BILKENT UNIVERSITY

Department of Economics

Ec453 Theories of Growth and Development I

Fall 2015 Midterm Exam

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This exam consists of two parts. The first is a closed book, no discussion exam. You have 2 hours to complete it. The second part is take home and you can consult with your friends, loved ones and any significant others, as long as you take an active part in the final writing. This part is due 9:30 Thursday, SHARP.

Use your time optimally.

1. Short questions (5 points each)

   (a) Convergence in per capita incomes across nations is a standart policy implication of the conventional neoclassical (mainstream) model. Discuss the main assumptions that lead to this prognostication.

   (b) Define the Marxian concept of *exploitation.* What are the distinguishing hypotheses behind this concept? Can there occur exploitation under a neoclassical world? Explain.

   (c) Why is that under the neclassical steady state we have zero rate of growth per capita? Explain.

   (d) State the *classical saving function.* What are the hypotheses behind this function?

2. (15 points) Observe the following data from Turkey, 2014: total income (GDP) is 750 billions US$. Value of aggregate capital stock is 100 billions US$. Level of population is 75 million people.

   It is also known that total investment expenditures is 150 billions US$; total consumption is 600 billions US$ and ignore trade and fiscal accounts. Assume away population growth and technological change.

   (a) Invoking the classical saving rule that wage rate equals consumption per person, calculate the labor-output and capital-output ratios. (*Beware of the units*!!! and use depreciation of capital stock as 1.0)

   (b) Find the Marxian rate of profit and the growth rate that sustain this data.

   (c) Plot the Marxian equilibrium in a four quadrant graph depicting equilibrium values of *w, c, r, and g.*

   (d) State the *rate of exploitation* for Turkey under the Marxian long run equilibrium you stated above.

   (e) Now consider a *Post-Keynesian (Passinettian)* set up for this data with I=150. Assume that workes do not save and all savings come from capitalist savings (out of capitalists' profit income). What is the level of aggregate profits in this economy under the Keynesian framework? What should the saving rate of capitalists be to sustain post-Keynesian equilibrium?

3. (25 points) *Solovobodia* is a small, private ownership economy. There is only one homogenous good, wheat, which is produced using labor and seeds of wheat alone. Land is in abundant supply, and is not considered to be a scarce good. Currently the following data is being observed in Solovobodia: output per labor, q, is 10; investment per labor, i, is 5; and consumption per labor, c, is 5. The technology in use in Solovobodia's wheat production admits that the ongoing capital-labor ratio, k, is 2.5

   Consider the neoclassical characterization of this economy. Under these conditions,

   (a) State the capital output ratio, v; and the labor output ratio, l.

   (b) Given that the wage rate (wages per labor) is equal to consumption per labor, find the profit rate in Solovobodia. Verify the unit cost price equation: $1 = wl + (1 + r)v$; and the market equilibrium equation: $1 = cl + (1 + g)v$.

   (c) Now suppose that output per labor is characterized by the following function of capital per labor:

   $$q = Ak^{\alpha}$$

   with A showing technology parameter, and stays constant over time. The parameter α denotes the share of capital in output. Calibrate the above data to the Solovobodian economic structure; that is find the values of A and α.

   (d) Assuming that the golden rule of savings applies; find the steady state values of capital per labor and output per labor. Calculate the rate of net profit and the wage rate and consumption per labor.

   (e) Now suppose that the workers came to power and succeeded in setting the wage rate at $\overline{w} = 11$ (about 10% higher than the steady state value of w). Find the new profit rate (net). Calculate the capital labor ratio, $\overline{k}$, and output per labor, $\overline{q}$, under the new equilibrium with $\overline{w} = 11$

   (f) Find the new savings rate that would sustain the distorted steady state capital labor ratio $\overline{k}$ under the new steady state. Calculate the new level of consumption per labor, $\overline{c}$, and contrast it with the golden rule steady state consumption level. Are the workers better off? How can you explain the fact that under the new regime even though $\overline{q} > q*$, we have $\overline{c} < c*$?

   (g) Now suppose that capitalists over-run the government and impose a new regime that maximizes *aggregate net profits per labor*, rather than consumption. That is,

   $$\max f'(k) \cdot k - \delta k$$

   with $\delta = 1$. Derive the new rule for the steady state and find the total net profits maximizing values of *k, q, s, and c.*

Part II: Take Home

This part is due Thursday, 19 November 09:30.

1. (10 points) In 500 words of a brief essay, discuss why the Industrial Revolution had occurred in Great Britain. What were the determinants of this historical moment?

2. (10 points) The G20 Meetings have concluded in Antalya with Turkey terminating its presidential role of the group. A Resolution had been shared at: https://g20.org/g20-leaders-commenced-the-antalya-summit/

   In 500 words of an essay, discuss and evaluate the proposals and findings set forth at the G20's 2015 Resolution. Be analytical and exciting!

3. (10 points) Using data from the Penn World Tables http://www.rug.nl/research/ggdc/data/pwt/pwt-8.1, Expert data section, find the real GDP at PPP, population and capital stock PPP data for Zimbabwe and USA (in US dollars) for 2011. Assume that the rate of depreciation of capital stock is 0.20 in Zimbabwe, and 0.10 in USA. Assume away population growth and technological change. Assume that both countries have access to the same level of technology and that the share of capital, α, is 1/3.

   (a) Assume that both countries save at the golden rule to maximize consumption per labor under the steady state. Find the level of consumption maximizing values of capital, output and consumption (all per labor) and plot the equilibrium configuration of both of these countries in one graph.

   (b) Discuss the nature of the steady state in relation to differences in per capita income accross these countries.

4. (10 points) Consider the following version of the Barro-style endogenous growth model with a strategic public good. Output is produced in the aggregate with:

   $$Y = K^{\alpha} L^{(1-\alpha)} G^{\beta}$$

   where G is aggregate public capital and is financed through taxes on GDP:$G = tY$

   (a) Express output per labor function (Y/L).

   (b) Find out the rate of growth in k as a function of parameters t, δ and L. What should β equal to in order to sustain balanced growth under long run equilibrium?

   (c) Plot your equilibrium configuration in a graph of k and *rate of growth*. What are the rather undesirable features of this model in depicting long run equilibrium growth?