ECON 4053 Development Economics

Semester 1, 2021-2022

Assignment #1

100 marks in total.

Due by 11:59PM, Friday, October 29 (week 8, reading week).

Please turn in your handwriting answers to Ms. Tina Kong at T1-301-R5-H10, or via a dropbox link on iSpace.

Q1: (10 marks) “Social and institutional innovations are as important for economic growth as technological and scientific inventions and innovations.” What is meant by this statement? Explain your answer.

Q2: (10 marks) Which measure shows more equality among countries around the world—GNI calculated at exchange rates or GNI calculated at purchasing power parity? Explain.

Q3: (25 marks) Imagine that a country has a national savings rate of 20% and a labor growth rate of 4%. The country’s production function is Y = min{0.2K, 0.1L}, where Y is the total production, K is the physical capital and L is the number of labor. Suppose that the physical capital and the labor in a given year is K0 = 40 and L0 = 80 and capital lives forever, so that the depreciation rate δ = 0.

1. Calculate physical capital, labor and production in the next year (K1, L1, Y1). (5 marks)
2. Does this economy reach a steady state? Explain. (5 marks)
3. Calculate the capital–output ratio. Explain the meaning of the capital-output ratio. (5 marks)
4. What the savings rate should be to get growth rates up to 8% per year and (ii) what the capital– output ratio should be (at a savings rate of 20%) to get the growth rates up to the same 8% per year (Hint: Use the Harrod–Domar model). Why does the savings rate need to *rise* to raise the growth rate? Why does the capital–output ratio need to *fall?* What does a fall in the capital–output ratio mean in economic terms? (10 marks)

Q4: (35 marks) The following table shows the income distribution data for Brazil.

|  |  |
| --- | --- |
| **Quintile** | **Percent Share** |
| Lowest 20% | 3.0% |
| Second quintile | 6.9% |
| Third quintile | 11.8% |
| Fourth quintile | 19.6% |
| Highest 20% | 58.7% |

1. Carefully graph the Lorenz curve, labeling the axes. (5 marks)
2. Explain how to find the Gini coefficient, graphically. (5 marks)
3. Assume that Brazil’s national income is about $3.4 trillion. What is the approximate dollar income of the bottom 20% and 40%? (5 marks)
4. Brazil’s population is approximately 209 million. Suppose that each household makes the average income for its quintile. What is the level of poverty if the poverty line is $3,000 per capita? (Calculate the various indices, including headcount index, total poverty gap, average poverty gap, average income shortfall, normalized poverty gap, normalized income shortfall, the Foster-Greer-Thorbecke indices P0, P1 and P2.) (10 marks)
5. Suppose one percent of national income were transferred from the richest 20% of households to the poorest 20% of households. Show the effect on relative inequality. (5 marks)
6. Under the same transfer, what is the effect on poverty? (5 marks)

Q5: (20 marks) This is a question on joint families, externalities, and fertility choice. Suppose that Ron and Hermione are the heads of a nuclear family, making their fertility decisions. For simplicity, assume away gender bias and issues of child survival. The following table details the costs and benefits (in dollars, say) of different numbers of children.

|  |  |  |
| --- | --- | --- |
| Number of children | Total benefit ($) | Additional cost |
| One | 500 | 100 |
| Two | 750 | 100 |
| Three | 840 | 100 |
| Four | 890 | 100 |
| Five | 930 | 100 |
| Six | 950 | 100 |
| Seven | 960 | 100 |
| Eight | 960 | 100 |

1. Based on the information in the table, how many children would Ron and Hermione have in order to maximize their net benefit? (5 marks)
2. Now consider two identical nuclear families: Ron and Hermione (as above), and Harry and Ginny. Ron and Ginny are siblings and the two couples form a joint family. Both couples have exactly the same costs and benefits of having children as in the table. Now suppose that 50% of the upbringing costs of each child (e.g., child care) can be passed on to the other family. Each couple makes independent decisions, taking only its own welfare into account. Now how many children will each couple have? (5 marks)
3. Explain the reason for this seemingly paradoxical result, using the concept of externalities, and try and understand why larger families (either integrated across generations or between siblings in the same generation), will tend to have a larger number of children per couple. (5 marks)
4. What is the relationship between the age structure of a population and its dependency burden? (5 marks)