**Group 2: Production Externality**

**Introduction**

We will use the two agents’ general equilibrium model to find economics simulation.

The purposes of this project are intended to find labour input that maximize profit and maximized utilities for each economics agents.

**Economy:**

Variables:

* nc: Number of consumers in an economy
* npro: Number of producers in an economy
* ngp: Number of goods produced by each producer
* lc: Units of labour that each consumer has
* kc: Units of capital that each consumer has
* T: Technology for a producer
* A: Alpha, the production parameters for a producer
* lp: Units of labour used by each producer
* kp: Units of capital used by each producer
* externality: whether the externality exists or not
* p: random input a price list for each group

Consumers:

Once we have the utility of each good consumed in an array form, we want to maximize it. For that we need to calculate the total utility and to know the price for each good. Then, knowing the total amount earned from the factors and each consumers labour and capital units we can maximize the utility function.

(1) Agent 1:

(2) Agent 2:

Where is the quantities consumed by agent 1 or 2 on X or Y

Producers:

Where, wage rate

are price of goods x and that of good y

are labor input from agent 1 and 2

are production function on labor,

Then, to maximize the profit:

(1)

(2)

**Step 3. Under the labor input when every man maximizes total profit and the budget constraint, deriving maximized utility on purchasing x and y as follow:**

Agent 1 and 2 ‘s utility function:(the number 1.5 is an assumption number served as a “compensation” for buying the good they own produces, which says “a happiness or an accomplishment when consuming the goods produced by oneself)

Agent 1:

Agent 2:

Then, to maximize one’s utility under budget constraint:

(1) For agent 1:

Subject to

The maximized condition for agent 1:

(2) For agent 2:

Subject to

The maximized condition for agent 2:

**Real case:**

Our real case is based on two factories that produce different goods: the first factory paper boxes and the second reusable plastic boxes.

We also have two types of consumers: those who use disposable boxes, that is, paper boxes; and those who prefer plastic boxes to be able to give more than one use.

The two factories, by the simple fact of producing, generate waste that contaminates a river. This contamination is what we will understand as a negative externality of production