Economics 236C Final Exam

Professor Chad Jones

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This exam contains 2 sections, worth a total of 180 points. Notice that each point corresponds to one minute.

The first section asks you to explore a model and is worth 90 points.

The second section asks you to discuss 3 papers, just as in the practice exam, and is also worth 90 points. Please choose *one* paper from each part, and answer the following questions:

(a) (23 points) Explain the main contribution of the paper. For papers with models, a good answer should highlight the main features of the economic environment, explaining which parts of this environment are innovative and important. For papers with empirical results, a good answer should explain how the results are obtained and give a sense of the magnitude of the result. For both kinds of papers, please provide a clear interpretation of the main results.

(b) (7 points) What is the most important shortcoming of the paper?

Section 1 (90 points)

Consider the following model of technology transfer, which we have not seen in class:

$$Y_t = A_t^{\sigma} K_t^{\alpha} L_t^{1-\alpha} \tag{1}$$

$$\dot{K}_t = I_t - \delta K_t \tag{2}$$

$$\frac{\dot{A}_t}{A_t} = \bar{v} \left(\frac{R_t}{Y_t} \right)^{\beta} \left(\frac{W_t}{A_t} \right)^{\theta} \tag{3}$$

$$W_t = \bar{W}_0 e^{\gamma t} \tag{4}$$

$$Y_t = C_t + I_t + R_t \tag{5}$$

$$L_t = \bar{L}_0 e^{\bar{n} t} \tag{6}$$

In this model, most of the variables have the usual interpretation. I'll comment on what is different. First, W_t is the world's stock of knowledge, assumed to grow exogenously. A_t is a country's own stock of knowledge, which is learns from the rest of the world by conducting "research" R_t. Letters with a "bar" over them and greek letters are exogenous parameters, assumed to be positive (and not too large, when necessary).

(a) (10 points) Provide an economic interpretation of the technology transfer equation. Why might it depend on R/Y rather than just on R?

(b) (20 points) Define formally a rule-of-thumb allocation of resources in this economy.

(c) (20 points) Solve for output per worker along the balanced growth path for this rule of thumb allocation.

(d) (15 points) Discuss how you might calibrate the parameters of this model. What kind of evidence would help you pin down key parameter values?

(e) (15 points) Suppose rich countries spend 5% of their GDP on technology transfer, while the poorest countries of the world spend 1%. Can a model like this explain a 50-fold difference in incomes across countries?

(f) (10 points) Discuss what you like and dislike about this model. How is it related to models we saw in class?

Section 2 (90 points)

Part 1

Greenwood, Jeremy, Zvi Hercowitz, and Per Krusell. 1997 "Long-Run Implications of Investment-Specific Technological Change"

Whelan, Karl. 2003. "A Two-Sector Approach to Modeling U.S. NIPA Data,"

Manuelli, Rodi and Ananth Seshadri. 2005. "Human Capital and the Wealth of Nations"

Part 2

Esteban Rossi-Hansberg and Mark Wright. 2005. "Urban Structure and Growth"

Kortum, Samuel S. 1997. "Research, Patenting, and Technological Change"

Fahri, Emmanuel and Ivan Werning. 2005. "Inequality, Social Discounting and Estate Taxation"

Part 3

Acemoglu, Daron. 2003. "Labor- and Capital-Augmenting Technical Change"

Jones, Charles I. 2005. "The Shape of Production Functions and the Direction of Technical Change"

Caselli, Francesco and John Coleman. 2005. "The World Technology Frontier"