Monopolistic Competition, Cost-Markup Pricing, Inflationary Pressures and Globalization

Suppose we think of a representative firm, with price $P$, output $Q$. Total revenue, $TR$, is given by

$$TR = PQ$$  \hspace{1cm} (1)$$

Marginal revenue is the change in $TR$ for a change in $Q$; using the product rule,

$$MR = \frac{\partial (PQ)}{\partial Q} = P + (\partial P/\partial Q)Q = P - sQ$$  \hspace{1cm} (2)$$

Then the slope of the demand curve is given by: $-s \equiv \partial P/\partial Q$

Define the demand elasticity $e$ as:

$$-e = \left( \frac{\partial Q}{\partial P} \right) \left( \frac{P}{Q} \right) = \left( \frac{1}{s} \right) \left( \frac{P}{Q} \right)$$

which is the same as:

$$s = \left( \frac{1}{e} \right) \left( \frac{P}{Q} \right)$$

Then substituting $s$ into the expression for $MR$ in (2) yields:

$$MR = P - sQ = P[1 - s \left( \frac{1}{P} \right) Q]$$

$$= P[1 - \left( \frac{1}{e} \right) \left( \frac{P}{Q} \right) \left( \frac{1}{P} \right) Q]$$

which, after substituting in for $e$, is:

$$MR = P(1 - 1/e) = \left( \frac{e-1}{e} \right) P$$

Setting $MR = MC$: 


\[ MC = MR = P(1 - 1/e) \]

and solving for \( P \) yields:

\[
P = \left( \frac{e}{e - 1} \right) MC
\]

Hence the price-cost markup is a function of the demand curve elasticity. Notice what happens if \( e \) is infinite; and if \( e \) is substantially less than infinite.

Now let the following describe marginal cost,

\[
\left( \frac{e}{e - 1} \right) = \lambda
\]

\[
MC = \left[ \left( \frac{W}{APL} \right)^\Gamma \times P_{\text{input}}^{\Gamma - \Gamma} \right]
\]

and think of this firm representing the whole economy: Then (3) can be rewritten as:

\[
P = \lambda \left[ \left( \frac{W}{APL} \right)^\Gamma \times P_{\text{input}}^{\Gamma - \Gamma} \right]
\]

where \( APL \) is average labor productivity, \( Q/N \). Log this equation,

\[
p = \ln(\lambda) + [\Gamma w \Gamma apl + (1 - \Gamma) p_{\text{input}}]
\]

Taking the derivative with respect to time, and holding constant the price-cost markup and \( APL \) yields:

\[
\pi = \Gamma(\Delta W/W) + (1 - \Gamma) \pi_{\text{input}}
\]

\[
= f(\hat{\gamma}, \hat{\pi}) + \pi^e + Z
\]

where

\[
\Gamma(\Delta W/W) \equiv f(\hat{\gamma}, \hat{\pi}) + \pi^e
\]

\[
(1 - \Gamma) \pi_{\text{input}} \equiv Z
\]

Notice that in (5), the familiar equation one obtains from the textbook requires several assumptions, including a constant price-cost markup, and constant \( APL \).

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