**Assignment weeks 3, 4 and 5**

# *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 (A) directly in this file after each question (Q) and please attach the \*.do file (do-file) that you generated. Rename both files as: “Assignment weeks 3-4-5 - 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, February 23 11:59 p.m. (*[*Québec time*](https://www.timeanddate.com/worldclock/converter.html?iso=20190227T045900&p1=189)*).*

***Please, organize your do-file by exercise. Feel free to make your comments/discussions in the do-file.***

# Exercise 1 (4%)

Assume that the population is composed of six individuals belonging to two population groups, 1 and 2. The following table shows the distribution of incomes for three different periods.

|  |  |  |  |
| --- | --- | --- | --- |
| *group* | *inc1* | *inc2* | *inc3* |
| 1 | 2 | 16 | 2 |
| 1 | 4 | 16 | 4 |
| 1 | 18 | 16 | 18 |
| 2 | 4 | 32 | 2 |
| 2 | 8 | 32 | 4 |
| 2 | 36 | 32 | 18 |

* 1. For the distribution *inc1,* state whether the following statements are true or false and why.

1. Based on the *Scale invariance principle,* income inequality of group1 is equal to that of group 2. Input the data and check your answer by estimating the Gini index by population groups.

**A: True, Gini indices of the two groups both equal 0.4444. Data inputting and Gini index computation are done in the do-file.**

1. By considering the *Scale invariance principle* and the *Population principle,* the income inequality of the group1 is equal to that of the total population.

**A: False. Gini index of the group 1 is 0.4444 while Gini index of the total population is 0.5.**

1. The between group inequality of *inc1* is equal to that of *inc2.* Also, check this using the ***dentropyg*** DASP command (for theta=0).

**A: True. Check using dentropyg is done in the do-file.**

1.2 Using the DASP command ***dentropyg***, decompose the entropy index (theta = 0). Do this for each of the three periods.

**A: Done in the do-file.**

1.3 Estimate the Gini inequality for each of the three distributions with the ***igini*** DASP command and discuss the results.

**A: Done in the do-file.**

**Gini inequality of period 2 is the lowest, followed by that of period 3 and period 1.**

**Within-group inequality of period 2 is nil. The between group inequality of period 1 and 2 is the same (ratio ½).**

**The within-group inequality of period 1 and 3 is also the same (scale invariance principle) but between-group inequality of period 3 is nil, making total inequality of period 1 higher than period 3.**

# Exercise 2 (5.5%)

Assume that the population is composed of eight households.

|  |  |  |  |
| --- | --- | --- | --- |
| *identifier* | *pre\_tax\_income* | *hhsize* | *nchild* |
| 1 | 480 | 8 | 4 |
| 2 | 1200 | 10 | 6 |
| 3 | 460 | 6 | 4 |
| 4 | 2500 | 6 | 2 |
| 5 | 3800 | 8 | 2 |
| 6 | 560 | 8 | 4 |
| 7 | 1240 | 6 | 2 |
| 8 | 1760 | 8 | 6 |
| **Total** | **12000** | **60** | **30** |

The disposable income of the household is composed of three income sources:

1. post tax income = pre-tax income – income tax;
2. child allowances
3. Guaranteed universal income

The government perceives two potential scenarios (A and B):

* Scenario A: apply a proportional income tax of 10%. 60% of the total collected taxes are equally distributed across the population as a guaranteed universal income. The rest of the budget is redistributed equally across the population of children, as child allowances.
* Scenario B: apply a proportional income tax of 10%, and then redistribute equally the generate revenue across the child population. In that case, the guaranteed universal income is equal to zero.

2.1 Using Stata, input the data (the eight observations), and then generate the variables:

* *pcincatA:* per capita post tax income with the scenario A;
* *pcincatB:* per capita post tax income with the scenario B;
* *pcuincA:* per capita universal income with the scenario A;
* *pcuincB:*  per capita universal income s with the scenario B;
* *pcallowA:* per capita child allowances with the scenario A;
* *pcallowB:*  per capita child allowances with the scenario B;
* *dpcincA:* per capita disposable income with the scenario A (*pcincatA+ pcuincA+ pcallowA*);
* *dpcincB:* per capita disposable income with the scenario B (*pcincatB+ pcuincB + pcallowB*).

**A: Done in the do-file.**

2.2 Using the DASP command *igini*, estimate the inequality in the distribution of the per capita disposable income for each of the two scenarios.

**A: Done in the do-file.**

2.3 Using the DASP command *diginis*, decompose the inequality in the distribution of the per capita disposable income for each of the two scenarios (remember that the three income sources are *pcincatA, pcuincA and pcallowA* for the scenario A and *pcincatB, pcuincB and pcallowB* for the scenario B)*.*

**A: Done in the do-file.**

2.4 Based on the results of 2.2 and 2.3, in which case will the set of transfer programs reduce inequality in disposable incomes the most? Why?

**A: Transfer program B reduces inequality in disposable incomes the most. This is because the guaranteed universal income does not re-distribute income at all and does not contribute to reducing inequality among households (same tax rate applied to all households and the guaranteed universal income is also distributed equally across population). The child allowances on another hand offer income re-distribution targeting households with more children, which are often poorer households.**

2.5 Estimate the change in the headcount poverty under the scenario B (with respect to the initial distribution) when the poverty line is 100 (use the DASP command *difgt*).

**A: Done in the do-file.**

2.6 With a poverty equal to 100, estimate the change in the poverty gap under scenario B (with respect to the initial distribution) (use the DASP command *difgt*). Discuss the found results in 2.5 and 2.6.

**A: Done in the do-file. The households that receive child allowances perceive some improvement in well-being, but this improvement is not enough to escape poverty. Households that were initially below the poverty line continue to stay under the poverty line, hence the unchanged level of headcount. The poverty gap index is reduced due to re-distribution of income from the rich to the poor.**

# Exercise 3 (3%)

* 1. Load the file data\_3, then initialize the sampling design with the variables *strata, psu* and *sweight*.

**A: Done in the do-file.**

* 1. Using the DASP ***ifgt*** command, estimate the headcount poverty when the measurement of well-being is the adult equivalent expenditures, and when the poverty line is equal to 21 000.

**A: Done in the do-file.**

* 1. Now, estimate the headcount poverty by population groups (defined by the sex of the household head) and discuss the results.

**A: Done in the do-file. The headcount poverty of female headed households is higher than that of male headed households. As shown in Stata, 37% of the female headed households are under the poverty line, compared to 30% of the male headed households. This finding is often seen in reality as female headed households are often constrained in the endowment of labor, capital and land compared to their counterparts.**