**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, multiplying all income by the same scale does not change the relative difference**

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, income does not remain the same to replication of the population**

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 ratio between the average income of the two groups are the same.**

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

**A:**

**For period 1:** The Entropy index for group 1 is 0.422837 with a standard error of 0.114650 and that of group 2 is also 0.422837 with a standard error of 0.114650. The population Entropy index is 0.481729 with a standard error of 0.155563

Each of the components between and within-group inequalities contributes by 50% to the total inequality.

**For period 2:** The Entropy index for group 1 is -0.000000 with a standard error of 0.000000 and that of group 2 is also -0.000000 with a standard error of 0.000000. The population Entropy index is 0.058892 with a standard error of 0.005921

Each of the components between and within-group inequalities contributes by 50% to the total inequality.

**For period 3:** The Entropy index for group 1 is 0.422837 with a standard error of 0.114650 and that of group 2 is also 0.422837 with a standard error of 0.114650. The population Entropy index is 0.422837 with a standard error of 0.081070

Each of the components between and within-group inequalities contributes by 50% to the total inequality.

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

**A: Gini\_inc1 = 0.500000**

**Gini\_inc2 = 0.166667**

**Gini\_inc3 = 0.444444**

Distribution 2 has more inequality, followed by distribution 3. Distribution 1 has better inequality compared to Distribution 2 and 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:  *Refer to 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: The results show that scenario A has a slightly reduced inequality in disposable income as the Gini estimate is 0.199790 compared to 0.181489 in scenario B. This implies that giving allowance to children together with universal income reduce inequality than allocating the tax to only child allowances**

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:**

**For scenario A:**

**pcincatA,**

Income share: 0.531078

Concentration Index: 0.395556

Absolute contribution to GINI: 0.210071

**pcuincA**

Income share: 0.283242

Concentration Index: 0.016667

Absolute contribution to GINI: 0.004721

**pcallowA**

Income share: 0.185681

Concentration Index: -0.080791

Absolute contribution to GINI: -0.015001

**For Scenario B:**

**pcincatB,**

Income share: 0.533597

Concentration Index: 0.381111

Absolute contribution to GINI: 0.203360

**pcuincB**

Income share: 0.000000

Concentration Index: 0.000000

Absolute contribution to GINI: 0.000000

**pcallowB**

Income share: 0.466403

Concentration Index: -0.046893

Absolute contribution to GINI: -0.021871

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 A is the one with the highest reduction in inequality in disposable incomes. This is because the program effectively targets both children and universal income which is according to hhsize.**

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:**

**Without child allowances, the poverty head count is : .3666667, With child allowances, the poverty headcount is : 0. Child allowances reduce the poverty head count from by .3666667. This difference is significant by at 10% significance level**

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: .1166667, With child allowances, the poverty gap is : 0. Child allowances reduce the poverty gap by .1166667 . This difference is significant by at 10% significance level**

**\*\*\*\*The results are showing that poverty measures agree that the distribution moves from the non-poor to the poor with enacting of allowance to children and reduces inequality**

# Exercise 3 (3%)

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

**A: refer to 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: 0.316088**

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

**A: Male=0.301265**

**Female = 0.370129**

**Total population poverty head count is 31.6% implying that these are total number of individuals below the poverty line. The results show that more females are poor compared to males. About 37% of females are poor while 30% of males are poor. This implys that there is income differentials between males and females.**