analytical problems, 60 points possible
 - Good luck.
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Part 1: Short answer

(40 points possible, 2 points each)

1. Define macroeconomics.
2. What are the three requirements for a good macroeconomic model?
3. Choose one. Macroeconomic models are used to explain how _____ variables influence _____ variables
 - (a) endogenous; exogenous
 - (b) exogenous; endogenous
 - (c) microeconomic; macroeconomic
 - (d) macroeconomic; microeconomic
4. Define the “crowding out” effect.
5. Give the expression for real GDP in terms of nominal GDP and the GDP deflator.
6. If investment is a flow, what is the corresponding stock?
7. Yes or No. If the change in the price level is shown to be a function of changes in the money supply according to $\% \Delta P = \% \Delta M$, does this model fit the classical dichotomy?

8. True or False. The aggregate production function $Y = F(K, L) = K^{1/2}L^{2/3}$ exhibits constant returns to scale.
9. Write down the equation that tells you what the value of the capital stock (per worker) will be tomorrow k_{t+1} as a function of the capital stock today k_t , investment today i_t , and the depreciation rate δ .
10. In the growth model, what does a government want to do to the savings rate s if the current steady state capital stock per worker k_0^* is less than the golden rule level of the steady state capital stock $k_0^* < k_{gold}^*$?
11. Name two potential causes of structural unemployment.
12. If the job separation rate is 0.02 per month and the job finding rate is 0.10 per month, what is the natural rate of unemployment (steady state unemployment rate)?
13. How could the Federal Reserve change expected inflation π^e without changing the current money supply?
14. Assume that the nominal exchange rate of euros per dollar is 0.85 €/€ and that purchasing power parity holds. If a Big Mac costs \$3 in the United States, how much should it cost in Europe?
15. If a country runs a trade surplus, is it a net borrower or a net lender on international markets? That is, is this country's capital account negative or positive?
16. Name the three main categories of investment I in the national income accounts.
17. Which survey from the Bureau of Labor Statistics does the unemployment data come from?
18. Define seignorage.
19. Who benefits and who loses from inflation?
20. True or False. If the correlation between real GDP and aggregate prices is approximately zero $\rho(Y, P) \approx 0$, this contradicts the classical dichotomy.

Part 2: Analytical problems

(60 points possible)

21. **Capital and labor shares of income (10 points).** Using the expressions characterizing the optimal levels of capital and labor from the firm's nominal profit maximization problem and using the real profit equation, show that the capital share of income and the labor share of income are both constant percentages of income when the production function takes the Cobb-Douglas form $Y = K^\alpha L^{1-\alpha}$.

22. **Fisher equation model of nominal interest rates (15 points).** Assume that the nominal interest rate i in a closed economy is determined by the Fisher equation,

$$i = r + \pi$$

where r is the real interest rate and π is the inflation rate. Further, the real interest rate r is determined in the model for loanable funds. That is, the real interest rate r is always the level that sets the demand for loanable funds equal to the supply of loanable funds according to,

$$I(r) = Y - C - G$$

where investment $I(r)$ is a negative function of the real interest rate r . The inflation rate π in this economy is determined by the quantity theory of money equation in percentage change terms,

$$\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Y$$

Further, assume that Y , C , G , and V are exogenous

- How would an increase in the money supply M affect the nominal interest rate i in this model?
- If output is a function of capital and labor $Y = F(K, L)$, then what would a decrease in the labor force L do to nominal interest rates i ?
- Suppose the demand for mortgages in this country was a negative function of the nominal interest rate i . That is, the demand for mortgages increases when the nominal interest rate decreases. What would be the effect of an increase in government spending on the demand for mortgages?

23. **Small Open Economy (15 points).** Assume that the country SmoothHawlitania is a small open economy, and that real GDP (Y) in SmoothHawlitania can be decomposed into aggregate consumption C , aggregate investment I , government spending G , and net exports NX in the following way:

$$Y = C + I(r^w) + G + NX(\varepsilon)$$

Furthermore, assume that real GDP is exogenous because capital and labor are exogenous $\bar{Y} = F(\bar{K}, \bar{L})$. Assume that government spending \bar{G} is exogenous and that taxes \bar{T} are exogenous. Also, assume that consumption is a positive function of disposable income in the following way $\bar{C} = C(\bar{Y} - \bar{T})$ and is, therefore, exogenous. Assume that investment is a negative function of the world interest rate $I(r^w)$ and that the world interest rate is exogenous. Lastly, assume that net exports $NX(\varepsilon)$ is a negative function of the real exchange rate ε , such that when ε goes up, NX goes down, and vice versa.

- (a) Write the equation above such that the trade account equals the capital account.
- (b) If the world all of a sudden becomes more risky and the world interest rate r^w increases, what does this do to the capital account? How does this change affect the real exchange rate ε and net exports NX ?
- (c) Now suppose that the government wants to protect its exports (i.e., increase net exports NX) in this environment. Suppose that a tariff on imports would increase net exports NX at every possible value of the real exchange rate ε . Would this tariff policy accomplish the goal of increasing net exports? Why or why not?

24. **Growth model with population growth (20 points).** The country of Napaj is characterized by an aggregate production function of the form $Y = K^{1/3}L^{2/3}$, where K is the aggregate capital stock and L is the labor force. The labor force (population) in Napaj is growing at rate n such that $\Delta L = nL$. The investment function of each worker is to save a fraction s of their income $i = sy$. Therefore, their consumption functions are to consume the remaining fraction of their income $c = (1 - s)y$.

- (a) Let output per worker be defined as $y \equiv \frac{Y}{L}$, and let capital per worker be defined as $k \equiv \frac{K}{L}$. What is the equation for the output per worker production function $y = f(k)$?
- (b) Given the savings rate s , depreciation rate δ , population growth rate n , and the exact functional form for the output per worker production function $y = f(k)$, write the expression for the steady state capital stock per worker k^* .
- (c) Given the savings rate s , depreciation rate δ , population growth rate n , and the exact functional form for the output per worker production function $y = f(k)$, write the expression for the golden rule level of steady state capital k_{gold}^* that maximizes steady state consumption per worker c^* .
- (d) Suppose that the current steady state capital stock in Napaj k_0^* is greater than the golden rule level of steady state capital $k_0^* > k_{gold}^*$. Further, suppose that the government cannot change the savings rate s of the people of Napaj but can influence the population growth rate n . What would the government want to do to the population growth rate n in order to get closer to the golden rule level of steady state capital k_{gold}^* ? [Hint: a graph might help you answer this question.]