**Econ 464**
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# Notes on Monopolistic Competition

**(I)** Representative Consumer.

Utility Function:

$$u(q_1, q_2, \ldots\ldots) = \sum_{i=1}^{\infty} q_i^{\alpha}, \quad \text{where } 0 < \alpha < 1$$

Income (in labor units) : $$I = L + \sum_{i=1}^{N} \pi_i (q_i),$$

where $\pi_i (q_i)$ are the profits of a firm producing brand i and N is the number of brands produced.

**(II)** Firms.

All potential firms have an identical Increasing Returns to Scale technology:

Total Cost in labor units: $$TC_i (q_i) = F + c\, q_i \quad \text{if} \quad q_i > 0$$
$$= 0 \quad \text{if} \quad q_i = 0,$$

where F and c are positive constants.

**(III)** Autarky Equilibrium under Monopolistic Competition.

Is a set of prices, number of brands produced and quantity produced of each brand $\{N^*, p_i^*, q_i^*\ I=1, \ldots N^*\}$ such that:

(1) Consumers Maximize utility and Firms maximize profits.

(2) There is free entry of firms (i.e., profits are zero ).

(3) The labor market clears (i.e., supply of labor (L) equals demand for labor)

$$L = \sum_{i=1}^{N^*} ( F + c\, q_i ).$$

**(IV)** Market for goods clears

**Characterization and Computation of Equilibrium in Autarky**

**( A )** Utility maximization subject to the budget constraint implies that the elasticity of demand is:

$\eta$ = elasticity of demand = $1/ (\alpha - 1)$.

**( B )** Each firm will produce a different brand so there is a single producer of variety I. Profit

Maximization requires that Marginal Revenue (MR) equals Marginal cost. Since,

$MR = p_i [1 + (1/\eta)]$, we have that

$p_i [1 + (1/\eta)] = c$ and therefore

(*) $p_i^* = c / [1 + (1/\eta)] = c / \alpha$ .

Free entry requires that : $\pi_i (q_i) = p_i q_i - F - c q_i = 0$ , then

(**) $q_i^* = F / (p_i - c)$.

Using (*) and (**) , then

(***) $q_i^* = [\alpha / (1 - \alpha)] (F / c)$.

**( C )** We calculate the number of brands that will be produced using the labor market equilibrium condition and the fact that every firm will produce the same amount given by (***).

$$L = \sum_{i=1}^{N} (F + c q_i) = N (F + c q_i) = N [F + c [\alpha / (1 - \alpha)] (F / c)] = N [F / (1 - \alpha)]$$ , then

the equilibrium number of brands is:

$N^* = (1 - \alpha) (L / F)$

( D ) Market clearing:

Suppose there is a single consumer so for commodity i: the quantity he consumes is equal to the quantity produced by the only firm producing commodity i:

$q_i^C = q_i^P = q_i^* = [\alpha / (1 - \alpha)] (F / c)$.

**Example of Equilibrium in Autarky and Free Trade**

Let $\alpha = ½$.

Autarky for a single country: in this case : $\eta = -2$, $p_i^* = 2c$ , $q_i^* = F/c$ , $N^* = L / (2F)$.

Free trade with 2 identical countries: the prices and quantities of each brand are the same but now there are twice as many brands. So the number of varieties is $N^{*FT} = L / F$. Each consumer buys all the varieties and consumes an equal amount of each variety so it will consume half of the amount it used to consume of the available varieties.

Suppose there is single consumer in each country, then in autarky he consumes $q_i^{C*} = q_i^* = F/c$ and in free trade he will consume : $q_i^{CFT*} = q_i^* / 2 = F/2c$ . Notice that this is the case since the firm that produces variety I has a single customer in autarky and two customers in free trade.

The consumer has higher utility in free trade since:

$u(\text{free trade}) = N^{*FT} (q_i^{CFT*})^{½} = 2 N^* (q_i^* / 2)^{½} = 2^{1/2} N^* (q_i^*)^{½} > u(\text{autarky}) = N^*. (q_i^*)^{½}$ .