Written Exam for the B.Sc. or M.Sc. in Economics summer 2014

Development Economics

Model Answer

August 6th, 2014

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

All questions must be answered.

Problem A

Please explain briefly

1. The difference between GDP per capita and the HDI index.
   This is described in T&S, Chapter 2. The HDI index is measuring national socioeconomic development, based on combining measures of education, health and adjusted real income per capita. GDP per capita (PPP adjusted) is thus just one component of HDI. In the new HDI index, GDP per capita has been replaced by Gross national income (GNI) per capita. (And the formula for the index has been changed in several other ways, but this is not of importance for the answer).

2. The relative importance of efficiency and technology according to calibrations of $A = T \times E$.
   The decomposition of productivity (A) into technology (T) and efficiency (E) is given in Weil, page 289. On page 314 (Section 10.4 Conclusion) Weil writes: "Our most important conclusion is that differences in efficiency among countries are much larger than differences in technology. Thus variation in efficiency explains most of the variation in productivity among countries."

3. The Kuznets Curve.
   The Kuznets curve is presented in T&S page 224-228 and in Weil page 388-390 . On page 388 Weil writes: "In 1955, economist Simon Kuznets hypothesized that as a country developed, inequality would first rise and then later fall (we will discuss the reasoning later). Kuznets's theory implies that if we graphed the level of inequality as a function of the level of gross domestic product (GDP) per capita, the data would trace out an inverted-U shape. This relationship, illustrated in Figure 13.3, has come to be known as the **Kuznets curve.**"

4. Possible causes of urban gigantism
   The urban gigantism problem is discussed in T&S Section 7.3. The possible causes of urban gigantism are given on pages 325-327: Gigantism is caused by (i) Hub and spoke transportation system that makes transport costs high for small cities; (ii) Import substitution industrialization, giving rise to less trade and incentive to concentrate in a single city largely to avoid transportation costs; (iii) Compounding effect of locating the national capital in the largest city; (iv) “Bread and circuses” to prevent unrest (evidence: stable democracies vs. unstable dictatorships).

5. The relationship between nutrition and activity.
   The relationship between nutrition and activity is the cornerstone of the nutrition based efficiency model described in Ray, chapter 13.4. The basic underlying assumption for this model is a functional relationship between nutrition and work capacity, which is denoted the capacity curve. This curve relates income, which is implicitly related to nutrition to work capacity. The capacity curve is s-shaped because most nutrition initially goes into maintaining the body's resting metabolism. In this stretch very little extra energy is left over for work, so work capacity at low income is close to zero and does not increase too quickly as income change. Once resting metabolism is taken care of, there is a marked increase in work capacity with nutrition. Finally, there is a phase of diminishing returns, as natural body limits restrict the conversion of increasing nutrition to ever-increasing work capacity.

6. The notion of "the three worlds of agriculture."
   The three worlds of agriculture are described in T&S Chapter 9.3 and in World Development Report (2008), Chapter 1. Agriculture operates in three distinct worlds—one agriculture-based,

one transforming and one urbanized. The classification is based on the share of aggregate growth originating in agriculture and the share of aggregate poverty in the rural sector. In each "world" the agriculture-for-development agenda differs in pursuing sustainable growth and reducing poverty.

7. The pros and cons of foreign direct investment for developing countries.
   The pros and cons of FDI are discussed in T&S page 688-694. The main "pros" are that FDI (i) increases total investment; (ii) increases foreign exchange reserves; (iii) increases tax revenue, and (iv) transfers technology. The main "cons" state the opposite results: FDI (i) lovers domestic savings, thereby lowering total investment; (ii) decreases foreign exchange reserves over time as profits are extracted; (iii) decrease the tax revenue because of race to the bottom and transfer pricing, (iv) does not transfer technology, but inhibit domestic entrepreneurship and innovation, and (v) influence policy decisions.

Problem B

Please explain how interlinkage of a credit contract with a labor contract may be the dominant contract for a rural laborer who works for and borrows money from a large farmer.

A model of interlinked transactions with loan repayment in labor is given in Ray (1998) Section 14.4.4. The text below are excerpts from the section.

Suppose that a rural laborer, Anka, must feed herself and her family through both the slack and the peak seasons of an agricultural year and imagine that there is no employment available in the slack season, whereas in the peak season, harvesting jobs are available that pay a wage of w. To finance her consumption in the slack season, Anka must borrow.

Suppose that there is a large farmer, Birju, who hires harvesting labor during the peak season and also has access to funds at an opportunity cost of i per unit, such that Birju is in a position to lend money to Anka.

Birju has the option to interlink the credit contract with the labor contract. One way to think about this is to imagine that the interlinked deal has two components: (i) the offer of a loan (to be chosen by Anka) at interest rate i^* (chosen by Birju) and (ii) the offer of a wage w^* at which Anka will pledge to supply her labor to Birju in return for her loan. A priori, w^* and i^* could be related to their counterparts w and i in a variety of different ways. In particular, w^* might be equal to w, which is just another way of stating that there is no interlinkage and that the deal in question is one of pure credit.

Figure 14.4 describes the total return to Birju from a contract of the form (w^*, i^*), provided that a loan of size L is taken by Anka. The figure displays various combinations of slack and peak consumption available to Anka under the contract (w^*, i^*). The left-hand panel of the figure considers the case where $w^* < w$ and $i^* > i$. The right-hand panel looks at the case where $w^* < w$ and $i^* < i$. The former corresponds to the case where the loan is repaid with interest in both cash and labor. The latter corresponds to the case where the loan is "subsidized" in cash terms, but repayment is extracted in labor. In both cases, the total return to Birju is given by the algebraic sum of the segments AB and BC. In both cases the net return to Birju is given by the segment AC.

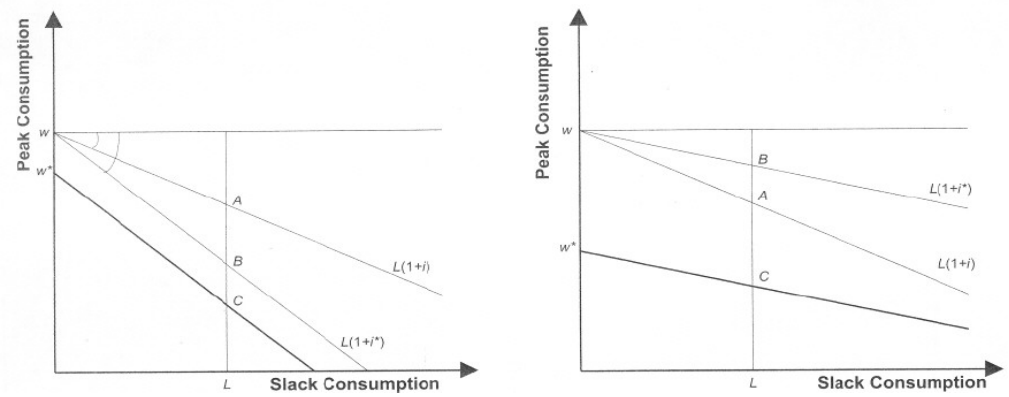


Figure 14.4: Birju's return from a contract (w, i*)*

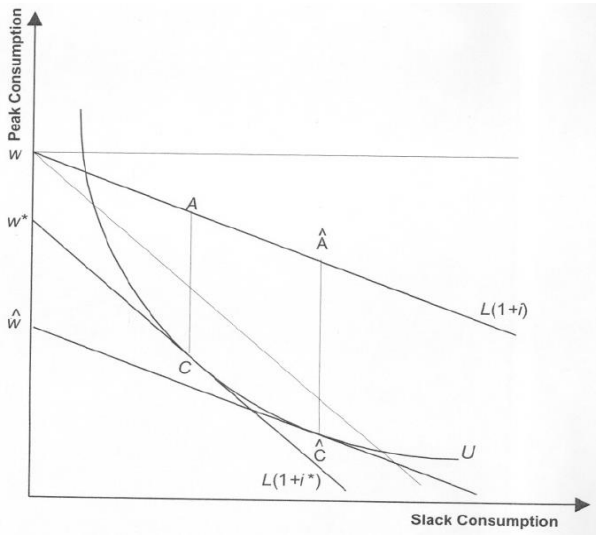


Figure14.5: Anka's return from a contract (w, i*)*

Figure 14.5 shows Anka's method of making loan choices. Anka has preferences over slack and peak consumption. Her preferences are represented by indifference curves. To find Anka's budget line under the contract, determine the vertical intercept *w** and then draw a line sloping downward from it that represents her trade-off between slack and peak consumption. This is precisely the line *w**C in Figure 14.4. Anka maximizes her utility at point *C*, which places her on the indifference curve marked *U*. Birju receives a profit of *AC* from this contract.

Birju's profit is maximized at the point at which the vertical difference between the indifference curve *U* and the line marked $L(1+i)$ is maximized. Birju could get Anka to choose this point as her consumption bundle provided he lowered the wage rate further (to $\hat{w}$), but charged exactly the same rate of interest in loans as his own opportunity cost, which is *i*. In that case Birju's return will be $\hat{A}\hat{C}$, which is higher than *AC*.

We may conclude that the dominant contract to offer is an interlinked contract. No extra interest is charged on the loan; all payments are made in "labor units". The best contract is one that "taxes" Anka's labor, which she treats effectively as a lump-sum tax that does not distort her loan incentives (she has to "pay the tax" anyway regardless of the loan size).

Problem C
Please explain how poverty lines are constructed when using the Cost of Basic Needs (CBN) method. To what extent is the dollar-a-day poverty line related to the CBN method? Describe the global geographical distribution of the poor and describe the main characteristics of high poverty groups.

The construction of poverty lines is explained in Ravallion (1998). The Cost of Basic Needs (CBN) method is explained on page 15-20. On page 15 it is stated that: "This method [the CBN] stipulates a consumption bundle deemed to be adequate for basic consumption needs, and then estimates its cost for each of the subgroups being compared in the poverty profile."

Amongst the (infinite number of) consumption vectors which could yield any given set of basic needs, a vector is chosen which is consistent with choices actually made by some relevant reference group. Poverty is then measured by comparing actual expenditures to the CBN. A person is not deemed poor who consumes less food (say) than the stipulated basic needs, but could consume it on rearranging her budget allocation.

The food component of the poverty line is almost universally anchored to nutritional requirements for good health. This does not generate a unique monetary poverty line, since many bundles of food goods yield the same nutrition. In practice, a diet is chosen which accords with prevailing consumption patterns, about which one might expect to arrive at a consensus in most settings.

One should be clear about the role of data on nutritional or other capabilities in these various versions of the cost-of-basic-needs methods. That role is essentially to provide an anchor for setting the reference utility level. Nutritional status is not itself the welfare indicator. Thus there is nothing to guarantee that someone who can afford the resulting poverty line at every place or date will actually reach the nutritional requirement.

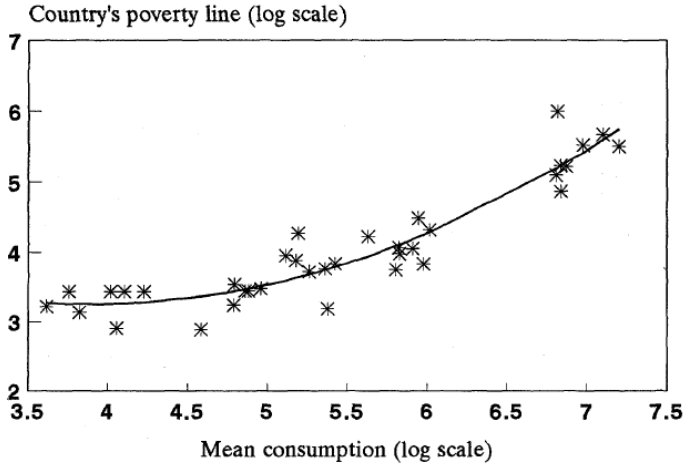
The scope for disagreement appears to be far greater with respect to the non-food component. A common practice is to divide the food component of the poverty line by some estimate of the budget share devoted to food. But the basis for choosing a food share is rarely transparent, and very different poverty lines can result, depending on the choice made.

The CBN is also briefly described in T&S, page 212, where a comparison to the dollar-a-day line is also briefly made: "Certainly one would not accept the international poverty level of $1.25 a day in an unquestioning way when planning local poverty work. One practical strategy for determining local absolute poverty is to start by defining an adequate basket of food, based on nutritional requirements from medical studies of required calories, protein, and micronutrients. Then, using local household survey data, one can identify a typical basket of food purchased by households that just barely meet these nutritional requirements. One then adds other expenditures of this household, such as clothing, shelter, and medical care, to determine the local absolute poverty line. Depending on how these calculations are done, the resulting poverty line may come to more than $1.25 per day at PPP."

To what extent is the dollar-a-day poverty line related to the CBN method? This is briefly described above (from T&S) and in Ravallion (1998) page 25-29.

All countries with World Bank type household surveys have their own poverty line, based on the CBN, expressed in the national currencies. PPP conversion factors for a wide range of countries makes comparisons of Household surveys, and thus poverty, possible. Such comparisons show that national poverty lines do not collapse to a single line, even when using the PPP-dollar. National poverty lines are increasing in the consumption level above some critical level. This is shown in Figure 5 in Ravallion (1998):

Figure 5: Poverty lines across countries



Note: Each point is one country. Both poverty line and mean consumption are measured at purchasing power parity.
Source: Ravallion, Datt and van de Walle (1991)

World Bank economists (Ravallion, Chen and Sangraula) have estimated "global poverty lines" using 2005-PPP data and poverty lines from 75 developing countries. The $1.25 per day line is the average poverty line for the 15 poorest countries in the sample, hence it represents extreme poverty across countries. The $2.5 line is the median poverty line for all developing countries, excluding the 15 poorest countries.

The global geographical distribution of the poor is given in T&S page 62 and in Figure 2.7 on page 63. About 1,4 billion people were poor in 2005 (using the $1.25 per day poverty line). Some 600 million of the poor lived in South Asia (mainly in India) while about 300 million lived in East Asia and the Pacific (mainly in China) and just below 400 million lived in Sub-Saharan Africa. The main geographical problem is that while the number of poor people has been decreasing since the 1980s in the East Asia it has been roughly constant in South Asia and increasing in Sub-Saharan Africa.

The main characteristics of high poverty groups are given in T&S Section 5.4: (i) Poverty is rural; (ii) Women make up a substantial majority of the world's poor; (iii) Poverty falls especially heavily on minority ethnic groups and indigenous populations. T&S also note that poor people come from poor countries. In addition, the lecture slides also point to: (iv) the poorest households depend on agriculture as their primary source of income and (v) People with no, or low, education have much higher poverty rates than people with more education.