**Assignment weeks 9, 10 and 11**

*To answer all the questions below, you must use Stata (and, specifically, DASP, if requested). Be concise and clear in your answers.*

*The assignment is divided into three exercises (the points assigned to each exercise are indicated next to each exercise). Please answer directly in this file after each question and please attach the \*.do file (do-file) that you generated. Rename both files as: “Assignment weeks 9-10-11 - Name, Surname”. Please submit this completed file and the \*.do through the virtual drop box (boîte de dépôt) in the course portal, no later than Tuesday, April 13 11:59 p.m. (*[***Québec time***](https://www.timeanddate.com/worldclock/converter.html?iso=20190410T035900&p1=189)*).*

# Exercise 1 (4.5%):

Assume that the population is composed of six individuals. The scores of each of the three dimensions of well-being are reported in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| Individual 1 | 2 | 10 | 6 |
| Individual 2 | 4 | 6 | 0 |
| Individual 3 | 8 | 8 | 12 |
| Individual 4 | 6 | 6 | 8 |
| Individual 5 | 14 | 10 | 4 |
| Individual 6 | 12 | 8 | 6 |

Assume that the poverty threshold of each of the three dimensions is 7. Perform the following computations with Stata.

* 1. Using the union approach, estimate the proportion of poor individuals. Redo the estimation using the appropriate DASP command.

***imdp\_uhi w\_1 w\_1 w\_3, pl1(7) pl2(7) pl3(7) /\*Union Approach\*/***

* 1. Using the intersection approach, estimate the proportion of poor individuals. Redo the estimation using the appropriate DASP command.

***imdp\_ihi w\_1 w\_2 w\_3, pl1(7) pl2(7) pl3(7) /\*Intersection approach\*/***

* 1. Which approach is more sensitive to the increase in individual multiple deprivations?

***The Union approach***

* 1. Estimate the Alkire and Foster (2007) index MPI( when the dimensional cut-off is equal to 2 (the poor are those with two or three dimensions of deprivation).
  2. Now estimate the same indices using the appropriate DASP command. Discuss your findings.
  3. Assume that the government has 12$ and can target one dimension with a universal transfer. Which targeted dimension would most reduce the union index, and the intersection index? Discuss your findings.

# Exercise 2 (4%):

For the case of tri-dimensional well-being dimension, the Bourguignon and Chakravarty (2003) poverty index (henceforth the BC index) is defined as follows:

Where is the contribution of the individual to the total poverty:

*and*

Using the data of exercise 1,

* 1. Estimate the Bourguignon and Chakravarty (2003) poverty index when .

***0.1823572***

* 1. Redo the estimation using the appropriate DASP command.

***0.182***

* 1. Generate three new variables (nw\_\*) wherein individuals equalize their well-being dimensions (example: gen nw\_1 = (w\_1+ w\_2+w\_3)/3) (i.e. For instance, individual 1 has 2, 10, 6 in the three dimensions respectively. After the equalisation, we will have: 6, 6, 6.). Then, using DASP, re-estimate the BC index with the new vectors of well-being. Explain the direction of the change in the BC index.

**The BC index is increasing**

# Exercise 3 (4%):

The data file ***Canada\_1996\_2005\_random\_sample\_2*** is a randomly drawn sample of 100 000 observations. It contains information on net and gross incomes, taxes and transfers.

* 1. Using the observations from 2005, estimate the expected marginal tax, benefit and net income rates for a range of gross incomes between 1000 and 31000$ (hints: use the DASP ***cnpe*** command with the option: type(dnp)), and briefly discuss your results.



***With respect to levels of gross incomes, the change on net incomes and benefits all increase at a decreasing rate and tend to flatten in a similar way. Marginal Taxes tend to increase much slower. At lower rates of gross incomes 130000 and below, marginal benefits grow at a higher rates compares to net incomes. This implies that individuals in a lower income bracket benefit more .***

* 1. Estimate the redistributive impact on the Gini inequality index for 1999, 2002 and 2005 (hints: use the Stata commands preserve/restore to preserve the data after using the Stata command “keep if year==…”). Discuss your results.

***The difference between two Gini indices of two given distributions (X,N) is also called the redistribution effect on inequality and this can be expressed as a difference between two main components: Gini\_X-Gini\_N = VE- HI. We observe that over times the difference has been declining from 0.15134358 in 1999 to 0.14404753 in 2002 to 0.1349144 in 2005. That over time there has been a progressive redistribution.***

* 1. Estimate the Kakwani progressivity index per year using the DASP command ***iprog*** (hints: use the option gobs(year)), and briefly discuss your results.
  2. Using the observations from 2005, check the TR progressivity condition for the tax T by using the DASP command ***cprog***.



***We see that indeed this tax regime is progressive as tax T is Tax Redistribution (TR) progressive if : CPROG (p) = L\_X(p) - C\_T(p) > 0 for all p in ]0,1[. In some words, the condition is that the share of incomes until a give p-percentile group (p-poorer group.***

* 1. In which province was inequality on gross incomes the highest in 2005? In which province was the Kakwani tax progressivity index the highest in 2005?

***Newfoundland and Province British\_Columbia respectively***