Carnegie Mellon Tepper SCHOOL OF BUSINESS

73-240 – Practice Exam 2

Sample Short Questions

Question 1:

Suppose real GDP per capita was $45,350 in 1989 and $67,000 now in 2014. Assuming real GDP per capita grew at a constant annual rate, what has been the average annual growth rate of real GDP per capita? (You only need to provide a formula for your result).

Question 2:

Suppose country X grows at a constant rate of 2% per year and country Y grows at a constant rate of 5% per year. Country X is currently twice the size of country Y. Calculate how many years it takes for Y to catch up with X. You may leave your answer in the form of a formula.

Question 3:

Consider Malthus' model of growth. Suppose population growth as a function of consumption per person is given by: $g(c) = 2c^{1/3}$. State what consumption per person and output per person are equal to in steady state.

Question 4

Suppose the matching function is given by $M = eV^{1-\gamma}U^{\gamma}$. Write down what the worker's probability of finding a job, $p(\theta)$, is in terms of labor market tightness, $\theta = V/U$, e and γ. Also write down what the unemployment rate is in therms of θ, e, and γ.

Question 5:

Write down an equation that pins down steady-state capital per worker. Assume that output per worker is given by $y = zk^{\alpha}$. Solve for steady state capital per worker in terms of s, z, n and d.

Question 6:

A student argues that improvement in technology always lead to increases to consumption per person. State whether this is always true and specify models which either support or negate the student's statement.

Question 7:

Consider the Malthus model of growth. Write down two assumptions we make in that model.

Question 8:

Write down an equation that describes how the stock of unemployed evolves over time.

Sample Long Questions

Problem 1: Search Model of Unemployment

Consider the search model of unemployment. Let the population of households equal to 1. All individuals who choose to stay out of the labor force produce b value of home goods. Suppose ϕ proportion of the job-seekers are type H workers and the other $1-\phi$ are type L workers. Firms matched to type H workers produce $2z$ while firms matched to type L workers produce z. All unemployed regardless of type produce home goods of value b. Assume that the number of matches, $M = eV^{1-\gamma}U^{\gamma}$, where e is the matching efficiency, V is the number of vacancies and U is the number of job-seekers.

a Suppose that prior to meeting a worker, firms do not know which worker they would meet and are prevented from creating vacancies for a specific type of worker. In this sense, when a firm creates a vacancy, it cannot discriminate and advertise for only one particular type of worker. Firms pay vacancy posting cost κ to create a vacancy. Upon meeting a worker, firms learn the worker's type. Workers of type L receive wage w_L, workers of type H receive wage w_H. Write down the firm's value of creating a job. What is this value equal to under free entry?

b Note that since firms cannot advertise for a specific type of worker, all workers have the same probability of contacting a vacancy. Write down the expected benefit of search for a type H and type L worker respectively.

c Assume that the worker's bargaining weight is α where $0 < \alpha < 1$. Under Nash Bargaining, what is the wage rate, w_H, for a type H worker? What is the wage rate, w_L, for a type L worker?

Problem 2: Do distributions matter?

Continuing from problem 1, characterize the labor market tightness θ (which is the ratio of vacancies to job-seekers) in terms of $z, b, e, \gamma, \kappa, \phi, \alpha$. Suppose the distribution of workers were to change such that the pool of job-seekers is largely made up of type L workers, i.e. ϕ shrinks. How does that affect θ? How does the composition of skilled (H type) vs. low-skilled (L type) job-seekers affect the unemployment rate?

Problem 3: Malthus

Consider the Malthus model of growth. Suppose there is a sudden influx of migrants that causes population to suddenly increase at time T. Using graphs, show what happens to c, l, N over the short and long run.