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Product Differentiation and Market Demand for
TNC in an emerging economy: The Case of
Indian Durable Consumer Goods Industries

WP 6 - 2001

**Product Differentiation and Market Demand for TNCs in an emerging economy:
The Case of Indian Durable Consumer Goods Industries**

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Abstract:

One of the important strategic decisions of TNCs in entering emerging markets is product differentiation in relation to growth in incomes and type of competition expected from local firms. This paper develops a simple theory in the context of the Indian economy that has opened up recently to competition. Being protected from potential competition in the pre-reform era, local incumbents do not have the usual incumbency advantages. Saddled with sunk costs in sub-international product lines, they cannot price-compete if new entrant TNCs position their product qualities sufficiently high. This and the fact that income growth swells the income of the middle classes are used to generate two hypotheses: 1. New entrant TNCs enjoy higher income elasticity for their products. 2. They face price elasticity similar to locals' unless there are too many TNCs competing in the same generic market. The hypotheses are tested on the basis of firm level panel data for five consumer durable goods industries.

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**Product Differentiation and Market Demand for TNCs in an emerging economy:
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1. Introduction

In entering an emerging economy, TNCs need to choose the right level of product differentiation. If selling products with identical quality, they are assured of stiff competition particularly in those markets where local firms are well-established with developed distribution networks. Even with higher production efficiency, winning through price competition is extremely costly if competitors have well-entrenched distribution networks. We will argue that the rapid growth of income in emerging countries, which expands the consumer markets for more income-elastic products, coupled with the fact that local incumbents are stuck with large sunk costs in their existing product lines, leads to a natural strategy of product quality choice for TNCs.

There is a small body of literature which attempts to apply industrial organization theory to international business issues (for example see Graham, 1998). There is also a large literature in international business, which gives importance to country specific institutional issues in understanding entry decisions of TNCs into emerging economies (Dunning, 1988; Luo and Peng, 1999; Beamish, 1998; Patibandla, 2001). Following these strands of the literature, we develop a simple argument to explain the choice of product quality and prices by newly entrant TNCs in the Indian economy. India presents an interesting case for this exercise because since the inception of economic reforms in 1991, GDP has been growing at an average annual rate of 6 percent. Secondly, there is a strong presence of local firms in most industries (Dawar and Frost, 1999).

In the literature on sequential entry, the incumbent is taken to have advantage over new entrants owing to lower cost and to lower price elasticity for its product relative to new entrants. Low cost advantage arises from accumulated learning economies in production internalized by the incumbent and lower price elasticity arises from consumer inertia, switching costs in consumption, and brand allegiance. Incumbents' advantage is further

enhanced by strategic pre-emptive activities that constrain entry and subsequent moves of later entrants (Schmalensee, 1978, Donnenfeld and Weber, 1992).

This perception of incumbency advantage needs qualification in the case of TNCs entering an emerging economy which was erstwhile under a protectionist regime. Indian markets became open to foreign companies only recently as a result of the reforms. Until then, these markets were protected by an industrial licensing regime that functioned as entry barrier (Ghemawat and Patibandla, 1999). Incumbents in domestic industries thus worked without much concern for potential competition². As a consequence, at the inception of reform their costs or product position in the quality space were not typical of incumbents modeled in the theoretical literature on sequential entry, where the fear of potential entry shapes the product differentiation strategy of an existing firm. Instead, we observe quality-price combinations more akin to monopolists or cartelised oligopolies. Besides, the pre-reform import-substituting package of the government protected domestic producers from imports as well, resulting in product quality below international standards (Bhagwati, 1993). Thus even though incumbents enjoyed a large domestic market, they did not generate significant brand loyalty that could be used against new entrant TNCs in the post-reform era. On the other hand, given the large size of the Indian market, incumbents had significant sunk costs in production capacity that would act against quick adaptation of product quality or product innovation in the post-reform era.

In this situation, potential entrants are not as seriously disadvantaged as in received theory. Also new entrants in our case are TNC's who have already developed and marketed elsewhere the products that they consider for the newly-opened market. Together these factors introduce an asymmetry to the advantage rather than disadvantage of potential entrants. For changing product specification or improving quality, an incumbent has to grapple with significant sunk costs in existing product lines. On the

² Industrial licensing protected local monopolies not only from international competition, but also from local competition. For a classic description of the licensing procedures and its role in deterring competition, see Bhagwati and Desai (1970).

other hand a TNC contemplating entry looks at the range of qualities in the product market as an *ex ante* choice without any sunk costs constraining it³.

Secondly the income growth process in emerging countries swell the number of households in the middle income groups faster. These groups comprise the lower end of the consumer durables market. For faster growth of market share, TNCs need to set their price/quality ratio such that they can attract the fast growing lower part of the market. Failing this, they would sell only to the higher income end of the market. That would mean that the TNC's market share grows more slowly than the incumbent's. We argue that this process of income growth in the market and the contrasting nature of cost curves of new entrants and incumbents determine the price/ quality ratio of TNCs.

The purpose of our paper is to use these specificities to explain the nature of demand faced by both local incumbents and TNCs for consumer durables market in India in the post-reform period. In section 2 we examine the choices regarding product differentiation or quality available to a new entrant TNC on the basis of typical relative cost situations of TNCs and incumbents. Then we analyse the potential entrants' decision about price/quality ratio on the assumption that they expect a rapid growth in consumer income. These considerations are used to generate two testable propositions in section 3. In section 4 we test these propositions using firm level panel data for Indian durable consumer goods industry. Section 5 concludes with some discussion.

2. Choice of Product Quality

1. Consider the generic market for a durable consumer item. We assume that the hedonic attributes underlying each product in this generic market are summarized by a scalar measure q called quality⁴.

Assume that average and marginal costs of production are increasing functions of quality. The incumbent's average cost, denoted $c_1(q)$ for producing one unit of each quality is shown by the curve C_1 in figure 1. A potential newcomer's average cost curve is shown

³ Incumbents however often have the advantage of a well-established distribution network. This enables them, in the short run, to compete with new entrant MNCs' higher quality products without lowering their prices.

⁴ Such measures are now commonly used following Mussa and Rosen, 1978, and the logic of comparing differentiated products by going back to more fundamental measurable attributes has been discussed in Rosen, 1974.

in figure 1 as C_2 , and the function is denoted by $c_2(q)$. Suppose at the start of the reforms the local incumbent, a monopolist or a cartelised oligopoly, was producing quality q_0 at price p_0 . The sale price p_0 in the protected pre-reform stage is shown in the figure as higher than the incumbent's average cost c_0 for quality q_0 , implying positive economic profit.

At the *ex ante* or capacity planning stage, a potential entrant's average cost curve is the envelope of average cost curves for different qualities, and is therefore flatter than the incumbent's, except in a close neighborhood of q_0 . Relative positions of C_1 and C_2 close to q_0 reflects the advantage of internalized economies of scale achieved by the incumbent before the newcomer's entry. C_1 increases slowly up to some $q_a > q_0$, and thereafter becomes steeper. This is to take account of the fact that given its technology and plant capacity, the incumbent can make neighborhood variations in quality without much additional cost. But beyond some quality q_a , average cost for higher quality products increases steeply.

2. Assume that potential consumers have identical preferences but are differentiated in terms of income, y . They each buy one unit of the product or none at all⁵. If one unit of the product of quality q is sold at price p , the consumer surplus of a buyer of income y is $S = yq - p$. This surplus function implies that consumers are vertically differentiated⁶.

Assume that income is continuously distributed with density $f(y)$ over the range (\underline{y}, Y) . When quality q_0 is offered at price p_0 , all buyers for whom $S = yq_0 - p_0 \geq 0$, are expected to buy the product. Thus all potential buyers for whom $y \geq p_0/q_0$ are expected to make a purchase, unless there is another product offering higher S . Therefore in the pre-reform stage the incumbent, selling a quality q_0 at price p_0 faces a market size $\int_{p_0/q_0}^Y f(y)dy$.

3. A potential entrant takes the cost function of the incumbent and its own *ex ante* cost function as given and known, and chooses a quality range and price. Since quality

⁵ It is quite natural to assume this for a durable goods market. For useful discussion of this, see Gabszewicz and Thisse, 1979.

⁶ Utility functions that permit such differentiation were introduced by Gabszewicz and Thisse, 1979 and issues related to vertical differentiation have been extensively discussed in Gabszewicz and Thisse, 1986.

decision implies committing to a plant size, the TNC makes an assumption about the long run response of the incumbent, namely that in the *long run* the incumbent can be forced to price-compete, either by intense advertising effort or by developing the TNC's own distribution network.

To examine how the TNC chooses product quality, we partition the quality axis into three segments: $q < q_0$; $q_0 \leq q \leq q_a$; $q_a < q$. Since quality q_0 is below international standards, products below q_0 cannot be exported, and thus reduce the future marketing options for the TNC. So the segment $q < q_0$ is ruled out. In the next segment, $q_0 \leq q \leq q_a$, the incumbent has a short run cost advantage. Thus the newcomer is left with the third segment, $q_a < q$ to build capacity, if at all.

Within this quality range, the TNC can set either, $p/q > p_0/q_0$ or $p/q < p_0/q_0$ with two different market implications.

(A) $p/q > p_0/q_0$: TNC's product breaks even with buyers at $y = p/q$, which is higher than p_0/q_0 . So the consumer surplus from the incumbent's product remains higher than that of the newcomer for income lower than $y' = (p-p_0)/(q - q_0)$. Therefore the market is partitioned at this point (see Figure 2, left panel). Market shares of the incumbent and the newcomer would be respectively $\int_{p_0/q_0}^{y'} f(y)dy$ and $\int_{y'}^y f(y)dy$ as shown in figure 3. Thus in this case the entrant TNC ends up occupying only the higher end of the market.

(B) $p/q < p_0/q_0$: TNC's product breaks even with buyers at $y = p/q$, which is lower than p_0/q_0 . Therefore the TNC not only competes in the entire market but also extends the market to a group of customers with lower income (see right panel, Figure 2).

In response to the new entry, the incumbent may not reduce price immediately and rather use its distribution network to continue to market q_0 at price p_0 . But the entrant assumes that through intense advertisement and by developing its own distribution network, it can force the incumbent to price-compete in the long run. In that case the lowest price the incumbent can afford is c_0 . The TNC has to choose its capacity today so that it can keep its p/q below c_0/q_0 in the long run. Initially it begins by setting $p/q < p_0/q_0$, and as the incumbent reduces its price, the TNC also reduces price keeping its p/q ratio always lower than the incumbent's. From figure 1, we can see that the newcomer can afford to

do this only for the range of qualities between q_a and q_b . Between these points the newcomer's average cost to quality ratio is less than that of the line L. Qualities beyond q_b have an average cost that does not allow them to be sold at a price satisfying $p/q < c_0/q_0$ without loss. Thus if the TNC wants to compete for the entire market and not occupy only the higher end of it, its quality choice can not be far away from the quality sold by the incumbent.

In this case TNC sells to a lower segment of the market where the incumbent can not sell, and in the rest of the market they compete- the TNC with lower price /quality ratio, and the incumbent with its distribution network.

3. Testable Hypotheses

We hypothesize that in Indian consumer durables markets, TNCs opt for competing in the entire market rather than cutting out a niche at the upper end of it, by offering lower price/quality ratio than incumbents. Since quality as a variable features in the hypothesis, it cannot be directly established. Before proposing a test based on observable variables, we state the informal reasons that suggest this hypothesis as a *prima facie* possibility.

Features of the income distribution for households comprising the Indian consumer durables market makes it more likely that TNCs would choose the said price/quality option. The relevant income range comprises relatively high-income households (top 8 to 10 per cent of income earners). Over this range income distribution is relatively denser towards the lower end. The higher end featuring very high income has relatively lower density. Also households with very high income often buy their durables from outside the domestic market, reducing the effective density of this part further.

Additionally, over the last decade GDP has grown at an annual average rate of 6.0 percent. Most of this income growth has swelled the size of the middle class, located at the lower end of the consumer durables market (Natarajan,1998)⁷. It implies that the density $f(y)$ is higher and also increasing faster for lower values of y in the consumer durables market. This trend is expected to continue in the medium run.

⁷ This study by National Council for Applied Economic Research (NCAER), which surveyed a sample of 300,000 households in India, shows that the number of households with an annual income exceeding Rs. 0.5 million at 1995-6 prices increased from 0.2 million in 1993-94 to 0.35 million in 1995-6 with a 33.8 per cent growth. The number of households with an income of Rs. 1 million doubled while Rs. 5 million-a-year households increased by two and half times.

In this market, an entrant who partitions the market and takes a position at the relatively higher end ($p/q > p_0/q_0$) will face a slower growing market than the incumbent. Thus for a potential entrant with a reasonably long horizon, we might expect the choice $p/q < p_0/q_0$.

Casual observations in the market place also suggest that the TNC products are not priced away for the higher niche of the market. Similarly media advertisements by TNCs and local incumbents appear to have the same target groups.

If the hypothesis is true, then we expect the TNCs to have a higher income elasticity of demand for their products compared to local incumbents. As explained in the last section, in this case while TNC and the incumbent compete in one part of the market and face similar demand situation, in the lower end of the market it is the TNC alone who sells. Any given aggregate growth of income swells this latter part of the market more, thus making TNC's market demand more income elastic than the incumbent's.

Difference in the price elasticity of demand faced by the two is not as clear-cut. In the part of the market where both the TNC and the incumbent are selling, unit price increase by the incumbent makes him lose a larger group of customers because its quality is poorer. But while the TNC would lose fewer customers in this part of the market, it will also lose some additional customers in the lower part of the market where it alone sells. The net effect can be precisely worked out if the prices p and p_0 are given, but in general the effect is indeterminate. However the effect is tractable if there are a number of TNCs operating in the market. In that case it is likely that the competing TNCs will face higher price elasticity. The reason is that on price increase each TNC loses customers out to other TNCs whose product quality is close to its own and provides near substitutes. This added to similar losses in the lower end of the market too, will be larger than the sale loss of an incumbent on price increase. We would therefore expect that in industries with a larger proportion of TNCs, they face price elasticity larger than incumbent's.

We now propose two hypotheses in statistically verifiable form:

Hypothesis 1: TNCs face larger income elasticity of demand than local incumbents.

Hypothesis 2: TNCs face larger price elasticity than incumbents if the proportion of TNCs in the industry is large.

4.1 Empirical Analysis

The two hypotheses are tested by estimating separate loglinear demand functions for each industry. The demand function allows for difference in income and price elasticity between TNCs and locals by using binary variables which take value zero for locals and 1 otherwise. The equation estimated is

$$\log Q = \alpha + \beta_1 \log Y + \beta_2 \log P + \beta_3 D * \log Y + \beta_4 D * \log P + \varepsilon$$

where Q = quantity sold, Y = consumer income proxied by GDP, P = price, D is a binary variable and ε is a random error term with usual properties.

For hypothesis 1 to be non-rejectable we require the estimate of β_3 positive and significant. For hypothesis 2 to be non-rejectable we require the estimate of β_4 to be negative and significant in industries where the proportion of TNCs is large.

4.2. Data and Empirical Results

Firm level panel data were collected for five consumer durable industries for the period 1990 to 1999 from the publications of the Centre for Monitoring the Indian Economy (CMIE) on the Indian corporate sector. These industries are Air-conditioners (A), Motor Cycles (M), Passenger Cars (P), Refrigerators (R), and Washing Machines (W). We use data on these five industries because we could identify only five consumer durable industries where there has been new entrant TNCs with a few years of operation in the Indian market. Firms with foreign equity above 40 per cent have been treated as MNC subsidiaries⁸. CMIE data presents a complete coverage of the corporate sector, and the data for these industries represents the whole population in these industries. Table 1 provides information on the number of firms and new entrant TNCs in these industries. In two industries, passenger cars (P) and motorcycles (M) the number of TNCs are fifty per cent or more of the total number of units in the industry.

The data on prices for each firm has been generated by dividing sales revenue by the number of units sold. Since products are differentiated, absolute values of prices and quantities across firms are not comparable. This is why the demand function used for estimation is in exponential form, which is converted to a loglinear form for estimation.

⁸ Maximum permissible foreign equity holding has increased generally since the reforms started. We adopt the 40 per cent definition because that was the threshold at the beginning of our sample period.

Panel data has several advantages for our exercise as it utilizes information on both the inter-temporal dynamics and the individuality of firms (Cheng, 1986). In particular, recall that our hypothesis about the income elasticity of demand is based on income growth over time.

The log linear demand functions estimated for the sample industries are reported in Table 2. The results are statistically significant. The statistically significant negative and positive signs of the estimated coefficients of the price and income variables imply that the demand function is well identified. Estimated coefficients for $D \cdot \log Y$ are positive and significant in all industries. This provides strong support to our first hypothesis.

Estimated coefficients for the interactive term $D \cdot \log P$ is negative and significant only in two industries P and M, and is insignificant in all others. As stated earlier, fifty per cent or more units in these two industries are TNCs. In other industries the proportion is much lower. This provides a strong evidence for our second hypothesis.

5. Conclusion

In this paper, we have developed a simple theory of strategic choices of TNCs in product differentiation and price setting in an emerging economy, which has recently opened up to competition. We assumed that entry choice is made with the knowledge of future growth in incomes and the product choices that were already made by incumbent local firms in the past. We argued that new entrant TNCs enjoy higher income elasticity for their differentiated products than local firms given the typical nature of incumbents' technology and the income growth process. TNCs in general face the same price elasticity unless too many TNC units enter the same generic market. The empirical results provide significant support to these hypotheses.

Essentially we focused on two different elements of the emerging economy scenario. The first is that incumbents have a large sunk cost in pre-existing product lines which disables them from competing effectively if TNCs introduce sufficiently higher qualities. Secondly, having ensured that incumbents cannot price-compete against the higher qualities, TNCs can aim to compete for the whole market and even further extend it by offering lower price/quality ratio than incumbents. This latter strategy of pricing becomes

attractive given the rapid income growth and concentration of that growth at the lower end of the durable consumer goods market.

Arguments used here are quite distinct from those in standard models of strategic entry in a competitive market, where incumbents have significant advantage. The argument is expected, *a priori*, to hold in many emerging countries with a rapid income growth process and an earlier history of import substitution and protection. On the other hand the argument evidently does not hold in a country where industry has remained open to foreign investment for a long period, even if it is an emerging economy. It may be worthwhile to explore in future research how general the process is.

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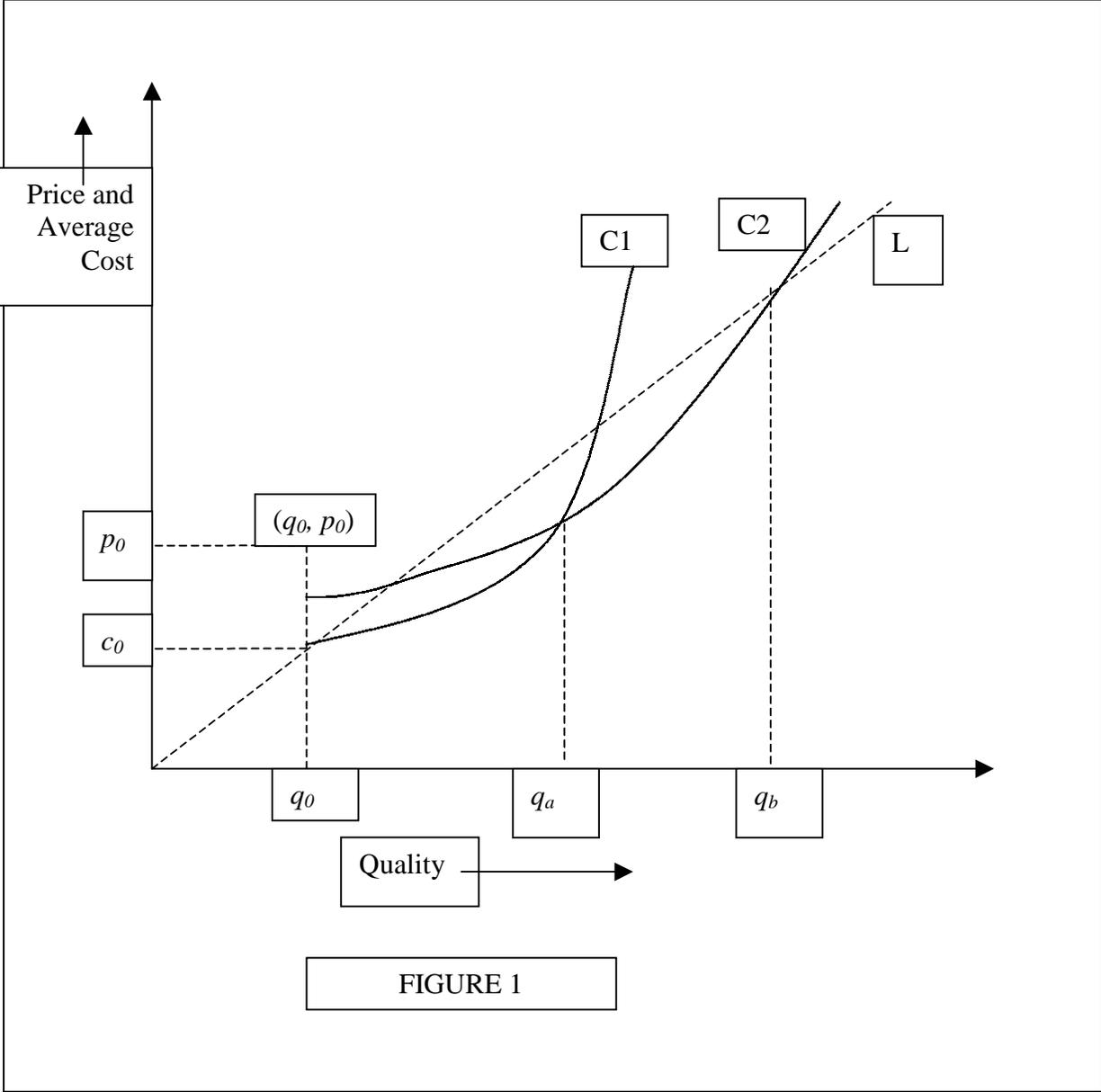


FIGURE 1

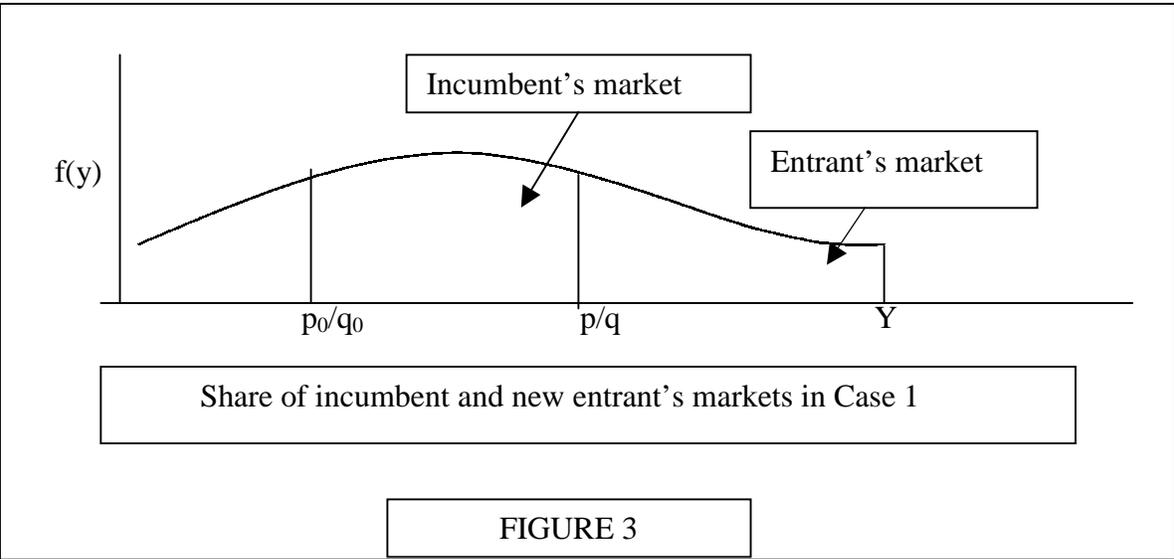
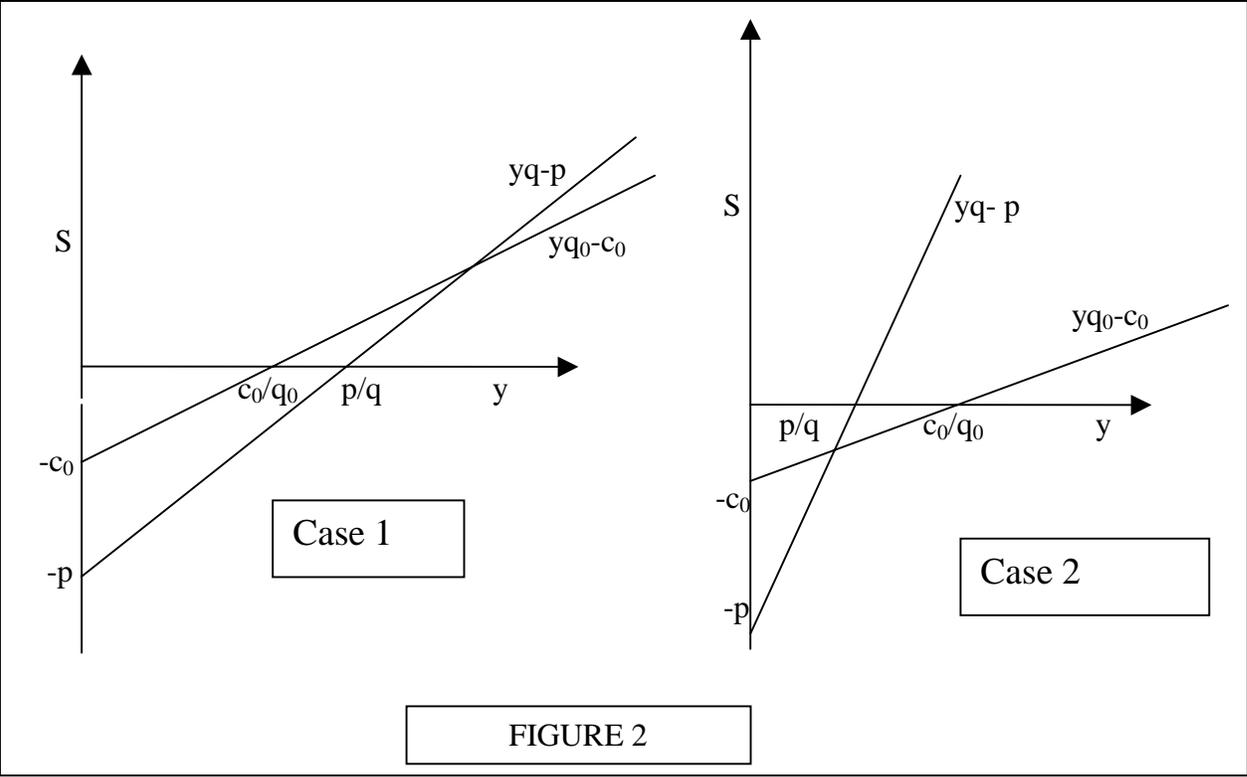


Table 1. The Sample

Industry	Total number of firms	Number of TNCs
A	5	1
M	4	2
P	9	5
R	4	1
W	5	2

Table 2: Log Linear Demand Functions

Dependent Variable: log Q

Industry	Constant	Log P	Log Y	D* logY	D*log P	Adjusted R ²
A	1.3 (1.2)	-0.56 (6.9)*	0.82 (4.5)*	1.68 (3.3)*	-1.1 (0.2)	0.92
M	-10 (7.5)*	-0.8 (1.8)**	1.4 (5.3)*	1.0 (2.8)*	-1.5 (2.0)*	0.93
P	-6.1 (1.8)**	-0.2 (0.4)	0.5 (1.0)	2.2 (2.8)*	-1.2 (1.6)**	0.78
R	-4.1 (4.1)*	-1.4 (10)*	1.4 (8.1)	0.4 (2.2)*	-0.6 (1.0)	0.90
W	-8.6 (4.0)*	-2.0 (15)*	1.3 (3.5)*	0.6 (8.1)*	1.0 (3.9)	0.95

Figures in the parentheses are *t* values.

* significant at 0.01 and ** significant at 0.05 levels.