

Part I

40 pts

Answer all questions. Unless asked differently in a specific question, please respond as follows. Please state whether the statement is true as written and explain why. If false or uncertain, explain why it is false or uncertain. A good answer would define terms carefully and provide caveats to the statements made or provide elaborations to the statement made when it is appropriate to do so. Use graphs and equations if they would help your arguments. Each question is worth 8 points.

1. Dependency theories argue that underdevelopment is not a stage in the development process, but the consequence of interaction between rich and poor countries.
2. Share of industry in the output of a country increases over time.
3. The Solow model shows us that a higher savings rate does not result in sustained higher rates of economic growth.
4. Multiple equilibrium models argue that less developed countries are in a low level equilibrium trap from which they can escape only if they coordinate their economic activities.
5. Lewis defines "surplus labor" as labor that contributes less to output than it is paid.

Part II

18 pts

Explain in what ways the Human Development Index is a better measure of the well-being of nations than Per Capita Income in PPP dollars. What were the changes in HDI that were introduced this year and explain why they are improvements (if they are!). Then calculate the human development index for Indonesia for 2008. You are given the following data.

Income per capita in PPP measure = US \$3957

Life expectancy = 71.5; Mean years of Schooling = 5.7; Expected Years of Schooling = 12.7.

In order to help you calculate, the following additional information is provided.

The value of $\ln(108211) = 11.5918$; ~~$\ln(100) = 4.6052$~~ $\ln(3957) = 8.2832$ $\ln(100) = 4.6052$

The index is computed under the assumption that the implied minimum of life expectancy is 20. The maximum observed was 83.2

The highest value for mean years of schooling was 13.2, for expected years of schooling was 20.6 and for the Education Index was 0.951

Student Name _____ Student No. _____

Part III

30 pts

Write short notes on each of the following five topics. In answering each topic, make sure that you define what it is and explain its relevance to understanding economic development. Each question is worth 6% of your examination.

1. Rostow's Stages of Economic Growth
2. The three core values of development
3. Solow steady state
4. Convergence
5. Purchasing Power Parity measure of GDP

Part IV

12 pts

This part is worth 12% of your examination

Explain how the growth experience of Argentina and South Korea are captured by the Classic Theories of Growth and Development presented in Chapter 3 of Todaro and Smith, Economic Development.

Part I

1. The statement is correct. Unlike traditional paradigms in development that see LDC economies as societies in pre-development stage, dependency theories view such societies as having evolved into their underdevelopment status as a consequences of their interaction with developed economies. These interactions include unequal benefits from trade, unequal power relationships that result in rules of the game in international interactions being rigged against the poor countries, colonial exploitation, adoption of policies based on functioning of developed country markets that are not applicable to LDCs etc. The emergence of economic elite whose fortunes are tied to the economies of DCs and dualism that represents the persistent coexistence of modern and traditional sectors are also traced to this interaction. A consequence of these ideas was to suggest that interaction with DCs do not benefit (in fact hurts) LDCs, a conclusion that was undermined by the rapid growth experienced by East Asian NICS that developed through export oriented industrialization.
2. This statement is only partially correct. Work by Hollis Chenery and associates have clearly shown that as a country's income increases, the share of industry in the GDP and in employment increases up to a point, but after some level, the share of industry begins to decline. Similarly, the share of agriculture declines systematically while that of services tend to increase in later stages of development after showing stability as incomes increase modestly from lower levels. The foundations of this hypothesis come from Engel' s law with respect to income elasticities of demand for agricultural, industrial and service sector products as income change and these tend to swamp the effects of trade patterns, variations in tastes across societies etc. Never-the-less, the statement is correct if we focus on only LDC countries.
3. This statement is correct about output per worker abstracting from growth due to technological change. The Solow Model shows that with any given rate of savings, since investments are subject to diminishing returns and capital is subject to depreciation (assumed to be at a steady rate) the rate of return on capital per unit of labor will ultimately converge to the rate of depreciation (plus growth rate of labor force) resulting in a steady state of no additional growth in output per worker (except for that accounted for by technological change). Thus any higher rate of saving would only have the effect of increasing output per person until the economy attains a new steady state corresponding to the higher rate of growth. Use graph.
4. This statement is also correct. Because the disparities in income per person among the countries of the world are viewed by many as being too large to be explained by differences in either factor accumulations or by differences in technology, some theorists have tended to look at low incomes of poor countries as representing low level equilibriums that do not reach higher levels that are possible for given factor resources and technologies these countries possess. Such low level equilibriums would result in situations where individuals in self interest would find it optimal to undertake activities that result in low level equilibria when they decide on the basis of expectations that others will also act similarly while if all were to undertake in a coordinated manner activities that result in the higher level equilibriums, all would be better-off. In other

words low level equilibria are the result of individually rational, but collectively irrational decisions and these are caused by market failure to coordinate. Big push might be a solution.

5. This statement is not correct in the sense that Lewis defines surplus labor in any sector as the amount of labor that could be removed from the sector without any reduction in the output of the sector – though those that are left in the sector may have to work harder. It is presented as the doctrine of zero marginal productivity in such sectors. Lewis argues that such is the state of affairs in some countries in the agricultural sector as well as what has been later named the urban informal sector. The statement only says that wages are higher than marginal product of labor; not that marginal product of labor is zero.

Part II

Per capita Income focuses on the resources that are available to the average individual to seek well-being rather than being a direct measure of well-being itself. It also significantly fails to account for differences in resources that are necessary to obtain the same level of well-being due to differences in geography, availability of resources, adequacy of infrastructures etc. It further does not account for great disparities in incomes that prevent much of the population from commanding over goods and services at levels indicated by per capita income measures. The widely accepted notion that marginal utility of income declines as incomes rise is not incorporated into the PP measure. The human development index, in addition to the income measure, focuses on actual (rather than potential) attainments in the areas of education and health. It further attempts to look at how far a country has progressed in each of these measures in relation to the actual progress made by the country that did best on that measure. The 2010 index introduces a few of significant innovations. The geometric mean of sub indices is used instead of arithmetic mean to account for the fact that performances in subfields are not perfect substitutes so that weakness in one area is not easily compensated by strength in another. The upper limit used in each sub index is the actual observed value rather than an arbitrary value- this had the effect that any increase in income at any level unequivocally improved the index by eliminating the arbitrary cut-off at \$40,000 in the old index. The minimum values were also made more realistic with respect to life expectancy and for incomes. For the education measure average and expected years of schooling replaced adult literacy and school enrollment ratios – this was done to reduce the impact of measurement errors and to give weighting to actual levels of education rather than treat it as a binary variable as in literacy. The use of natural logarithm instead of logarithm to the base ten has no effect on HDI.

$$\text{The income sub index} = \frac{\frac{82832 - 50938}{115918 - 50938}}{\frac{82832 - 50938}{115918 - 50938}} = 0.4907$$

$$\frac{8.2382 - 4.6052}{11.5918 - 4.6052} = 0.52$$

$$\text{The health sub index} = \frac{71.5 - 20}{83.2 - 20} = 0.8149$$

$$\text{Index of average years of schooling} = \frac{5.7 - 0}{13.2 - 0} = 0.4318$$

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$$\text{Index of expected years of schooling} = \frac{12.7-0}{20.6-0} = 0.6165$$

$$\text{Education sub index} = \frac{\sqrt{0.4318 \times 0.6165}}{0.951-0} = 0.5291$$

$$\begin{aligned} \text{HDI} &= \sqrt[3]{0.4902 \times 0.8149 \times 0.5291} = 0.5957 \\ &= \sqrt[3]{0.8149 \times 0.5291 \times 0.52} \\ &= 0.6075 \end{aligned}$$

Part III

1. W.W. Rostow identified 5 stages of economic growth. They were traditional society, pre condition for take-off, take-off, drive to maturity and the age of mass consumption. The key transformation is the transition of an economy that saves 5% of its income or less to one that saves 10% or more of the economy. The mechanics for the transition is the emergence of a leading sector that through its size and linkages with other sectors increasingly transforms an economy from a traditional to a modern one.
2. The three core values of development according to Todaro and Smith are (a) sustenance – the ability to meet basic needs that include food , shelter, health and protection; (b) Self esteem- a sense of self-worth and self respect , ability to follow one’s own interests and not being used as a tool by others for their own ends; and (c) Freedom from servitude: to be able to choose- meaning not in social servitude to nature, oppressive institutions , dogmatic beliefs, and to the belief that poverty is inevitable.
3. Steady state of according to Solow is a situation where output per unit of labor remains unchanged for a given level of technology because the rate of increase in population and the rate of depreciation offsets the saving rate of an economy thereby holding steady the amount of capital per worker, the income per worker and the savings in the economy per worker. The expression used is a steady state, not an equilibrium, because total income, population, amount of saving, amount of capital in the economy are all changing while the output per worker is unchanged given the technology.
4. The question as to whether income per person of countries are converging. In effect this asks whether rate of growth of incomes of countries with lower incomes are higher than those of countries with higher incomes. Evidence indicates that this is not true for the world as a whole; but it is for the OECD countries alone and also if we include with them the countries in Asia.
5. International comparisons of incomes based on market exchange rates suffer from the fact that incomes so compared do not properly reflect differences in well-being. This is in part due to extreme volatility of exchange rates, exclusion of non-traded goods from any role in exchange rate determination, and of course, the effect of(differential) interferences in the market by governments of countries. In order to correct for these difficulties, goods and services produced in all countries are valued on the basis of prices prevailing in the countries

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and aggregated to obtain values of incomes that depend on the same set of prices for all goods in all countries.

Part IV

The classic theories dealt with in the book are the Harrod-Domar Model, The structural change paradigm, Dependency theories and the Neoclassical counter revolution as well as the Lewis model. S. Korea fits the Harrod-Domar Model of higher growth associated with higher savings, confirmed to the structural change paradigm of Chenery (in that it went through transformations in sectoral shares postulated by the structural change paradigm). But it does not fit the Dependency theories since its development was based on export orientation that has at its fundamentals interaction with the developed world. The state also played a very strong role in S. Korea's economic development; therefore it is also a poor fit with respect to the neoclassical counter revolution. Argentina, on the other hand, is a country that poorly confirms to the take-off proposed by Rostow since for almost the last 100 years, it appeared that it had met the pre-conditions, but failed to take-off. Structural change more or less confirms to the Chenery perceptions, but has a much higher urban sector than would correspond to its stage of development. Dependency theorists find Argentinian experience as one that fits their view – with significant foreign direct investment it still failed to develop a vibrant industrial sector. After difficulties in the 1980s Argentina attempted to confirm to the neoclassical paradigm, had considerable initial success, but, ultimately came to a collapse in 2002 so that one may say that Argentina for a short period supported the neoclassical paradigm, but its long term history is more in accordance with the dependency paradigm. Argentina also does not fit the Lewis model in which population pressure on agriculture is such that the marginal product of labor is zero. While S. Korea had a very dense agricultural population in the 1950s, the modern sector grew rapidly in the 1960's to exhaust any surplus labor that might have been there – S. Korea therefore is not considered to be a country that had significant surplus labor in the traditional sector.

McGill University
Department of Economics

Economic Development I Section 4

Professor C.J. Kurien
Midterm Examination Tuesday, February 28, 2013 10.05 to 11.25 AM
(Duration 80 minutes)

Student Name: _____
(Last Name) (First Name)

Student ID # _____

Instructions:

1. Clearly print your name on this page and the on the top margin in each page.
 2. Answer all questions.
 3. Answer in non-erasable ink, not pencil.
 4. Only non-programmable calculators are permitted. No other exam aids other than language dictionaries are allowed.
 5. Cell phones and other electronic devices are not permitted.
 6. Round answers to two decimal points if required.
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Part I -----/40 points
Part II-----/18 points
Part III-----/30 points
Part IV-----/12 points

Midterm Grade-----/100 points

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Part I

Answer all questions. Unless asked differently in a specific question, please respond as follows. Please state whether the statement is true as written and explain why. If false or uncertain, explain why it is false or uncertain. A good answer would define terms carefully and provide caveats to the statements made or provide elaborations to the statement made when it is appropriate to do so. Use graphs and equations if they would help your arguments. Each question is worth 8 points.

1. Starting from a position of general equilibrium, if the only additional investment undertaken in a small country is a shoe factory, it would fail because of lack of demand.
2. Share of agriculture in an economy diminishes as income of a country increases because people move away from agriculture to industry since the latter pays higher wages.
3. The Solow model shows us that the effect of a higher savings rate on economic growth is temporary.
4. The dualistic hypothesis refutes Lewis's view that the coexistence of traditional sector and the modern sector is an integral part of the process of development.
5. In the immediate post-war period it was believed that rich countries grow faster than poor countries. Now we know that the reverse is true.

Part II

Explain the limitations of comparing incomes across nations on the basis of market exchange rates. How does use of purchasing power parity measures provide a better basis of comparing incomes across nations? Are there contexts in which the exchange rate based measures are more appropriate than purchasing power parity measures?

Below you are given data for Malaysia and the United States. Both countries produce only 2 goods each.

MALAYSIA Population 30 million. 10 million tons of rice produced there at a price of 1200 Ringgits per ton. Also 4 million square feet of housing is produced at a price of 400 ringgits per square foot. Exchange rate is 3 Ringgits per US dollar.

USA Population 300 million. 60 million tons of rice is produced at a price of 400 dollars per ton. 100 million square feet of housing is produced at a price of 500 dollars per square foot.

- a. Calculate the per capita income of Malaysia and USA in US dollars using exchange rate given (where needed).
- b. Calculate the per capita income of Malaysia using Purchasing Power Parity.



Student Name _____ Student No. _____

Part III

Write short notes on each of the following five topics. In answering each topic, make sure that you define what it is and explain its relevance to understanding economic development. Each question is worth 6% of your examination.

1. Multiple Equilibria
2. The three components of economic growth
3. Harrod-Domar Model
4. Convergence
5. Market fundamentalism

Part IV

This part is worth 12% of your examination

Explain how the development experience of Pakistan and Bangladesh diverged since Bangladesh separated from Pakistan.

PART I

1. True. This is an argument made by Rosenstein-Rodan regarding the need for big push. He argues that if the only additional income generated in an economy already in equilibrium is the payment to the factors that are used in the production of shoes, since these factors will not spend all the additional income they receive on shoes, the additional demand for shoes will fall short of the cost of producing the shoes (cost being equal to the payment made to these factors). He then proceeds to argue that if investment were to take place simultaneously in many industries, workers in all the new firms combined would demand a variety of products generating adequate demand for all the new industries. This big push results in higher level equilibrium that would not have been reachable by investing in one industry at a time as each such investment would fail.
2. False. In a closed economy, share of agriculture in output is equal to the share of expenditure on agricultural products by economic agents. Therefore when income of a country increase, food having a low income elasticity of demand and food products being a major part of agricultural production anywhere, the share of expenditure on agriculture would diminish and therefore the share of agriculture in the GDP would also diminish. This would be true even if there are no differences in wages between industry and agriculture. In a closed economy, the shares would vary somewhat as a consequence of production for import and substitution of imports for domestic production. But this modification in most cases is small so that the pattern expected from closed economies remains.
3. True. In the Solow model, for a given technology, economies converge to a steady state and once there, no further growth takes place in output per worker. However, higher savings rate is associated with steady states with higher levels of output per worker. Therefore, if the savings rate of an economy already in a steady state were to increase, the economy would move from that initial steady state to a higher level steady state; but once the new higher level steady state is reached, output will be stagnant if technology is unchanged. Thus an increase in savings rate would result in growth as an economy moves one steady state to another; but this is temporary since once the new steady state is reached, growth stops.
4. True. Lewis views the coexistence of traditional and modern sectors as a stage in the transition of an economy from a largely traditional economy to a largely modern economy in the process of modernization of an economy. Dualistic hypothesis, however, asserts that this coexistence is permanent and not transitional. The modern sector is often an export enclave the fortunes of which are influenced by the developed economies and whose interconnections with the traditional sector are small. Boeke, the original proponent of the dualistic hypothesis and Everett Hagen who elaborated on it even

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argued that the modern sector by drawing dynamic elements away from the traditional sector reduced the prospects of latter's modernization.

5. Uncertain. It is true that in the 1950s and 1960s, the general professional opinion held that developed countries were growing rapidly while developing countries were growing more slowly in per capita incomes. This view has changed considerably since then due to the experience that many developing countries were also growing rapidly since then. Today, perhaps temporarily, developed countries are growing slowly while some, though not all or even a majority of them are growing very rapidly. The growth in East and South East Asia and of late in the BRICS country have been much faster than developed countries; but many countries in Africa and Latin America are still slow growers.

PART II

Market exchange rates reflect the demand and supply of foreign exchange of economies. These are influenced by trade, capital movements and speculation. Nontradable goods play no direct role in the determination of exchange rates. Their prices vary across countries, and tend to be lower in less developed countries compared to DCs because nontradable services are cheaper in low wage developing countries. Except for policy induced distortions and transportation related costs, prices of tradables on the other hand tend to be equalized across countries. Thus the same basket of goods may have different prices in LDCs and DCs due to these price differences for non tradables; consequently identical incomes measured by exchange rates indicate different levels of wellbeing. Exchange rates are also very volatile, especially due to speculation and capital movements while consumption baskets in countries are much more stable, Thus incomes would change as measured by exchange rates rapidly while wellbeing remains more or less unchanged indicating that exchange rate based measures of income do not reflect wellbeing adequately. Purchasing power parity measures use a common set of prices to value goods in all countries eliminating the errors introduced by volatility and variations in prices of non tradables. Thus for welfare measurement purposes they are an improvement over exchange rate based measures. However when comparing the effects of one country's (say China's) growth on other economies, exchange rate based measures are still the more appropriate ones since demands are expressed through exchange rates.

a. GDP of Malaysia in ringgits = $1200 (10) + 400 (4)$ Million = 13600 Million

Per capita GDP in ringgits = $13600 \text{ million} / 30 \text{ million} = 453.33$ ringgits.

Exchange rate based PC GDP = $453.33 / 3 = 151.11$

GDP of US in dollars = $60 (400) + 100 (600)$ Million = 84,000 Million.

Per Capita GDP of US = \$280.

b. GDP of Malaysia using PPP method (US Prices) = $10(400)+4(600)$ million dollars
=6400 million.

Per capita GDP using PPP = $6400 / 30 = 213.33$

PART III.

1. Multiple equilibrium means that with the same initial conditions, a country may find itself in more than one equilibrium at different levels of income. The motivation for the study of multiple equilibriums is that based on the fact that empirical estimates of parameters of production cannot explain the wide divergence in incomes across countries. {Alex and Diego: For instance, the 100 fold difference in Per capita income between Qatar and Zimbabwe would require 10 billion times more capital per worker in the former than the latter when the share of capital in income is 20%} If poor countries are at low levels of equilibriums while higher levels of equilibriums are possible, then this might perhaps explain the huge differences in income per person across countries.

The diagram on page 160 of the book and an explanation of the diagram is useful here.

2. The three components of economic growth are growth of labor, growth of capital and improvements in technology. If labor growth is used as a proxy for population growth, then growth of per capita income is determined by accumulation of capital and improvements in technology. Pre Solow, accumulation of capital was seen as the major factor; with Solow the emphasis shifted to technological change. Empirical evidence forced a reemphasis on accumulation and the endogenous models that are classified as AK models illustrate this change.
3. This is the earliest of growth models. The Harrod-Domar model follows up on the Keynesian identity that savings and investment are equal in a closed economy. With any given savings rate s , investment is equal to savings and generates additional incomes according to a marginal capital output ratio c . Thus growth rate $g = s/c$. Since c was viewed in these models as a technological datum, policy prescriptions amounted to promoting savings rate or import of foreign capital. Solow model removed the assumption of a fixed c since it appeared to contradict the neoclassical emphasis on substitution of capital and labor as wages change and the law of diminishing returns.
4. Convergence asks the question whether incomes of developed and developing countries are converging over time as would be implied by a model such as Solow's. Empirically what is seen is that while among the OECD countries (Developed countries) there is strong evidence of convergence in the 25 years up to 2005, the same is not true when all countries of the world are included in a study. But it is true that some poor countries like China, India, etc. are growing much more rapidly than the developed countries so that convergence is taking place for them as well. Perhaps it is correct to say that, in the language of Rostow, countries that have gone through take off are experiencing convergence especially since, as pointed out by Gershenkron, late developers grow faster than those that developed earlier.

5. Market fundamentalism refers to the position of some economists of the neoclassical tradition who argue that unhindered markets work better than all other alternatives, especially government intervention in economies. Specifically, the neoclassical counter revolution (to the dependency thesis) denies that government intervention can enhance growth; in fact they argue that governments are inefficient and such intervention would slow down growth. The positive experience of some of the most rapidly growing economies that actively engaged in industrial policy has resulted in the weakening of the market fundamentalism. The global crisis of 2007 -2008 led to further weakening of the view that markets left to themselves always works well. [Note to Alex and Diego. Economic Theory shows that markets are efficient in a static context; there is really no theory that says markets left alone are best in promoting growth.]

PART IV.

In 1971 when Bangladesh separated from Pakistan, Bangladesh was much poorer than Pakistan and experiencing stagnation while the former was experiencing modest growth. Today while Bangladesh is still significantly poorer than Pakistan (Per capita income in PPP about 1500 vs 2600 in Pakistan). But Bangladesh does not have the extreme income inequality that Pakistan has and growth there has been broader based than in Pakistan. In education and literacy, the countries are now about equal; but improvements are more rapid in Bangladesh. But gender equality is much better advanced in schooling in Bangladesh suggesting that in gender equality, the future looks better there. It also has caught up in life expectancy with Pakistan though in 1971, life expectancy was only 42 years there while in Pakistan it was 52. Overall, in spite of the low income, Bangladesh has comparable human development index as its erstwhile partner. All these have also to be viewed in the context of Bangladesh being significantly resource poor with the highest population density for any non city state nation. Because of its strategic location, Pakistan has received a lot more aid; but it is plagued by the tendency of the military to take over at the detriment of democracy. Finally, Bangladesh has a much better functioning civil society sector and has pioneered the microfinance revolution through the Grameen Bank. Todaro and Smith present the contrast as one where though initially much richer, Pakistan has grown without developing while Bangladesh in spite of terrible odds have performed much better than expected in developing its society. {Note this is a brief summary; students may emphasize different aspects of what is in the text.}

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PART I – Multiple choice questions: Choose only the best answer (only one answer) and record it on the Scantron answer sheet provided with your exam. (2 marks each)

1. The Millennium Development Goals include

- a. eliminating the proportion of people living on less than \$1 per day.
- b. universal primary education.
- c. increasing exports by one half.
- d. all of the above.
- e. none of the above

Answer: B

2. The core values of development include

- a. increasing income per person.
- b. reducing the inequality of income.
- c. the ability to meet basic needs.
- d. all of the above.
- e. none of the above

Answer: C

3. The number of units of developing country currency required to purchase a basket of goods and services in a developing country that costs one dollar in the U.S. is given by

- a. GNP price deflator.
- b. Human Development Index ranking.
- c. purchasing power parity.
- d. the exchange rate.
- e. the Big Mac Index

Answer: C

4. Developing countries are starting to converge with developed countries in the long run in what respect?

- a. Growth rate
- b. Income inequality
- c. Population
- d. Per capita income
- e. all of the above

Answer: D

5. Which of the following is not a policy proposal of the neoclassical counter-revolution school?

- a. promoting free trade
- b. privatizing state-owned enterprises
- c. welcoming multinational corporations
- d. promoting trade unions
- e. all of the above are policy proposals of the neoclassical counter-revolution school

Answer: D

6. Which of the following is an assumption of the Lewis two-sector model?

- a. surplus labor in industry.
- b. positive marginal product of labor in agriculture.
- c. an upward sloping labor supply curve in industry.
- d. none of the above.
- e. all of the above

Answer: D

7. In contrast to the earlier neoclassical models of economic growth, in endogenous growth models, there is more emphasis on

- a. human capital.
- b. externalities.
- c. increasing returns to scale.
- d. all of the above
- e. none of the above

Answer: D

8. What conclusion can be reached from the following data on income shares?

	Percentage of Income Received by	
	Lowest 40%	Highest 20%
Bangladesh	17.3	45.3
Indonesia	14.4	49.4

- a. absolute poverty is more widespread in Bangladesh
- b. the size distribution of income is more unequal in Indonesia
- c. Bangladesh had adopted a strategy of redistribution with growth
- d. growth in Bangladesh is calculated using poverty weights rather than income weights
- e. No clear conclusion can be made

Answer: B

9. If the poverty gap ratio is 0.25 and the mean income of the poor is 75\$, then the poverty line must be:

- a. 75\$
- b. 100\$
- c. 125\$
- d. 250\$
- e. There is insufficient information to calculate a poverty line

Answer: B

10. If the Foster-Greer-Thorbecke measure is equal to 0.2 when alpha is equal to 1, and given a population of 50,000 individuals and a poverty line of 200\$, then the total amount of money required to bring all the poor up to the poverty line must be:

- a. 200\$
- b. 5,000\$
- c. 10,000\$
- d. 20,000\$

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e. 50,000\$

Answer: The correct answer does not appear. Everyone got 2 points.

11. What relationship between the different poverty measures is true? Note: AIS is the Average Income Shortfall, APG is the Average Poverty Gap, HCI is the Head count Index, NIS is the Normalized Income Shortfall and NPG is the Normalized Poverty Gap.

- a. $AIS = HCI * NIS$
- b. $APG = HCI * NIS$
- c. $NPG = HCI * AIS$
- d. $NPG = HCI * APG$
- e. $NPG = HCI * NIS$

Answer: E

12. Which of the following predictions of the Solow model at the Steady State is true?

- a. Per capita income grows at the population growth rate
- b. Per capita income grows at the rate of savings
- c. Per capita income is the same for all countries having the same savings rate, population growth rate, depreciation rate and facing identical technologies
- d. None of the above
- e. All of the above

Answer: C

13. Which of the following is not an assumption of the Solow Model?

- a. Technology is homogeneous and exogenous
- b. Savings is a constant proportion of output
- c. Full employment
- d. Technology is increasing returns to scale
- e. All of the above are assumptions of the Solow Model

Answer: D

14. Which of the following is a criticism of the Lewis model?

- a. Surplus labour in rural areas is paid according to its average product instead of its marginal product
- b. The model predicts a Kuznets's curve pattern of income inequality and growth
- c. Economic growth is only possible if manufacturing profits are reinvested domestically
- d. Surplus labour is when the marginal product of labour is equal to zero
- e. None of the above is a criticism of the Lewis model

Answer: C

15. Consider an economy with a capital output ratio equal to 2 and a target growth rate of 10%. Which of the following statements is true, according to the Harrod-Domar model?

- a. If the savings rate is 5%, this economy needs to fill a savings gap of 5%
- b. If the savings rate is 5%, this economy needs to fill a savings gap of 15%
- c. If the savings rate is 10%, the economy needs to fill a savings gap of 5%
- d. If the savings rate is 10%, the economy needs to fill a savings gap of 15%
- e. If the savings rate is 15%, this economy has no savings gap to fill

Answer: B

16. Suppose the price of a Big Mac is \$4.33 in the US and is 3700 Won in South Korea. The official market exchange rate trades \$1US for 1151 Won. Then according to the Big Mac Index:
- a. The implied PPP exchange rate is 265.8 Won per US\$ and the Won is overvalued against the US\$
 - b. The implied PPP exchange rate is 265.8 Won per US\$ and the Won is undervalued against the US\$
 - c. The implied PPP exchange rate is 854.5 Won per US\$ and the Won is overvalued against the US\$
 - d. The implied PPP exchange rate is 854.5 Won per US\$ and the Won is undervalued against the US\$
 - e. There is insufficient information to calculate the implied PPP exchange rate.

Answer: D

17. The Human Development Index (HDI) is a better measure of economic development than a National Income Accounting (NIA) based measure because:
- a. It uses purchasing power parity exchange rates
 - b. It considers the distribution of income
 - c. It allows for cross country comparisons
 - d. None of the above reasons make the HDI a better measure than NIA measures
 - e. All of the above are reasons that make the HDI a better measure than NIA measures.

Answer: D

18. Consider two countries where the proportion of income accruing to the lowest income decile is lower in country A than in country B. Which of the following statements is true about income inequality measures?
- a. The Lorenz curve for A is closer to the 45 degree line, and the Gini coefficient is higher for country A.
 - b. The Lorenz curve for A is closer to the 45 degree line, and the Gini coefficient is lower for country A.
 - c. The Lorenz curve for A is farther from the 45 degree line, and the Gini coefficient is higher for country A.
 - d. The Lorenz curve for A is farther from the 45 degree line, and the Gini coefficient is lower for country A.
 - e. There is insufficient information to compare either the Lorenz curves or Gini coefficients between the two countries

Answer: E

19. The S-curve is used to illustrate
- a. the typical path taken by the current account over time.

- b. economic fluctuations in the economy.
- c. the typical growth path of a developing economy.
- d. the existence of multiple equilibria.
- e. none of the above

Answer: D

20. Most successful examples of modern economic growth have occurred in a country with
- a. a temperate-zone climate.
 - b. a market economy.
 - c. exports of manufactured goods.
 - d. none of the above
 - e. all of the above.

Answer: E

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Faculty of Arts

Econ313

Sample Final Examination
Economic Development 004

Examiners: Prof. John Kurien

April xx, 20xx

Associate Examiner: Prof. Paul Dickinson

Instructions:

- This exam has four parts.
- Carefully follow the instructions in each part.
- SHOW ALL YOUR WORK.
- Only Non-Programmable Calculators are allowed.
- NO notes or texts, or crib sheets allowed.
- *Only Translation Dictionaries are allowed.*
- *Please return the question paper.*
- This exam comprises 5 pages, including this cover page.

Parts A, B, C and D must be answered by students in BOTH Sections

Part A (20 points) – Evaluate the following statements indicating whether they are true, false, or uncertain and why. Make sure that you indicate how the statement should be qualified if it needs to be qualified.

Please answer 4 out of 7 questions in this section. Each question is worth 5 points. A good answer will define terms carefully and provide caveats to the statements made or provide details for the statements made, when this is appropriate. To receive maximum points, your answer should discuss intelligently the relevant literature and related lecture material.

(Indicate clearly which question you are answering)

1. Rural poor women have a high fertility rate because they are uneducated and thus don't know about family planning.
2. Farm labourers have more incentives to provide high levels of effort on small farms than on large farms. Thus, farm yield per acre is decreasing in farm size.
3. The Poverty Gap and the Gini coefficient are equally useful to measure income inequality in developing countries.
4. The best growth model is the Solow model because it takes into account the spillover effects that investment in capital may have on the economy.
5. The urban giantism problem is solely created by the large population growth in developing countries.
6. The Kuznets' inverted-U hypothesis has been proven to be true in all developing countries.
7. Given their access to new technologies and capital, developing countries should be able to catch up with rich ones relatively quicker than in the past.

Part B (30 points) – Quantitative Questions

Please answer both questions

Question 1: Poverty and Inequality in Econland (15 points)

Suppose Econland is populated by 15 individuals. These individuals work in three different sectors: 5 individuals work in farming and earn 1\$ each; 5 individuals work in the urban informal sector for 3\$ each; and 5 individuals work in the urban formal sector for 5\$ each.

- (a) [1 points] What is Econland' s National Income? What is Econland' s per capita national income?
- (b) [2 points] In a carefully labeled diagram, depict Econland' s Lorenz Curve.
- (c) [1 points] Explain how you would calculate the Gini coefficient for Econland.
- (d) [5 points] Suppose that Econland' s poverty line is 1.25\$. What is the level of poverty in Econland? (Use P_0 and P_1 where P_0 and P_1 are the P^α where $\alpha=0$ and $\alpha=1$ respectively)
- (e) [3 points] Suppose that one percent of national income were transferred from the richest quintile of households to the poorest quintile of households. What is the effect on poverty? (Use P_0 and P_1).
- (f) [3 points] Suppose that the Lewis model is an appropriate model for Econland' s economy. What would economic growth imply for the residents of Econland, in terms of poverty and inequality?

Question 2: A fertility decision (15 points)

Ayesha lives in rural Bangladesh. She has two children, both girls. She knows that she lives for three more periods. She has to decide whether she wants to have another child. If decides to do have one more child, during the next period (period I) she will have less labor force participation than if she did not have a child. She also acquires less work experience in period I and this would affect her income in period II as well. The next child may be a boy (50% probability) or a girl (50% probability). Market interest rate is 10%.

If she chooses not to have a child in period I, she would earn \$2000 in period I, \$3000 in period II

If she chooses to have a child in period I, she would earn only \$1500 in period I and \$2500 in period II. The incomes above are net of all childcare costs. In period III she would be unable to work and therefore would not be able to earn any income.

Each child would marry in period II. If she has no boys, the families of each girl she has would pay her \$200 in period III, her period of old age. If she has a boy, the families of girls would pay her nothing, but the boy's support would be worth \$2000 in period III.

- a) [3 points] What is the present value of net benefits of having another child if the child turns out to be male?
- b) [3 points] What is the present value of net benefits of having another child if the child turns out to be female?
- c) [4 points] What is the present value of net benefits of having another child if the child may be male or female with 50% probability each?
- d) [1 point] Do you expect her to have a child in period I?
- e) [4 points] If she understands that the mortality probabilities are such that one third of her children would die in period II before getting married, *explain* how, if at all, this would affect her above decision. You need not compute the net present value for this part. Assume each child has equal probability of dying.

Part C (20 points) – Common Essay:

Brain Drain: Good or Bad?

Background:

Some researchers have recently argued that the brain drain problems faced by developing countries are overstated. They point out that while it is worrisome to see the departure of the poor world's doctors, nurses and teachers to more lucrative job markets in the rich world, there is often a factor that is neglected: those who stay may want to emulate them and should invest in more education than they would otherwise want. Thus, countering the "brain drain", they argue that there would be a "brain gain": The prospect of securing a visa to America, Canada, or Europe should tempt more people in poor countries to invest in education. If the temptation is strong enough, and the chances of landing a visa low enough, the poor country could even come out ahead: it might gain more qualified (if disappointed) doctors and engineers than it loses.

As with all debates about the brain drain, theory has run ahead of evidence. The numbers on international flows of people are much patchier than those on cross-border flows of goods or capital. To illustrate their point given the lack of good data, these economists investigate internal migration instead. The rural villages of Mexico lose many of their brightest sons and daughters to jobs in cities or border towns.

Those Mexicans who leave their home villages tend to be better educated than those who stay. But despite this, the example the leavers set (and the job leads they provide) raises the average level of schooling of those left behind. Because they can aspire to a world beyond the village, even if they never reach it, young Mexicans have an added reason to stay in school beyond a ninth year, the authors show.

Question:

Using what you know about education and migration issues in developing countries, write a short, but careful, essay on the relative merits of the argument mentioned above. In particular, you should answer and explain the following: even if the brain drain does leave a country with a better-educated populace, is this necessarily a good thing?

Part D (30 points) – please answer two questions out of the following three

1. (15 points) You have been asked by the minister of the health in Botswana to make policy recommendations pertaining to the country's high rate of HIV/AIDS infection. In your first meeting, an advocacy group of AIDS victims is requesting that you recommend wide availability of Anti-Retroviral Treatment. In the same meeting, public health officials are urging you to look at Uganda's policies in the hope that Botswana can learn from Uganda's preventive approach. Write a short report outlining your recommendations to the minister of health about what to do about Botswana's HIV/AIDS crisis. Your report should also include a brief statement about the economic impact of the HIV/AIDS crisis. Be clear and concise, but provide analysis in your answer. Make sure to look at the problem from all angles.
2. (15 points) At a conference on sustainable development, an environmental activist condemns the use of high yield variety (HYV) of seeds, citing the negative environmental consequences of the Green Revolution. Meanwhile, the person sitting next to you in the audience (a Neo-Malthusian from Populand) whispers to you that HYVs will prevent negative checks from occurring in his highly populated country. Who do you agree with and why? In your essay, choose one side but make sure to argue both the pros and the cons of both arguments. Be clear and concise, but provide analysis in your answer and explain each point of view. Make sure to look at the problem from all angles.
3. (15 points) Suppose that a developing country devotes extensive resources towards improving the education and skill level of the labor force. How might this help the country avoid a coordination failure? Is this strategy likely to be successful? Why or why not?

The answers are by necessity brief and tries to focus on the most important points. Please do not look at these as full answers.

Part A

1. Uncertain. Economists see the opportunity cost of the value of time of the mother as a major determinant of fertility rather than lack of knowledge about family planning. However, one of the major determinants of the opportunity cost is the level of education of the females in their reproductive years. Since less educated females would earn less in the labor market, their opportunity cost of having children is lower and are, therefore, likely to have more children.
2. This question is from the previous year when we also covered the chapter on agriculture. The second part of the question is right, but not for the reason given in the first part. So false.
3. False. The Gini measures income inequality directly and is therefore useful to measure income inequality. The poverty gap refers to the extent to which incomes of the poor lie below the poverty line – it is a measure of the minimum amount of resources that needs to be added to the incomes of the poor so as to bring all the poor to at least to the poverty line used in the calculation of the gap. It is thus not a measure of income inequality.
4. False. Solow model does not deal with spill over effects at all. It uses an aggregate production function where capital and labor are substitutable. In that model society saves a constant proportion of its income, invests all of the savings, but returns to that investment diminishes with the capital labor ratio. Models such as of Roemer focuses on spill over effects.
5. False. The urban gigantism is caused by many factors other than the large population growth. Rural-urban migration is a major influence on growth of large urban centers. So are agglomeration economies in both industrial sector and in the provision of social, health and other services. Finally, cities are seats of governments, company head offices etc. and that also results in many activities that support and depend on such facilities.
6. False. Kuznets' inverted-U hypothesis postulates that as the per capita income of a country increases, the inequalities of income in a country initially increases and then diminishes. Statistical evidence indicates that inequalities do not change significantly as a country increases its per capita income. Simon Kuznets arrived at the hypothesis because at the time he wrote, Latin American countries that have large inequalities was the dominant group of middle income countries while Asia and Africa as well as Europe, US, Canada, and Oceania had lower inequalities. But the experience of East Asian countries that moved from low to middle and ultimately high income countries with very little change in inequalities show that the inverted-U was just an artifact.
7. True. The availability of technologies removes the need to engage in costly search for new technologies that are necessary in developed countries that are in the frontiers of technology. Alexander Gershenkron pointed out that later a country enters modern economic growth, faster

it grows. Of course, countries that are stagnant and unable to benefit from modern technology available in the rest of the world do not grow fast.

Part B. Question 1.

- a. National income is $1 \times 5 + 3 \times 5 + 5 \times 5 = 45$.
Per capita income = $45 \div 15 = 3$
- b. For a Lorenz curve, the points are as follows. 0% of the population receives 0% of income. Lowest 1/3 of the population receives (1/9) of the income. Lowest (2/3) of the population receives (4/9) of the income and finally 100% of the population receives 100% of the income. Draw your own graph.
- c. To calculate the Gini we calculate the area of the graph between the diagonal and the Lorenz curve above. It is often easier to calculate the area under the Lorenz curve as follows. For the first 33.33 % of the population, the area UNDER the Lorenz curve is $(1/3) \times (1/9) \times (1/2) = (1/54)$. For the next 1/3 of the population, the area under the Lorenz curve (by dividing that area into a triangle and a rectangle) $(1/9) \times 1/3 + (1/3 \times 1/3) \times (1/2) = (5/54)$. For the final (1/3), similarly the area under the Lorenz curve is $(4/9) \times 1/3 + (5/9) \times 1/3 \times (1/2) = (13/54)$. The total area under the Lorenz curve is the total of the above three numbers, i.e. $19/54$. Therefore, the area between the diagonal and the Lorenz curve is $0.5 - (19/54) = (8/54)$. The area under the diagonal is 0.54 or $27/54$. Hence the Gini is $(8/54)$ divided by $(27/54) = (8/27) = 0.296$. NOTE. All you needed to do was an explanation, not the computation.
- d. P_0 is the head count index. It is $5/15 = (1/3)$
 $P_1 = (1/15) [(.25/1.25) + .25/1.25 + (.25/1.25) + (.25/1.25) + (0.25/1.25)] = 0.066$
- e. 1% of the national income is 0.45 dollars. Distributed to the poor equally would increase the income of each to 1.09 dollars, which is still below the poverty line. So the head count index would remain unchanged. But the poverty gap, calculates as in (d) above would drop to 0.0426.
- f. As workers transfer to urban formal sector, head count ratio diminishes since each worker moving from the rural area to the urban sector reduces the head count ratio as well as the poverty gap. But the direction of change on inequality is not clear since as individuals migrate, the old and new Lorenz curves would cross. However, beyond a point the inequalities would diminish. (Draw graphs and verify!)

Part B. Question 2.

Qn.2. There are several possible outcomes for Ayesha.

If she chooses to have no further children, her income stream in the three years is (2000,3000,400). The present value of that stream is $2000 + 3000/(1.1) + 400/(1.1)^2 = 5057.85$

If she decides to have a child and it turns out to be male, her income stream would be (1500,2500,2000). The present value of that stream so computed would be 5425.61

If she decides to have a child and it turns out to be female, her income stream would be (1500,2500,600). The present value of that stream would be 4268.59

Since a male or a female child are equally likely, the expected value of having a child would be $0.5 \times 5425.61 + 0.5 \times 4268.59 = 4847.10$

So the answers are (a) $5425.61 - 5057.85 = 367.76$; (b) $4268.59 - 5057.85 = -789.26$; (c) $4847.10 - 5057.85 = -210.75$; and (d) no, since her present value of net benefits of having a child is lower than the present value of not having any more children.

(e). Instead of explaining the steps, here are the computations. They are a bit involved. [For simplicity of computations, we are assuming that only one child could die - since we are dealing with expected values only, this assumption would not lead to any errors. If you do not understand why this qualification is being made, ignore it.]

If she has 1/3 probability of a child dying; her income streams are:

(i) if she decides to have no more children as follows. 2/3 probability of (2000, 3000, 400) and 1/3 probability of (2000, 3000, 200). We can calculate the expected value easily.

If she decides to have a child, and the child is female, her income stream would be (1500, 2500, 400) if a child dies and (1500, 2500, 600) if no child dies. The probabilities are 0.5 times 1/3 and 0.5 times 2/3. ie. 1/6 and 2/6

If she decides to have a child and it is male, the outcomes are as follows:

If there is no death, her income stream is (1500, 2500, 2000) with probability 0.5 times 2/3 = 2/6

If a female child dies, her income stream is the same (1500, 2500, 2000). The probability is 0.5 times 1/3 times 2/3 = 1/9. Here 0.5 is the probability of a male child; 1/3 is the probability of a child dying given that she has three children and 2/3 is the probability that the child dying is a female child given that a child dies. If the male child dies, her income stream would be (1500, 2500, 400) and the probability would 0.5 times 1/3 times 1/3 = 1/18. The reasoning is similar to the immediately previous paragraph.

So the outcomes if she decides to have one more child are:

(1500, 2500, 400) with prob 1/6 or 3/18

(1500, 2500, 600) with prob 2/6 or 6/18

(1500, 2500, 2000) with prob 2/6 or 6/18

(1500, 2500, 2000) with prob 1/9 or 2/18 and

(1500, 2500, 400) with prob 1/18.

It is easy now to calculate expected values.

Part C. Brain Drain: Good or Bad.

It is undoubtedly true that those who migrate from a poor country to a more developed country often are better trained than those who remain; one reason for this being the selectivity imposed by the recipient country is frequently based on educational attainment. Similarly, the prospect of a better job in urban areas and the differential in income prospects by migration if more

pronounced for the better educated people and hence those who migrate to urban areas are generally better educated than those remain. To the extent to which international migrants go to countries from which no return remittances are made to the country of origin, there are obvious costs to the country associated with the brain drain. When remittances are made from the higher income, a cost benefit computation is obviously feasible and results might vary from case to case.

But the issue raised in the question is of investment in human capital by those who do not manage to migrate as a consequence of the existence of migration opportunities. This issue is best looked at in the same way as Todaro looks at migration. Individuals would invest in human capital if the expected return to investment exceeds the cost of investment. The expected return would be based on both the income generated if one manages to migrate and the income generated if one does not manage to migrate multiplied by their respective probabilities. Since the return on human capital investment for a person is much higher with migration than without migration, the expected return of such investment would be higher than the case in which there is no migration – if the same amount investment were made. Thus, more investment would be made and more people would be educated. Notice, however that if we postulate as with Todaro that the process would continue until the expected costs and benefits of investment in education are equalized, it is also true that for those that remain, the benefits of education would be lower than its costs! Thus, even though it leaves the country with a better educated populace, this would be a point where the benefit of marginal investment is below the cost of that investment.

If one were to further postulate that many of the international migrants are educated at levels beyond secondary school, then the costs can be seen as more pronounced than otherwise. This is because the social costs associated with higher levels of education are much higher than the private costs in most countries – and individuals make decisions on the basis of private costs. Consequently, the over investment is likely to be much larger than would be indicated by the argument in the previous paragraph.

The whole argument would need to be qualified when one considers the possibility of social benefits that exceed private benefits. The spill over effects of human capital investment would moderate and could even overtake the higher costs – especially if more of those who get educated are those who generate more spillover effects or in patterns of education that have greater spill over effects.

Part D. Question 1.

The HIV/Aids epidemic has devastated the reproductive age population on Botswana. After a period of extraordinarily rapid growth in the 1960 to 1990 period, with increased incidence of HIV/AIDS Botswana was hit with high disease related mortality resulting in not only economic losses, but emergence of many orphans including children who became victims of the disease due to transmission of the disease from mothers.

The economic impact is severe because of a variety of factors. First, the disease affects and disables people who are mostly in the prime of life – those in early

adult life. Since there is no cure for AIDS yet, this means that those affected will spend the remainder of their life as economically unproductive individuals who would thus be dependent on the rest of the society precisely at a time in life they would normally have been productive, independent and supporting other dependents both old and young. Those affected have often invested heavily in their education and the risk of contracting aids reduces the benefits from education resulting in rational decisions by many that expensive education is not worthwhile. HIV/AIDS imposes heavy burdens on the society and those who are related to those affected resulting in lower ability of society to invest in education, health and productive activities. As in the case of dealing with most diseases, there are fundamentally two approaches; treatment and prevention. The approach used in Uganda with large scale assistance from international agencies, foreign governments and international and local NGOs focused heavily on prevention through a policy of staying with one partner as a way of preventing transmission of the disease and thus controlling it. The prevention policy focused on overcoming traditional and religious objections to using condoms, public education of the ill effects of the disease including the increased susceptibility to other diseases that HIV entails. Combined with less focus on treatment that was extremely costly, the result was that large number of those affected died off while spread was effectively contained resulting in a decline in the proportion of population affected. However, there is some evidence that success has given rise to less caution and we may be witnessing an increase in HIV/AIDS in Uganda now.

Anti-Retroviral treatment is extremely expensive and as a consequence outside the ability of governments to provide except for a very small proportion of the population unless the drugs are heavily subsidized internationally. The Ugandan experience also indicates that cheap availability of Anti-Retroviral drugs has also resulted in less caution with respect to habits that result in spread of diseases. While the resources available to the government of Botswana is greater than that of most African countries, the level of income is still modest and the extent of HIV incidence is very high and it would be an unwise use of resources to focus on only provision of drugs especially since the costs would escalate over time if prevention attempts are not made.

So the recommendation would be that Botswana also focus primarily on prevention through education and publicity by reaching out to all in reproductive years. This can be done through schools, work places and communication media as well as the use of governmental machinery for communication. Efforts need to focus on pointing out the negative aspects as well as clearly indicating alternatives such as use of condoms and encouragement of exclusive sexual relationships with a single partner. Of course, for those affected, to the extent possible drug treatment should also be made available; an effective way of doing so would be to make sure that copayments should be made by those affected to the extent to which they are able to.

2. Question 2 is from chapter 9.

3. Some economists have viewed low levels of education in many less developed countries as a coordination failure. Such a view is based on several factors. In a country where there is not a critical mass of educated people, it is

likely to be unprofitable to locate industries that require large numbers of educated people. Similarly, as Roemer model indicates, the productivity of individuals depend on the skills of those they work with and in a society where most individuals are not well educated, the benefits of education to an individual may not be high - in other words there are significant externalities in education. In the same vein, when primitive agriculture is the major economic activity in a country and the scope of applying tools from better education to increase productivity of such agriculture is limited due to institutional and technological factors, the benefits of education may be limited to an individual; but wide spread education could change the institutional factors and generate possibilities of developing other avenues of employment resulting in higher overall productivity in the country.

The existence of externalities of education not only in terms of direct productivity, but also in terms of development of innovation, adaptation of technology to local conditions, and improvements in health and demographic factors is widely recognized today. As a consequence, countries invariably attempt to subsidize and often provide publicly free of charge early to mid level education. The standard approach, thus, of dealing with coordination failure is to subsidize education either partly or fully with respect to out of pocket costs. Similarly, educational facilities are subsidized or fully paid for by governments; this includes building of buildings, maintaining them, paying for teachers and other staff and books and other simple accessories. The coordination failure can and in many cases is met by such public provisioning or public subsidy to education.

Is this likely to be successful? The evidence is mixed. Social benefits of subsidizing education with respect to improvements in social and demographic factors, especially with respect to educating women and with respect to earlier levels of education is clear. However, there are several caveats here. Providing education to rural residents in countries with primitive agriculture often results in excessive migration to urban areas where many end up being unemployed or underemployed in the informal sector while these individuals could have been productive in traditional agriculture. Similarly, it is important to make sure that education is delivered where it benefits most. Social and long term economic benefits of education is seen to be higher when provided to girls while in many societies the facilities provided are availed by boys rather than girls. Similarly, due to higher costs of tertiary education and the economic influence of the elites, in many societies much of the educational expenditure is at the highest level and it is taken advantage of by only the elite. Not only is the social benefit low for such expenditure, but it increases social inequality and generate forces that militate against democratization and grass roots development.

Thus the process is likely to be MORE successful if it is properly directed towards areas where productivity is higher and externalities are positive and very significant. Educating elite males do not help break the low level equilibrium traps. A broad based education policy that reaches the lower income individuals, especially females, along with safeguards against excessive migration to urban areas where economic opportunities are limited would work best as indicated by historical evidence.

STUDENT #
STUDENT NAME:

ECON313

Faculty of Arts

McGill University
Department of Economics

April Examination

Economics 313 Sections 003
Economic Development

Examiner: Niloufar Entekhabi

April 17th, 2007

Associate Examiner: Prof. John Kurien

9.00-12.00

Instructions:

- Indicate clearly, **on each booklet**, your name, student ID number, and the particular part (questions) you are answering.
- Show all your work.
- Only Non-Programmable Calculators are allowed.
- No notes or texts allowed.
- Language Dictionaries are allowed.
- This exam has **three** parts.
- You have **three** hours.
- Please allocate your time efficiently.
- Please return the question paper.
- This exam comprises 5 pages, including the cover page.

Good Luck!

Do not write here:

Part 1: /20

Part 2: /30

Part 3: /50

/100

Part 1 (20 points) – Short questions

- True, False and Uncertain – explain

Please answer 4 out of 6 questions in this section. Each question is worth **5 points**, for a total of 20 points. For each question in this section, please state whether the statement is true, false, or uncertain. Explain why. A good answer will define the terms carefully, provide the relevant details, caveats and comments to each of selected statements. To receive maximum points, your answer should discuss intelligently the relevant literature and related lecture material (4-5 lines).

Indicate clearly which question you are answering.

- 1) The Economic Note explains that minimum wage jobs are the entry point to the labour market for the least qualified individuals, including young people, immigrants, and older women. The lowest-paid workers are by definition the least productive, meaning that a higher minimum wage raises the bottom rung of the labour market ladder to a height that many cannot reach, thereby contributing to keep them unemployed. Therefore rises in the minimum wage do not help reduce poverty but instead create at least some unemployment.
- 2) Gross Enrolment Ratio, as the percentage of students enrolled in a level of education regardless of their age, could be greater than 100%.
- 3) Promoting informal sector, by encouraging more migration from rural to urban area, has a negative impact on the urban development.
- 4) Percentage of adults infected by HIV falls as income per capita is rising.
- 5) Microeconomic theory of fertility explains that number of desired children is decreasing with the increase of household income.
- 6) Countries with different income distributions could get the same Gini coefficient.

Part 2 (30 points) – Quantitative Questions

- Please answer both questions.

Question 1 (20 points) Return to Education

Enrique lives in rural Equator and is finishing his high school. As an outstanding student, he was accepted by the leading private university, Universidad de Quito to study in a two year program on comparative literature and linguistic to become a college teacher. If he goes to university, he will pay a tuition fee of 1000 \$ (1 \$= 1 peso) per year (for 2 years). Suppose also that there is a “psychological” cost of 400 \$ associated with moving to the city of Quito, which represents the money equivalent (paid only once, in the first period) of leaving his family/girlfriend.

In the first year, Enrique can work in the library of the university and earn 1000 \$ per year, while during the summer of the second year, he can do an internship and earn 2000\$. At the third year, he may start working as a college teacher, where he will earn 4000 \$ per year for the first 2 years of his career. For the sake of this exercise, suppose that we only have 4 periods.

If Enrique refuses to go to University, he will work on the family farm and will earn 1000 \$ per year for the first two years. His father promises him a salary equal of 3000 \$ from the third year. Consider a discount factor of 10%.

- (9 points) Calculate the expected present value benefits of studying.
- (9 points) Calculate the expected present value costs of studying (direct and indirect costs).
- (2 points) Should Enrique go to the university?

Question 2 (10 points) Income Inequality

Suppose that the following table describes the distribution of income in Bosnia.

- (4 points) Fill the cumulative share of population and income.
- (4 points) Plot the Lorenz curve.
- (2 points) Explain, only in words, how would you calculate the Gini-Coefficient?

Income Category	Share of Total Income (%)	p = Cumulative Share of Population (%)	L = Cumulative Share of Income (%)
Top 20%	4.7		
4th 20%	11.1		
3rd 20%	17.1		
2nd 20%	24.4		
Lowest 20%	42.7		
Total	100		

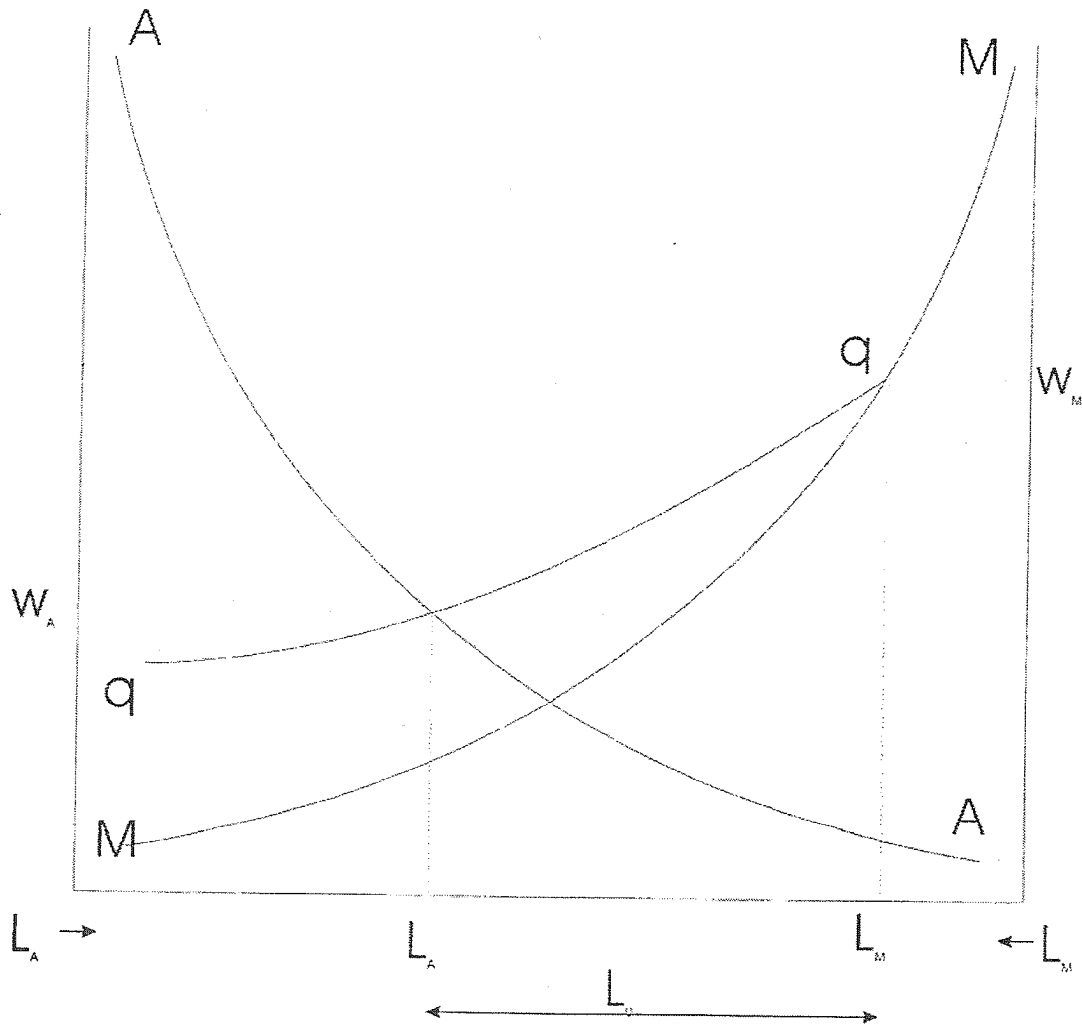
Part 3 (50 points) – Essays

- **Suggestion:** read each question and think for a few minutes before writing. You don't need to be long. Be precise.

Question 1 (20 points) Harris –Todaro Model of Migration

“If everyone had the same chance to enter any career, subsequent differences in income and prestige would be justified by reference to individuals’ particular talents and weaknesses ...”

- (10 points) Explain how this statement could be related to Harris - Todaro model of rural-urban migration? Explain the economic incentive behind migration from rural to urban area, in this model.
- (5 points) Using the following graphic, where M is the manufacture sector in the urban area and A is the agriculture sector in the rural area, refer, at least to two variables that will increase the chances of migration to the cities.
- (5 points) What do we mean by a 'segmented labour market' in the urban area? What are the most important characteristics of these sectors?



W_m : fixed salary in the urban sector
 L_m : number of jobs available in the urban sector
 L_u : urban unemployment
 L_a : number of jobs available in the rural area

Question 2 (20 points) Human Capital

The PROGRESA program is a large-scale government program in Mexico, basically designed to foster investment in human capital and ultimately to alleviate poverty. By this program, substantial payments are made to parents, contingent on their children's regular attendance at school.

As the program is somehow costly for the government to be implemented, you- as a development economist- have been asked by the minister of the education in Mexico to make policy recommendations on the benefits of this program to the Mexican economy.

- (6 points) You should write a report that includes a brief statement about economic impact of the higher education on the development status of a country. (Please indicate at least 2 variables you are considering for measuring the improvement in the educational system of Mexico). You should underline educational inequality and explain how it is measured (2 variables to quantify the inequality). Also explain, how a program like PROGRESA, will decrease the degree of inequality.
- (6 points) You should also consider the impact of such a program on reducing the child labours. Hint: please start your analysis by providing all the key economic characteristics of the child labor's market (from supply and demand sides).
- (4 points) You should, by using a graphic, explain the economic paradox of the negative slope for the child labor's supply curve.
- (4 points) Explain how public investments might help to resolve the worst forms of child labours in the developing countries? (You can make reference to the documentary "Sacrifice" seen in the class). Do you believe that an international ban on the worst form of child labour would benefit the government of Mexico?

Be clear and concise. Make sure to look at the problem from all angles.

Question 3 (10 points) Environment and Development

The scientists suggest that the nations of the world should coordinate their efforts to reduce the undesired consequences of the climate change, in particular by investing in sustainable energy technologies to reduce the accumulation of the greenhouse gases. However, many developing countries lack the resources to invest in more clean technologies.

You -as an economist and environmental activist- are invited by UN Foundation to give a presentation at a conference on sustainable development.

- (4 points) Please explain when a development path is sustainable? Use a graphic to show and compare a sustainable and an unsustainable path.
- (4 points) Describe the issues for setting up a system of national accounts that includes the environmental gains and losses, in money values, in developing countries.
- (2 points) Explain the relationship between poverty, environment, growth, and development.

ECONOMICS 313

ECONOMIC DEVELOPMENT 1

Fall 2015

ASSIGNMENT 2

This is a set of questions meant as practice towards the preparation for the mid-term and the final examinations. While it is not necessary to submit the assignment, it is in your best interest to work out the solution.

Part A:

1. True, False or Uncertain: The supply curve of labour to industry in the Lewis model is horizontal if there is surplus labour in agriculture.
2. What are three factors that distinguish models of endogenous growth from their Neoclassical counter parts?
3. What is technological spillover?
4. The best way to reduce inequality in developing countries is through the use of progressive income taxes. This way, the Gini will be decreased and the welfare of the country will increase.

Part B:

Question 1 Romer Model

Suppose that there are two industries in a Romer economy that each produce output according to the following:

Industry #1: $Y_1 = 10K_1^{0.4}L_1^{0.6}\bar{K}^{0.2}$ and

Industry #2: $Y_2 = 10K_2^{0.4}L_2^{0.6}\bar{K}^{0.2}$

Where Y_1 and Y_2 denote each industry's output, K_1 and K_2 is each industry's capital stock and L_1 and L_2 is each industry's labour force. \bar{K} denotes economy-wide capital stock that embodies a particular

technology. We assume that each industry makes its decisions holding \bar{K} fixed.

- Suppose both industries are identical such that $K_1=K_2=K$ and $L_1=L_2=L$. Furthermore, suppose that $K=100$ and $L=50$, while $\bar{K} = 200$. Calculate Y_1 and Y_2 and $\bar{Y} = Y_1 + Y_2$.
- Suppose that each firm has doubled its input, then economy wide capital is increased. What is \bar{K} now?
- Given your answer in b), what happens to economy wide output when each industry doubles its inputs? Calculate $\bar{Y} = Y_1 + Y_2$ and interpret your results.

a)

$$Y_1 = Y_2 = 1903.7$$

$$\bar{Y} = 3807.308$$

b)

$$\bar{K} = 400$$

c)

$$\bar{Y} = 8746.897$$

The economy has more than doubled its output by doubling its inputs. There the economy has increasing returns to scale.

Question 2 Suppose that there are 10 inhabitants in Country A, where income is distributed as follows in Country A:

Inhabitant	Total Income (LCU) of Each inhabitant		
1	2		
2	5		
3	8		
4	11		

5	14		
6	26		
7	29		
8	31		
9	34		
10	40		

a) Using the data in the above table, draw the Lorenz Curve for this country.

(b) Using the data in table above and assuming that the Poverty Gap Ratio is 0.6 and that there are 5 individuals living under the poverty line. Calculate the poverty line, the head count index and the P_α measures when $\alpha=1$ and when $\alpha=2$.

(b) Suppose that you were to take 1 unit of income away each from individuals 8, 9 and 10 and give them to individuals 3, 4 and 5. If the poverty line is the same as in (b), calculate the new head count index, the new poverty gap index and the new P_α measures when $\alpha=1$ and when $\alpha=2$.

(c) The calculations above are based on incomes. Are there any limitations to using income measures to assess poverty? Are there any alternative measures?

Question 2

a)

Inhabitant	Total Income (LCU) of Each inhabitant	Income as a % of total	Cumulative Income
1	2	0.01	0.01
2	5	0.025	0.035
3	8	0.04	0.075
4	11	0.055	0.130
5	14	0.07	0.200
6	26	0.130	0.330
7	29	0.145	0.475
8	31	0.155	0.630
9	34	0.170	0.800
10	40	0.200	1.000

200

1

b)

$$\text{PGR} = (Y_p - \mu_p) / Y_p$$

$$\text{or, } Y_p = \mu_p / (1 - \text{PGR})$$

$$\mu_p = (2 + 5 + 8 + 11 + 14) / 5 = 8$$

$$Y_p = 8 / (1 - 0.6) = 20$$

$$\text{HCR} = 5 / 10 = 1/2 = 0.5$$

$$P_\alpha = (1/N) \sum_{i=1}^H [(Y_p - Y_i) / Y_p]^\alpha$$

$$P_1 = (1/N) \sum_{i=1}^H [(Y_p - Y_i) / Y_p] = \text{HCR} * \text{PGR} = 0.5 * 0.6 = 0.3$$

$$P_2 = (1/N) \sum_{i=1}^H [(Y_p - Y_i) / Y_p]^2 = 0.2025$$

c)

$$\mu_p = (2 + 5 + 9 + 12 + 15) / 5 = 8.6$$

Y_p remaining constant at 20

$$\text{PGR} = (Y_p - \mu_p) / Y_p = 0.57$$

$$\text{HCR} = 5 / 10 = \frac{1}{2} = 0.5$$

$$P_1 = (1/N) \sum_{i=1}^H [(Y_p - Y_i) / Y_p] = \text{HCR} * \text{PGR} = 0.5 * 0.57 = 0.285$$

$$P_2 = (1/N) \sum_{i=1}^H [(Y_p - Y_i) / Y_p]^2 = 0.1898$$

d) Yes, there are limitations to using income as a measure to assess poverty because income only provides basis for a partial analysis. It is possible that a temporary shock to income creates a bias in the poverty measures. Alternatives are consumption or land holdings that fluctuate less.

Practice PROBLEM SET NO. 3

These problems will be taken up in the conferences during the week beginning October 15th. While you do not hand in your answers, it is in your best interest to **work on these questions before the conferences**.

Part A: Short Essays: True, False and Uncertain – explain.

For each question in this section, please state whether the statement is true as written, and explain why. A good answer will define terms carefully and provide caveats to the statements made or provide details for the statements made, when this is appropriate. To receive maximum points, your answer should discuss intelligently the relevant literature and related lecture material.

1. The Poverty Gap and the Gini coefficient are equally useful to measure income inequality in developing countries.

Terms to define income inequality (the fact that individuals in the society do not have the same level of income), Poverty Gap (the amount of income needed to bring the average poor person up to the poverty line) Poverty Gap Ratio is the poverty gap divided by the poverty line. and Gini coefficient (an index of inequality, ranging from zero (absolute equality) to 1 (absolute inequality) which is calculated using the ratio of the area above the Lorenz curve (depicting the percentage of income earned by each percentile of the population sorted from the poorest to the richest) to the sum of the area above the Lorenz curve and the area below the Lorenz curve.

By defining the terms, one will see that the Gini is the only measure of inequality, whereas the Poverty Gap is a measure of poverty (that is looking only at the left-hand side of the distribution of income of individuals in the society). Other measures of inequality could be some form of range, say top 20% income divided by income of bottom 20% , or variance, or variance divided by mean.

The answer is false.

2. The Kuznets' inverted-U hypothesis has been proven to be true in all developing countries.

False.

Term to define: Kuznets' inverted-U hypothesis: the idea here is that as a country 'begins' to develop, inequality is increasing in income. Eventually, as a country becomes more and more developed, inequality is decreasing in income. (The Lewis model is consistent with this hypothesis)

See figs. 5.10, 5.11 and 5.12: the empirical evidence is mixed. In fact, for some countries, this relationship does

not hold – Pakistan has had changes in the GINI coefficient despite no changes in GNI per capita, while Hong Kong seemed to have a U-shaped relationship (see fig. 5.12). Bottom line: false. Students didn't need to remember the names of countries, but they need to acknowledge that it may hold in some countries but not in others. A diagram would be useful here.

Part B: Quantitative Questions:

Question 1: Poverty and Inequality in Devoland (15 points)

Consider the following table summarizing the distribution of income in Devoland:

Individual	Income (in econs)
1	1
2	10
3	42
4	58
5	73
6	97
7	166
8	230
9	491
10	604

- (a) Suppose that the Poverty Gap Ratio = 0.5375, and that there are 4 people below the poverty line. What must the poverty line be in Devoland? Show all your work.

Recall: $PGR = \frac{Y_P - \mu_P}{Y_P}$. Rewrite equation to solve for the poverty line Y_P :

$$\begin{aligned}
 Y_P \cdot PGR &= Y_P - \mu_P \\
 Y_P \cdot PGR - Y_P &= -\mu_P \\
 Y_P(PGR - 1) &= -\mu_P \\
 Y_P &= \frac{-\mu_P}{(PGR - 1)} \\
 Y_P &= \frac{\mu_P}{(1 - PGR)}
 \end{aligned}$$

Since there are 4 people below the poverty line, calculate the mean income of the poor by taking the average income of the poorest 4 individuals:

$$\mu_P = \frac{1}{4}(1 + 10 + 42 + 58) = \frac{1}{4}(111) = 27.75$$

$$\text{So: } Y_P = \frac{\mu_P}{(1 - PGR)} = \frac{27.75}{1 - 0.5375} = 60$$

- (b) Calculate the Head Count Index

$$\begin{aligned}
 H &= 4 \\
 N &= 10 \\
 H/N &= 0.4
 \end{aligned}$$

- (c) Calculate the P_1 and P_2 measures

$$P^1 = \frac{1}{N} \sum_{i=1}^4 \frac{Y_p - Y_i}{Y_p} = \frac{1}{NY_p} \left(4Y_p - \sum_{i=1}^4 Y_i \right)$$

$$P^1 = \frac{1}{10 \cdot 60} (4 \cdot 60 - (1 + 10 + 42 + 58)) = \frac{1}{600} (129) = 0.215$$

$$P^2 = \frac{1}{N} \sum_{i=1}^4 \left(\frac{Y_p - Y_i}{Y_p} \right)^2 = \frac{1}{NY_p^2} \left(\sum_{i=1}^4 (Y_p - Y_i)^2 \right)$$

$$P^2 = \frac{1}{10 \cdot 3600} ((60 - 1)^2 + (60 - 10)^2 + (60 - 42)^2 + (60 - 58)^2)$$

$$P^2 = \frac{1}{36000} ((59)^2 + (50)^2 + (18)^2 + (2)^2)$$

$$P^2 = \frac{1}{36000} (3481 + 2500 + 324 + 4) = \frac{6309}{36000} = 0.17525$$

(d) Suppose that Devoland introduces a flat tax which taxes each one of the non-poor. The tax is equivalent to 2 econs. The tax revenues are then redistributed equally among the poor. Calculate the new Poverty Gap Ratio, Head Count Index and P_1 and P_2 measures. What has happened to poverty after this tax and transfer?

There are 6 non-poor people, so there is a total of 12 Econ that will be taxed from the non-poor and distributed equally to the poor, so each poor person under the old distribution gets 3 Econ. The new distribution is thus:

Individual	Income (in econs)
1	4
2	13
3	45
4	61
5	71
6	95
7	164
8	228
9	489
10	602

Now, a few things have changed: First, the number of people under the poverty line has fallen: there are now 3 poor people (1, 2, and 3):

$$\mu_p = \frac{1}{3} (4 + 13 + 45) = \frac{62}{3} = 20.666$$

$$PGR = \frac{Y_p - \mu_p}{Y_p} = \frac{60 - 20.666}{60} = 0.6556$$

So notice that the mean income of the poor has gone down, and the PGR has gone up. This is because the richest poor individual under the original distribution is now not-poor, so naturally the poor are now on average poorer, despite the fact they all received some money.

$$HCI = 3/10 = 0.333$$

$$P^1 = \frac{1}{N} \sum_{i=1}^3 \frac{Y_p - Y_i}{Y_p} = \frac{1}{NY_p} \left(3Y_p - \sum_{i=1}^3 Y_i \right)$$

$$P^1 = \frac{1}{10 \cdot 60} (3 \cdot 60 - (4 + 13 + 45)) = \frac{1}{600} (118) = 0.1967$$

$$P^2 = \frac{1}{N} \sum_{i=1}^3 \left(\frac{Y_p - Y_i}{Y_p} \right)^2 = \frac{1}{NY_p^2} \left(\sum_{i=1}^3 (Y_p - Y_i)^2 \right)$$

$$P^2 = \frac{1}{10 \cdot 3600} ((60 - 4)^2 + (60 - 13)^2 + (60 - 45)^2)$$

$$P^2 = \frac{1}{36000} ((56)^2 + (47)^2 + (15)^2)$$

$$P^2 = \frac{1}{36000} (3136 + 2209 + 225) = \frac{5570}{36000} = 0.1547$$

- (e) Now, returning to the distribution of income in the table, suppose that individual 4 gives 3 econs to individual 3. Calculate the new Poverty Gap Ratio, Head Count Index and P_1 and P_2 measures. What has happened to poverty after this transfer?

Individual	Income (in econs)
1	1
2	10
3	45
4	55
5	73
6	97
7	166
8	230
9	491
10	604

Now the new mean income of the poor has not changed from what we calculated in (a), because the total income of the poor has not changed, nor has the number of poor. So:

PGR: Same as in (a)

HCI: same as in (a)

P_1 : Also same as in (a) – remember, it is the same thing as $HCI \cdot PGR$!

Now will this be the same for P_2 ?

$$P^2 = \frac{1}{N} \sum_{i=1}^4 \left(\frac{Y_p - Y_i}{Y_p} \right)^2 = \frac{1}{NY_p^2} \left(\sum_{i=1}^4 (Y_p - Y_i)^2 \right)$$

$$P^2 = \frac{1}{10 \cdot 3600} ((60 - 1)^2 + (60 - 10)^2 + (60 - 45)^2 + (60 - 55)^2)$$

$$P^2 = \frac{1}{36000} ((59)^2 + (50)^2 + (15)^2 + (5)^2)$$

$$P^2 = \frac{1}{36000} (3481 + 2500 + 225 + 25) = \frac{6231}{36000} = 0.1731$$

So, the P_2 measure is lower than in (a). This is because income is now distributed slightly more equally among the poor (especially the richest of the poor), so the P_2 measure is lower.

- (f) In a clearly labeled diagram, represent the Lorenz curves corresponding to the distributions in the table and that result from the transfers in (d) – what can you say about changes in income inequality after the redistribution?

A carefully drawn Lorenz diagram will show that the new distribution in (d) (series 3) is more equal than in (a) (series 2), as a response to the redistribution, as expected. Note, however, that this improvement is only moderate, as the curves are actually not that different.

and Hollis Chenery. The table shows the growth of income in 12 countries as measured first by the rate of growth of GNI (GNI weights), second by an equal-weights index, and third by a poverty-weighted index where the actual weights assigned to income growth rates of the lowest 40%, the middle 40%, and the top 20% of the population are 0.6, 0.4, and 0.0, respectively. Some interesting conclusions emerge from a review of the last three columns of Table A5.2.1:

1. Economic performance as measured by equal-weights and poverty-weighted indexes was notably worse in some otherwise high-GNI-growth countries like Brazil, Mexico, and Panama. Because these countries all experienced a deterioration in income distribution and a growing concentration of income growth in the upper groups over this period, the equal-weights and poverty-weighted indexes naturally show a less impressive development performance than the simple GNI measure.

2. In five countries (Colombia, Costa Rica, El Salvador, Sri Lanka, and Taiwan), the weighted indexes show a better performance than GNI growth because the relative income growth of lower-income groups proceeded more rapidly over the period in question in those five countries than that of the higher-income groups.

3. In three countries (Peru, the Philippines, and South Korea), little change in income distribution during the period in question resulted in little variation between the GNI measure and the two alternative weighted indexes of social welfare.

We may conclude, therefore, that a useful summary measure of the degree to which economic growth is biased toward the relative improvement of high-income or low-income groups is the positive or negative divergence between a weighted social welfare index and the actual growth rate of GNI.

TABLE A5.2.1 Income Distribution and Growth in Twelve Selected Countries

Country	Income Growth			Annual Increase in Welfare		
	Upper 20%	Middle 40%	Lowest 40%	GNI Weights	Equal Weights	Poverty Weights
Brazil	6.7	3.1	3.7	5.2	4.1	3.5
Colombia	5.2	7.9	7.8	6.2	7.3	7.8
Costa Rica	4.5	9.3	7.0	6.3	7.4	7.8
El Salvador	3.5	9.5	6.4	5.7	7.1	7.4
India	5.3	3.5	2.0	4.2	3.3	2.5
Mexico	8.8	5.8	6.0	7.8	6.5	5.9
Panama	8.8	9.2	3.2	8.2	6.7	5.2
Peru	3.9	6.7	2.4	4.6	4.4	3.8
Philippines	5.0	6.7	4.4	5.5	5.4	5.2
South Korea	12.4	9.5	11.0	11.0	10.7	10.5
Sri Lanka	3.1	6.3	8.3	5.0	6.5	7.6
Taiwan	4.5	9.1	12.1	6.8	9.4	11.1

Sources: International Bank for Reconstruction and Development/The World Bank: *Redistribution with Growth: An Approach to Policy*. Copyright © 1974 by World Bank. Reprinted with permission.

