Name:_____   Economics of Development
Spring 2019   Exam 1
Total quiz is 30 points. Each question is worth three points. Each sub question is worth an equal share of these three points.

1) Circle to indicate whether the statement is true or false.

Statement	Is the statement True or False?
The Harrod-Domar model predicts increasing the savings rate will increase the growth rate of an economy.	True or False
Sen states that one of the main themes of the first generation of development economics was deregulation to allow increased foreign direct investment.	True or False
Neutral technological progress changes the marginal rate of technical substitution for a given input bundle without changing the amount of output produced using that input bundle.	True or False
Solow designed his model to explain the cross-country evidence suggesting there is 'club convergence' across countries in income per capita over time.	True or False
The Romer model is based on the idea of "technology spillovers" resulting from the transfer of intellectual property rights.	True or False
Conversion of a currency by the purchasing power parity method applies a common set of international prices to all goods and services produced in a country.	True or False
The Lewis model assumes the marginal product of labor in the manufacturing sector is zero but the marginal product of labor in the agricultural sector is greater than zero.	True or False
Dumping is when a firm that has monopoly power in a home country sells uses the monopoly profits to sell at a lower price in foreign markets to drive out competitors.	True or False

2) Growth theories
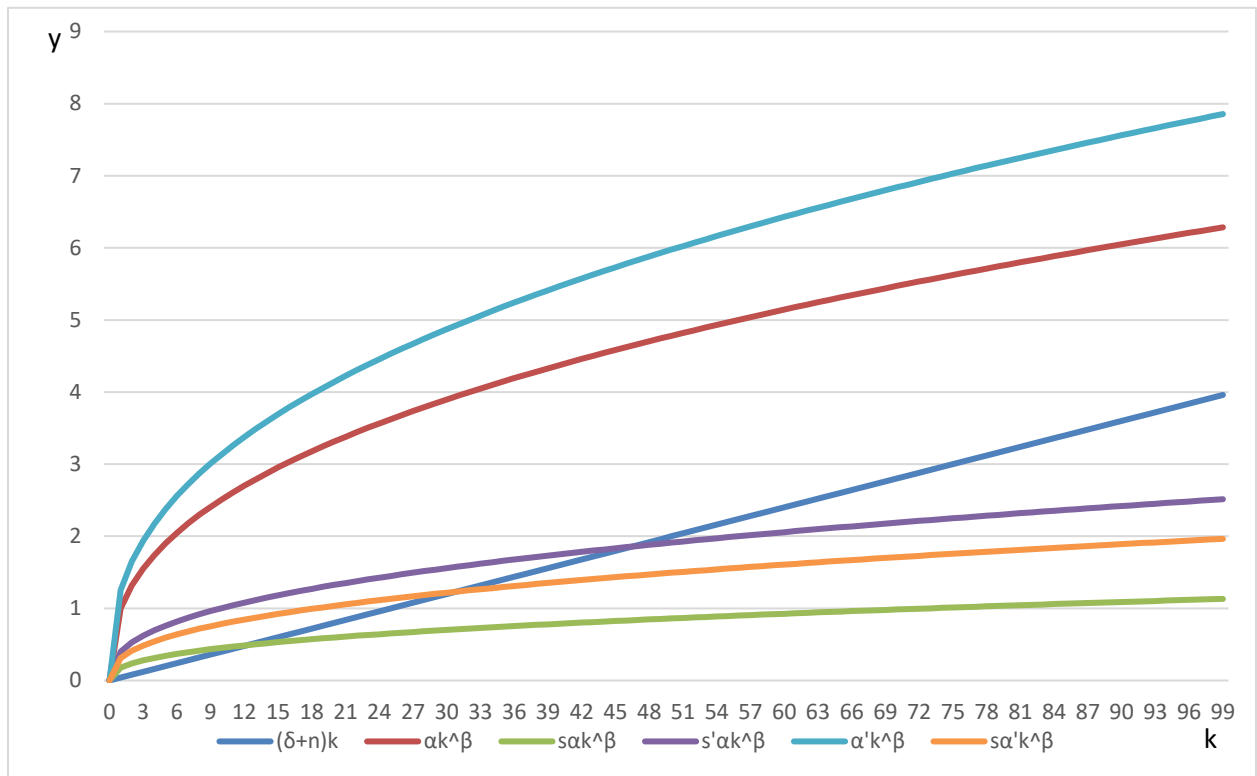
a) In the graph, k is capital per worker on the x-axis, output per worker is defined as $y = \propto k^{\beta}$ on the y-axis with α capturing total factor productivity and β the share of national income controlled by owners of capital, n is population growth rate, δ is the depreciation rate, and s is the savings rate. Identify on this figure the steady states in k and y for: 1) the baseline (α,s), 2) after growth due to an increased savings rate (α,s'), and 3) after growth from an increase in total factor productivity (α',s).

b) In class, we discussed why the creators of the Harrod-Domar model created their model. We then discussed why the Solow model was created. Finally, we discussed how the Solow model led to the literature on (unconditional) convergence. Summarize these discussions, indicating how Harrod-Domar, Solow, and the convergence literature are intellectually related. (you can start here and continue on the next page)
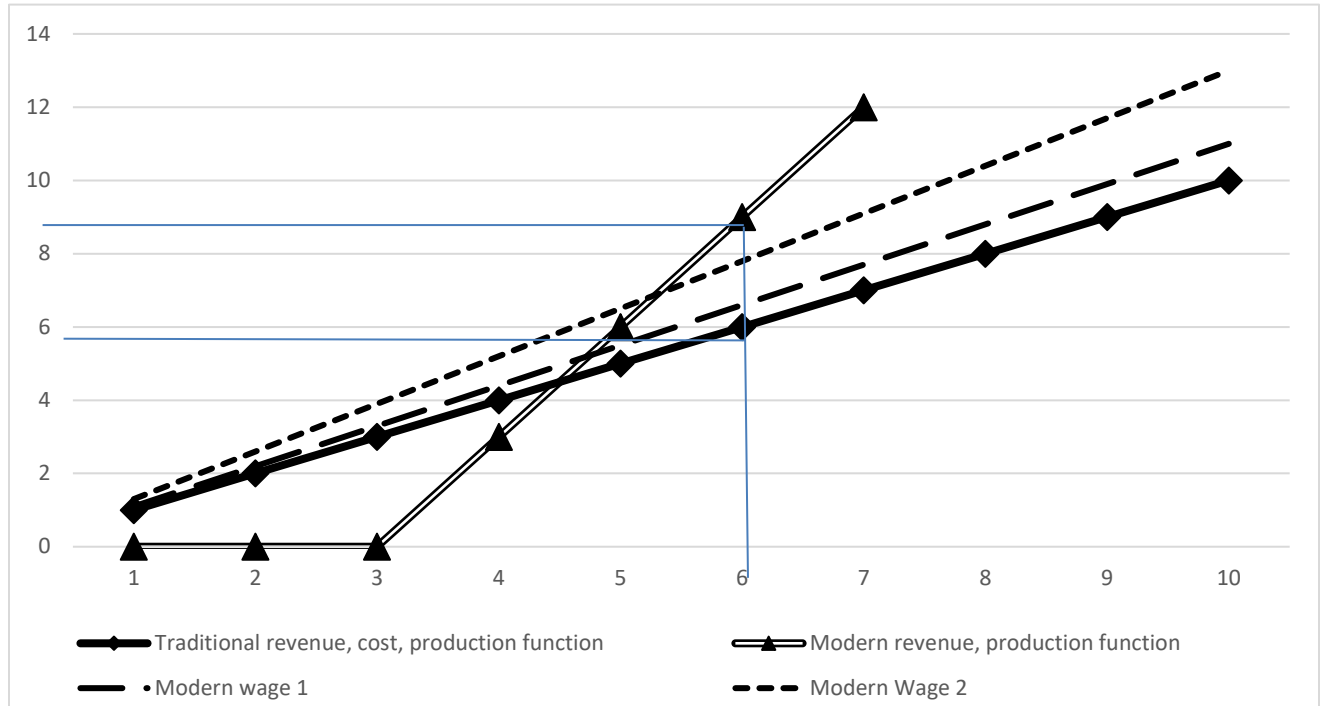
3) Exchange rates and trade strategy.
    a. Illustrate on a supply and demand graph the impact of an overvalued domestic currency on the demand for US dollars where the price is units of domestic currency per dollar, and the supply and demand curves are of US dollars.

    b. Explain how an overvalued currency impacts importers and exporters differently.

4) More models

Output

Traditional revenue, cost, production function   Modern revenue, production function

Modern wage 1   Modern Wage 2

The x-axis is labor in one of N sectors of the economy measured in hundreds. 600 workers are currently employed using traditional technology, and they make 600 units, where output is measured in hundreds as well. Each worker is paid 1 per unit of work and each unit of output produced sells for 1 in the traditional sector. The line with the diamond markers is the traditional revenue, cost, and production function. The double line is the modern revenue and production function. It costs the equivalent of 300 workers to bring in the technology, but each worker is more productive with the modern technology than the traditional technology. Possible cost curves reflecting different wages in the modern sector are represented by the dashed lines.

    a. What is the name of this model?

    b. Will coordination be needed to have all N sectors in the economy modernize if the modern wage is represented by modern wage 1? Why or why not?

c. Will coordination be needed to have all N sectors of the economy modernize if the modern wage is represented by modern wage 2? Why or why not?

d. What is the nature of the spillover benefit to the other N-1 sectors of the economy of the sector represented in the figure modernizing?

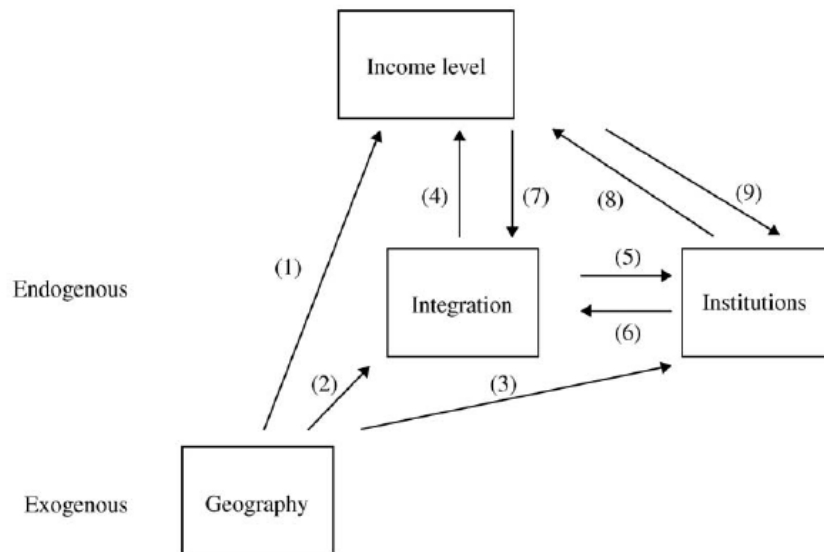5) Explaining differences living standards in cross country comparison

Figure 1. The ''deep'' determinants of income.

a) Describe what this figure illustrates in terms of what causes high income levels, noting the three 'strands of thought' on what leads to income differences over time.

b) What are the main findings of the paper in terms of which is 'strand of thought' most strongly supported by the findings?

6) New Growth Theory.
    a. What are forward and backward linkages, and how can they explain why 2% of the US land area produces 50% of GDP?

    b. What are spillovers, and what role do they play in the Romer model? Illustrate using the formal model that Romer developed.

7) There are four workers in the economy who differ in their labor quality as defined by their 'q' value. Q is defined on a scale of [0,1] with higher q being higher quality. Worker one has q=1, worker two has q=0.6, worker three has q=0.4, and worker four is q=0.2. Production takes place using two workers, with output of combining workers i and j defined by $y_{ij} = q_i * q_j$.

a) Fill in the following

Combination 1	Resulting output 1	Combination 2	Resulting output 2	Total output (1+2)
(1, 0.6)		(0.4, 0.2)		
(1, 0.4)		(0.6, 0.2)		
(1, 0.2)		(0.6, 0.4)		

b) Say production can be increased by paying for training that will increase the q of a given worker. The cost of this training, c, can be expressed in terms of output y. Training that costs c raises the skills of a worker as represented by a 0.1 increase in their q value. As you may recall from class, training will be given to the lower q worker in a given pair so you can just focus on that. What is the maximum cost c a firm would be willing to pay for the training that will increase the skill level of the 0.6 worker in a (1, 0.6) pairing?

c) Continue with the training details from part b. What is the maximum cost c a firm would be willing to pay for the training that will increase the skill level of the 0.2 worker in a (0.4, 0.2) pairing?

d) Contrast your answers to (b) and (c) to illustrate why the O-ring theory can be used to explain a lack of 'convergence'.

8) Illustrate the following:
   a. Place a tariff on the imported commodity such that the selling price with the tariff is higher than the international price but less than the domestic price if no imports are allowed. Show the level of domestic supply, the level of international supply, and the tax revenue generated. Contrast the autarky outcome, the open market outcome, and the tariff outcome. Y axis is price, x axis is quantity.

   b. The tariff is proposed as a way to develop a domestic manufacturing industry that will become more efficient as the domestic industry 'learns by doing'. What would 'learning by doing' look like on your graph to (a) – what part of the graph would change over time? You can verbally describe the change or draw the change.

   c. Explain how the promise by government to remove the tariff after 10 years and the industry has improved efficiency in the sense of your answer to (b) potentially illustrates "the commitment problem".

9) Arendelle workers producers produce 18 units of salmon and 8 units of potatoes per unit of labor. Workers in the Kingdom of the Southern Isles (KSI) can produce 12 units of salmon and 4 units of potatoes unit of labor.

   a. If there are 100 laborers in Arendelle and 100 in KSI describe the level of production of each commodity in each country in autarky if each country divides up their labor force with half of the work force allocated to each commodity.

	Salmon	Potatoes
Arendelle		
Kingdom of the Southern Isles		
TOTAL		

   b. Identify the product in which each country has a comparative advantage and explain why this is the product in which they have a comparative advantage.
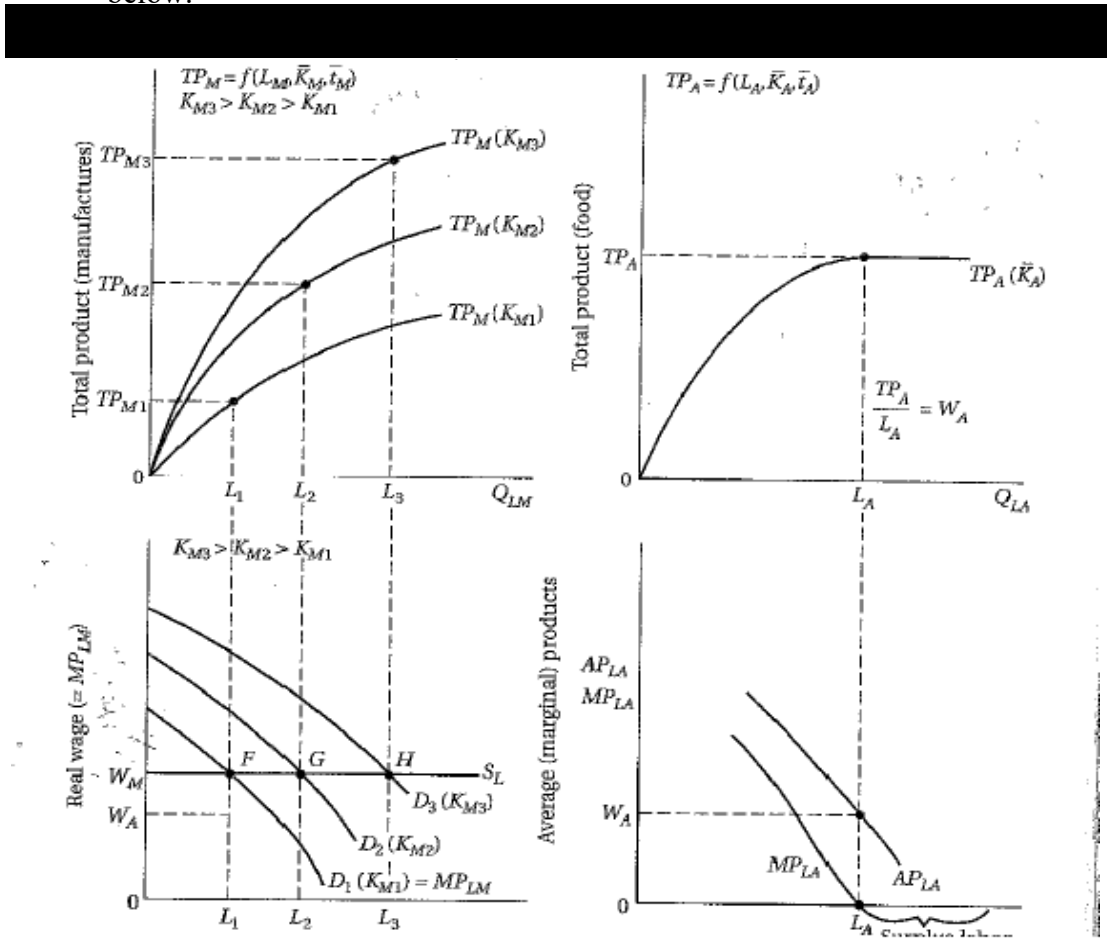
   c. Move 3 Arendelle workers to the commodity in which they have comparative advantage and 5 KSI workers to the commodity in which they have comparative advantage. What levels of each commodity are now produced in each country?

	Salmon	Potatoes
Arendelle		
Kingdom of the Southern Isles		
TOTAL		

   d. Trade 21 units of potatoes from where potatoes is the comparative advantage for 55 units of salmon from where salmon is the comparative advantage. How does the amount of each commodity in each country now compare to what you found in (a)? Why did this happen?

	Salmon	Potatoes
Arendelle		
Kingdom of the Southern Isles		
TOTAL		

10) Consider the following set of figures taken from the textbook and answer the questions below.

Top left figure: $TP_M = f(L_M, \bar{K}_M, \bar{t}_M)$, $K_{M3} > K_{M2} > K_{M1}$

Y-axis: Total product (manufactures)
Curves: $TP_M(K_{M3})$, $TP_M(K_{M2})$, $TP_M(K_{M1})$
Y-values: TP_{M3}, TP_{M2}, TP_{M1}
X-axis: L_1, L_2, L_3, Q_{LM}

Top right figure: $TP_A = f(L_A, \bar{K}_A, \bar{t}_A)$

Y-axis: Total product (food)
Value: TP_A
Curve: $TP_A(\bar{K}_A)$
$\dfrac{TP_A}{L_A} = W_A$
X-axis: L_A, Q_{LA}

Bottom left figure: $K_{M3} > K_{M2} > K_{M1}$

Y-axis: Real wage ($= MP_{LM}$)
Points: F, G, H, S_L
W_M, W_A
Curves: $D_3(K_{M3})$, $D_2(K_{M2})$, $D_1(K_{M1}) = MP_{LM}$
X-axis: L_1, L_2, L_3

Bottom right figure:

Y-axis: Average (marginal) products
AP_{LA}, MP_{LA}
W_A
Curves: MP_{LA}, AP_{LA}
X-axis: L_A

a) What is the name of this model and what qualitative / structural change in the economy of a country is this model designed to describe?

b) Where specifically does the money come from to invest such that the capital stock increases from K_{M1} to K_{M2}? Shade in the area and describe why this area is profit.

Work Page