**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 | 1 | 5 | 3 |
| Individual 2 | 2 | 3 | 0 |
| Individual 3 | 4 | 4 | 6 |
| Individual 4 | 3 | 3 | 4 |
| Individual 5 | 7 | 5 | 4 |
| Individual 6 | 6 | 4 | 3 |

Assume that the poverty threshold for each of the three dimensions is 3.5. 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.

**A :** imdp\_uhi w1 w2 w3, pl1(3.5) pl2(3.5) pl3(3.5)

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

**A :** imdp\_ihi w1 w2 w3, pl1(3.5) pl2(3.5) pl3(3.5)

* 1. Which approach is more sensitive to the increase in the individual multiple deprivations?
  2. Estimate the Alkire and Foster (2007) index MPI( when the cross-dimensional cut-off is equal to 2 (the poor are those with two or three dimensions of deprivation).
  3. Now estimate the same indices using the appropriate DASP command. Discuss your findings.

**A :** imdp\_afi w1 w2 w3, dcut(2) w1(1) pl1(3.5) w2(1) pl2(3.5) w3(1) pl3(3.5)

* 1. Assume that the government has 6$ and can target one dimension through 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 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 .

**A**: scalar alpha = 1

scalar rho = 1

scalar beta = 1/3

scalar z=3.5

gen ngap1 = (z-w1)/z\*(z>w1)

gen ngap2 = (z-w2)/z\*(z>w2)

gen ngap3 = (z-w3)/z\*(z>w3)

cap drop pi // try to drop the variable pi

gen pi = (beta\*ngap1^rho + beta\*ngap2^rho + beta\*ngap3^rho)^(alpha/rho) // we generate the pi variable

if ngap1==0 & ngap2==0 & ngap3==0 replace pi=0 // If the gasps in dimensions 1, 2 and 3 are nil, then pi is equal to zero.

qui sum pi

scalar MDI\_BC = r(mean)

dis "The MDI\_BC Index : " = MDI\_BC

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

**A :** imdp\_bci w1 w2 w3, alpha(1) gamma(1) b1(0.33) pl1(3.5) b2(0.33) pl2(3.5) b3(0.33) pl3(3.5)

* 1. Generate three new variables (nw\_\*) wherein the individuals equalize their well-being dimensions (example: gen nw\_1 = (w\_1+ w\_2+w\_3)/3) (i.e. For instance, individual 1 has 1, 5, 3 in the three dimensions respectively. After the equalisation, we will have: 3, 3, 3.). 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.

**A :** gen nw\_1=(w1+ w2+w3)/3

gen nw\_2=(w1+ w2+w3)/3

gen nw\_3=(w1+ w2+w3)/3

imdp\_bci nw\_1 nw\_2 nw\_3, alpha(1) gamma(1) b1(0.33) pl1(3.5) b2(0.33) pl2(3.5) b3(0.33) pl3(3.5)

/\* Equalizing the well-being dimensions reduces the BC index\*/

# Exercise 3 (4%):

The data file ***Canada\_1996\_2005\_random\_sample\_1*** 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 the range of gross incomes between 1000 and 31000$ (hints: use the DASP ***cnpe*** command with the option: type(dnp)), and briefly discuss your results.

**A :** preserve

keep if year==2005

cnpe T B N, xvar(X) min(1000) max(31000) type(dnp)

/\* In general, we observe that, benefits and taxes increase with the increase of per capita gross income. As we move to higher per capita gross income, benefits increase more than taxes, resulting in a positive net income rate. \*/

restore

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

**A :** preserve

keep if year==1999

igini X N

local Gini\_X=el(e(est),1,1)

local Gini\_N=el(e(est),2,1)

igini N, rank(X)

local CONC\_N=el(e(est),1,1)

dis "Difference = " `Gini\_X' - `Gini\_N'

dis "VE = " `Gini\_X' - `CONC\_N'

dis "HI = " `Gini\_N' - `CONC\_N'

restore

preserve

keep if year==2002

igini X N

local Gini\_X=el(e(est),1,1)

local Gini\_N=el(e(est),2,1)

igini N, rank(X)

local CONC\_N=el(e(est),1,1)

dis "Difference = " `Gini\_X' - `Gini\_N'

dis "VE = " `Gini\_X' - `CONC\_N'

dis "HI = " `Gini\_N' - `CONC\_N'

restore

preserve

keep if year==2005

igini X N

local Gini\_X=el(e(est),1,1)

local Gini\_N=el(e(est),2,1)

igini N, rank(X)

local CONC\_N=el(e(est),1,1)

dis "Difference = " `Gini\_X' - `Gini\_N'

dis "VE = " `Gini\_X' - `CONC\_N'

dis "HI = " `Gini\_N' - `CONC\_N'

restore

/\*

the redistributive impact on the Gini inequality index is higher in 1999

\*/

* 1. Estimate the Kakwani progressivity index per year using the DASP command ***iprog*** (hints: use the option gobs(year)).

**A :** iprog T, ginc(X) hsize(hhsize) gobs(year) type(t) index(ka)

* 1. Using the observations from 2005, check the TR progressivity condition for the tax T by using the DASP command ***cprog***.

**A :** preserve

keep if year==2005

cprog T, rank(X) hsize(hhsize) type(t) appr(tr)

restore

* 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?

**A :** preserve

keep if year==2005

iprog T, ginc(X) hsize(hhsize) gobs(province) type(t) index(ka)

igini X, hsize(hhsize) hgroup(province)

restore

/\* the Kakwani tax progressivity index is highest in Manitoba while inequality on gross incomes is highest in Newfoundland \*/