

# THE MONOPOLISTIC-COMPETITION MODEL OF THE NEW TRADE THEORY

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Utility of the representative consumer over (an endogenously determined number  $n$  of) differentiated goods  $x$ :

$$U = \sum_{i=1}^n x_i^\alpha, \quad 0 < \alpha < 1. \quad (1)$$

The condition on  $\alpha$  implies diminishing marginal utility, i.e. a “taste for variety”.

Labour is the only factor of production. Hence, labour income = GDP (= the economy’s budget constraint) is given by:

$$\bar{L} = \sum_{i=1}^n p_{x_i} x_i. \quad (2)$$

It can be shown in this context (by maximising (1) subject to (2)) that demand for one product variety is:

$$x_i = \frac{\bar{L}}{p_{x_i}^\sigma \left( \sum_j p_{x_j}^{-\alpha\sigma} \right)}, \quad \text{where } \sigma = \frac{1}{1-\alpha} > 1.$$

If there is a large number of firms, so that each firm cannot affect  $\left( \sum_j p_{x_j}^{-\alpha\sigma} \right)$ , the own-price elasticity of demand for  $x_i$  is given by:

$$e_i = - \frac{\frac{dx_i}{x_i}}{\frac{dp_{x_i}}{p_{x_i}}} = \frac{1}{1-\alpha} = \sigma$$

Firms are all assumed to produce a single differentiated good  $i$ . Their total cost functions are given by:

$$TC_{x_i} = F + (MC_{x_i})x_i.$$

Hence, firms’ cost functions are identical.

Firms' average cost function is:

$$AC_{x_i} = \frac{F}{x_i} + MC_{x_i}.$$

Firms' maximisation problem ( $MR = MC$ ,  $w = 1$ ) is:

$$p_{x_i} \left(1 - \frac{1}{e_i}\right) = p_{x_i} (1 - [1 - \alpha]) = p_{x_i} \alpha = MC_{x_i}. \quad (3)$$

We assume freedom of entry (i.e. monopolistic competition). Hence:

$$p_{x_i} = AC_{x_i} = \frac{F}{x_i} + MC_{x_i}. \quad (4)$$

From (3) and (4) we can solve for the equilibrium output for each firm, which turns out to be identical for all  $i$  (hence, we can drop that subscript):

$$x = \frac{\alpha F}{MC_x(1 - \alpha)}. \quad (5)$$

Firm size is independent from market size, but the number of firms is now determined by the size of the market (assuming full employment):

$$\begin{aligned} \bar{L} = n(MC_x x + F) &= n \left( \frac{\alpha F}{1 - \alpha} + F \right) = n \left( \frac{F}{1 - \alpha} \right), \\ \therefore n &= \frac{L(1 - \alpha)}{F}. \end{aligned}$$

Therefore, opening trade to an identical country must double the number of goods accessible to the home consumer, and opening to a number  $N$  of identical countries will multiply the number of goods by  $N$ .

Since all goods are produced in identical quantities (see (5)), we can write a home-country resident's utility in autarky as:

$$U^a = nx^\alpha,$$

where  $n$  is the equilibrium number of firms (and hence goods) in the home country.

If the home country completely opens trade with one identical partner country, utility becomes (where  $x$  now stands for the quantity consumed by a home-country resident in the autarky equilibrium):

$$U^{f_2} = (2n) \left(\frac{x}{2}\right)^\alpha = 2^{1-\alpha} n x^\alpha > U^a,$$

and if it completely opens trade with  $N > 2$  identical partner countries, utility becomes:

$$U^{f_N} = (Nn) \left(\frac{x}{N}\right)^\alpha = N^{1-\alpha} n x^\alpha > U^{f_2} > U^a.$$

- $\implies$  Free trade increases utility by offering a wider range of consumer goods.
- $\implies$  The larger the group of freely trading countries the better.
- $\implies$  Intra-industry trade exists.