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_i:

$$U = \sum_{i=1}^{n} x_i^{\alpha}, \; 0 < \alpha < 1. \tag{1}$$

The condition on α implies diminishing marginal utility, i.e. a "taste for variety".

Labour is the only factor of production. Hence, setting the wage rate to 1, labour income = GDP (= the economy's budget constraint) is given by:

$$\overline{L} = \sum_{i=1}^{n} p_{x_i} x_i. \tag{2}$$

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

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

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:

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

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

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

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

$$p_{x_i} = AC_{x_i} = \frac{F}{x_i} + MC_{x_i}. \tag{4}$$

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):

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

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

$$\overline{L} = n(MC_x x + F) = n\left(\frac{\alpha F}{1 - \alpha} + F\right) = n\left(\frac{F}{1 - \alpha}\right),$$

$$\therefore n = \frac{L\,(1 - \alpha)}{F}.$$

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:

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

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