**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. Relative inequality compared to the mean is equal for both groups.

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. Inequality of the total population also takes into account the inequality between group 1 and group 2. The inequality of the total population is 0.481729, which is 0.058892 (i.e., the inequality between groups 1 and 2) higher than the inequality of group 1.

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. The income of both groups 1 and 2 changes by the same amount. So, it does not change the inequality between both groups.

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

**A:**

****

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

**A:** The income inequality of Inc1 is the highest (0.500000), followed by Inc3 (0.444444) and Inc2 (0.166667).



# 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: Please see 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:**

****

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:**

****

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:** Scenario B shows the highest reduction in inequality in disposable incomes. This is because the scenario B targets the transfer to support households with children. It effectively helps reduce the livelihood burdens of the households with high number of children.

Based on the results, the Child Allowances contribute to the reduction in inequality for both scenarios A and B. Hence, the result indicates that the Child Allowances is an effective program in reducing inequality.

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:**



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:**



Without child allowances, the poverty gap is: 0.1166667

With child allowances, the poverty gap is: 0.0616667

Child allowances reduce the poverty gap from 0.1166667 to 0.0616667 or by 0.055.

This difference is statistically significant at 10% level (i.e. P>|t| = 0.0858).

The households that receive child allowances perceive some improvement in well-being, but this improvement is not enough to escape poverty. This is what explains the unchanged level of headcount poverty. However, the poverty gap is reduced because an improvement in the well-being of the poor can decrease the poverty gap.

# Exercise 3 (3%)

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

**A:**

****

* 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:**

****

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

**A:**

****

The poverty headcount for the female-headed households is higher than the male-headed households and the whole population. This may imply that female-headed households are disproportionately more struggling than the male-headed households in moving out of poverty.