International Journal of Business and Management Invention (IJBMI)
ISSN (Online): 2319 – 8028, ISSN (Print): 2319 – 801X
www.ijbmi.org || Volume 6 Issue 12 || December. 2017 || PP—60-64

Market Structure of the Indian Computer Industry And Cynicism Layoff

Kalpita Ray*,ByasdebDasgupta**
**Research Scholar, Dept. of Economics,University of Kalyani,Nadia,WB*
***Professor,Dept. of Economics,University of Kalyani,Nadia,WB*
*Corresponding Author:Kalpita Ray**

Abstract:*Automation isthe buzzword of the future of our Indian computer industry. The strategic behaviour of Indian IT firms is to generate profit by substituting Indian IT employee with foreign expertise and generate insecurity among them. The objective of this paper is to test the market structure of the Indian computer industry and try to understand the recent incidence of shedding of IT workers in India. The nature of market structure reveals that the Indian computer industry is oligopolistic in nature and the strategic behavior of Indian computer Industry in terms of the PR statistics estimate reveals that the decision to lay off IT workers in recent time is deeply associated with the market structure of the industry.*

Keywords:*Market structure*
JEL classification: L1, L860

Date of Submission: 25-11-2017 Date of acceptance: 14-12-2017

I. INTRODUCTION

The Indian computer industry contributes significantly in the growth of national income in terms of export earnings. The industry intensifies employment opportunity of the country. At present the industry is not only reducing its capacity to employment generation but haslaid offa large number of employees. Automation and US H1-B Visa program for skilled workers as a part to tightening the US immigration policy makes the situation worse off. Enormous computer firms of India announce to replace Indian employees with US local workers at the new branch in US. This situation is threatening to the Indian IT workers. They are workingin an atmosphere of insecurity. Insecurity implies no assurance of opportunity and outcome in the variability of circumstances. In fact, insecurity engenders fear of job loss, generates stress and invokes absenteeism, premature retirement and lower wages. Intra industry trade in computer industry between India and US is largely composed of two way exchanges of fairly similar goods i.e. labour.

In fact, this trade is based on increasing return by exploiting scale economy. Economies of scale in production indicate market is not perfectly competitive. In most perfectly competitive models, itis assumed that production takes place with constant returns to scale (i.e. no economies).In fact, by changing the assumption it provokes the possibility of positive profits and strategic behavior among firms i.e. imperfect competition. On the contrary,under the perfectly competitive market intra industry trade can take place. The trade pattern depends on the interaction of demand uncertainty and risk aversion between two countries. Alike, the fundamental theory of James Tobin; "not putting all the eggs in one basket", a producer can condense the risk they face by placing the eggs in additional foreign baskets through trade in the presence of smaller transportation cost. However, the result is similar for the risk averse firm which controls a plant in home country as well as operates in high cost foreign firm in abroad. (Cukrowski; Aksen, 2001).

Therefore, the objective of the paper is to determine whether the Indian computer industry is involved in intra industry trade due to exploitation of economies of scale or diversify the riski.e. either Indian IT firms have some market power or they are perfectly competitive in nature. In fact, we have to quantify the nature of market structure of theIndian computer industry. We have also discussed the socio economic condition of Indian IT employees in the present epoch. We have applied the Panzar and Rose (P-R)(1987) model to test the market competitiveness empirically. The remaining paper is organized as follows; section II discusses the literature on market structure, sectionIII states the PR model, section IV depicts data and its related findings.

II. LITERATURE REVIEW

There exists ample of literature study on market structure of computer industry. Technological innovation and change in business organisation is a key characteristic of computer industry. On the contrary, an innovative firm tends to enjoy some sort of market power. In case of a computer industry, a potential entrant generates new market segment (e.g. Personal Computer) by engendering major innovation (microprocessors) without entering into direct competition with dominant, diversified, established firm in mainframe computer segment. Thus, new entry threat comes from complementary products rather than substitute commodities. Teece (1986) points out that the capability to protect ownership of innovation affects vertical integration. When it is difficult to protect new patent-driven-technologies, vertical integration in manufacturing units simplifies the protection of that knowledge. On the contrary, the established manufacturer forms a barrier to entry by exclusivity dealing, long term contract with retailers etc. Such contract forces new manufacturers to set up their own distribution network which is costly to a new manufacturer. This deters him an entry. Price protection is a commonly used practice between manufacturers and retailers in the personal computer (PC) industry. This is motivated by drastic declines of product values during the product life cycle. Consequently, price protection has two primary impacts: (1) shifting sales forward in time and (2) increasing total sales. This benefits the retailers but upsets the manufacturers simultaneously (Lee, Padmanabhan, Taylor, Whang; 2000). However, these arguments are strongly criticized by Bresnahan and Greenstein (1999). They argue that the vertically disintegrated platforms have led to divided technical leadership in important market segments. This leads to a far more technically competitive computer industry. Nowadays, technological proximities are considered as one of the firm level strategies of being forced to threaten a broader array of competitors in this sector. A case study by Hagedoorn, Carayannis, Alexander (2001) on the alliances between two competitive companies like IBM and Apple in early 1990s was largely directed towards new technological development. The purpose of the partnership of joint R&D was to capture the market share and influence the market structure. (Khanna, 1995; Bresnahan, Greenstein, 1999; Hagedoorn, Carayannis, Alexander, 2001; Malarba, Nelson, Orsenigo, 2006). Above literature do not focus on market structure and distribution to labour share in Indian computer industry.

III.METHODOLOGY

The PR theory proposes two separate notions. Firstly,suitable method for analysis is an assessment of reduced form with providing specific attention to the coefficients of factor prices w_t. Secondly, the reduced form revenue equation is observed as well as estimated in any circumstances. No quality correction and no tricky data problem affect the reduced form revenue equation. On the contrary, price and quantity variable depends on market environment. PR statistics is H statistics which is defined as the sum of the elasticities of reduced form revenues with respect to all factor prices.

Now we shall present the above notion through the following set of equations:

Let y be a vector of decision variable including output, prices, advertising expenditure or quality levels, which affect firm's revenue. Then the revenue function of the firm is expressed as: R = R(y, z)
We also assume z to be a vector of exogenous variables and is held responsible for shifting revenue functions.
Then the firm's cost function is expressed as:
c = c(y, w, t)

Where, w: is a vector of m factor prices that are exogenous to the firm.
t: is the vector of exogenous variables and responsible for shifting the cost function.
Firm's profits can be expressed as:

$$\pi = R - c = \pi(y, z, w, t)$$

$$\text{Let } y^0 = \text{argMax}_y\{\pi(y, z, w, t), \quad \text{where } y^0 = y(w_1, w_2 \dots \dots \dots w_m)$$

$$y^1 = \text{argMax}_y\{\pi(y, z, (1+h)w, t), \quad y^1 = y\big((1+h)w_1, (1+h)w_2 \dots \dots \dots (1+h)w_m\big)$$

With scalar $h \geq 0$

$$R^0 = R(y^0, z) = R^*(z, w, t)$$

$$R^1 = R(y^1, z) = R^*(z, (1+h)w, t)$$

R^* is firm's reduced form revenue function. Then by definition,

$$R^1 - c(y^1(1+h)w, t \geq R^0 - c(y^0, (1+h)w, t) \dots\dots. (1)$$

Or, $$R^1 - (1+h)c(y^1, w, t) \geq R^0 - (1+h)c(y^0, w, t) \quad (2)$$

Because c, is linearly homogeneous function of w.

Or, $$R^0 - c(y^0, w, t) \geq R^1 - c(y^1, w, t) \quad (3)$$

Multiplying both side with (1+h), we get:

$$(4)\quad (1+h)R^0 - (1+h)c(y^0,w,t) \geq (1+h)R^1 - (1+h)c(y^1,w,t)$$

Now by adding (1) + (4), we get:

$$R^1 + (1+h)R^0 - (1+h)c(y^1,w,t) - (1+h)c(y^0,w,t) \geq R^0 + (1+h)R^1 - (1+h)c(y^0,w,t) - (1+h)c(y^1,w,t)$$

$$\text{or,}\quad R^1 - (1+h)R^0 \geq R^0 - (1+h)R^1$$

$$\text{or,}\quad R^1 - (1+h)R^1 \geq R^0 - (1+h)R^0$$

So we get, $-h(R^1 - R^0) \geq 0$

$$\text{or,}\quad (5)\ (R^1 - R^0)/h \leq 0$$

Thus, $\{R(y^1,z) - R(y^0,z)\}/h \leq 0$

For two factor prices:

$$\frac{[R^*(1+h)w_1,(1+h)w_2] - R^*(w_1,w_2)}{h} \leq 0$$

We assume that reduced form of revenue equation is differentiable, so the above equation can be expressed as:

$$\frac{\partial R^*[(1+h)w_1,(1+h)w_2]}{\partial h} \leq 0$$

$$\text{or,}\frac{\partial R(h)}{\partial h} = w_1\frac{\partial R^*[(1+h)w_1,(1+h)w_2]}{\partial w_1} + w_2\frac{\partial R^*[(1+h)w_1,(1+h)w_2]}{\partial w_2} \leq 0$$

Taking limit $h \to 0$ in the above equation, we get: H, the Rosse-Panzar statistic:

$$\lim_{h\to 0}\frac{\partial R^*}{\partial h} = \lim_{h\to 0}[w_1\frac{\partial R^*[(1+h)w_1,(1+h)w_2]}{\partial w_1} + w_2\frac{\partial R^*[(1+h)w_1,(1+h)w_2]}{\partial w_2}] \leq 0$$

$$\text{or,}\quad w_1\frac{\partial R^*}{\partial w_1} + w_2\frac{\partial R^*}{\partial w_2} \leq 0$$

$$\text{or,}\quad \frac{1}{R^0}\lim_{h\to 0}\frac{\partial R^1}{\partial h} = \frac{w_1}{R^*}\frac{\partial R^*}{\partial w_1} + \frac{w_2}{R^*}\frac{\partial R^*}{\partial w_2} \leq 0$$

$$\text{or,}\quad H = \lim_{h\to 0}\frac{1}{R^*}\frac{\partial R^*}{\partial h} = \frac{w_1}{R^*}\frac{\partial R^*}{\partial w_1} + \frac{w_2}{R^*}\frac{\partial R^*}{\partial w_2} \leq 0$$

Therefore, $H = \sum w_i(\partial R/\partial w_i)/R^* \leq 0$

Thus we have proved that the sum of the factor price elasticities of monopolistic reduced form revenue equation must be non-positive.Thus the intuition of the result states that the percentage change in equilibrium revenues that would follow from owing to one percent increase in all the factor prices. This one percent increase in the entire factor prices shifts the marginal cost upward by one percent. H statistics reveals that the change in equilibrium revenue is due to one percent increase in cost. According to microeconomic theory, optimal revenue of monopoly firm always falls under elevating cost condition.In a similar manner we can prove that the value of H statistic for monopolistic competition and Oligopoly firms shall lie between 0 and 1, whereas for perfect competition the value will be equal to 1. In case of a perfectly competitive firm produce,the output is at the minimum point of average cost curve. Thereby, an increasein thecost by one percent shifts the average cost curve upward by the same proportion without changing the level of output. At the firm level,revenueshifts proportionately to the cost at equilibrium in the long run. Thus, H statistics in perfectly competitive industry is equal to one.

The reduced-form revenue function is estimated from the following equation:

$$\log TR = \alpha + \beta_1(\ln W_1) + \beta_2(\ln W_2) + \beta_3(\ln W_3) + \beta_4(\ln W_4) + \beta_5(\ln W_5) + \gamma(\ln TA) \qquad (6)$$

For simplicity the equation 6, is modified in the following manner, wherein the value of β_1 in equation 7, represents the H statistics. (Shaffer, 2004)

$$\log TR = \alpha + \beta_1(\ln W_1) + \beta_2(\ln W_2 - \ln W_1) + \beta_3(\ln W_3 - \ln W_2) + \beta_4(\ln W_4 - \ln W_3) + \gamma(\ln TA_{i,t}) \qquad (7)$$

To measure the distribution of revenue income among the four factor of production labour, land, capital and entrepreneur we have estimated the following equation as:

$$\log TR = \alpha + \beta_1(\ln W_1) + \beta_2(\ln W_2) + \beta_3(\ln W_3) + \beta_4(\ln W_4) \qquad (8)$$

IV. DATA AND NUMERICAL FINDINGS

In this paper, we have applied the firm level secondary data from Prowess database and RBI data base to estimate the model. The model is projected on the data of 18 Indian computer firms from 2000-01 to 2016-17 years. The independent variables are per unit prices of four factors of production. Price of labour: wages (W_1) and salaries, price of land: rent (W_2), price of capital i.e. dividend paid to shareholders who invests in business (W_3) andprice of entrepreneur in terms of profit(W_4). We consider gross fixed asset (TA) as a control variable and per unit sales revenue as dependent variable (TR). To measure the elasticity, we have used all the variables in per unit term. Due to lack of data on employment, land, capital and business owner, we have applied asset as a proxy variable to generate price of per unit factor cost. To estimate the panel dataset we have used balance panel regression technique by using SPSS17 statistical software.

Table-1 system estimation result:

Year	A	β_1	β_2	β_3	β_4	γ
2000-2016	1.513 (0.00)	0.826 (0.00)	0.474 (0.00)	0.353 (0.00)	0.340 (0.00)	0.00 (0.17)

Source: Author's own calculation

Table-2 test of market structure:

Value of H statistics	Perfect competition	Monopoly	Oligopoly
2000-2016	Rejected	Rejected	Accepted

Rejected at 5 % level of significance

Table-3 revenue share distribution:

Year	A	β_1	β_2	β_3	β_4
2000-2016	1.513 (0.00)	0.353 (0.00)	0.121 (0.00)	0.12 (0.561)	0.341 (0.00)

Source: Author's own calculation

The result states that Indian computer firms are not perfectly competitive. They are strategically related as $0 < \beta_1 < 1(T\text{-}1)$. The recent incidences also support these findings and observations. All Indian firms follow the decision of barometric firm to substitute foreign personnel instead of domestic less updated experienced labour. They are not interested to invest for retraining them because the IT industry is now moving towards highly autonomous technology. Surprisingly the distribution of one unitincrease in income from sale or revenue is distributed nearly in the similar way between return to per unit labour or wages (0.35) and return to entrepreneurs in terms of profit (0.34) as shown in T-3. This is because fall in profitability of Indian computer firm due to external volatile economic conditions. This is a reasonable condition to replace Indian IT employee with foreign IT expertise besides the tightening immigration policy of US. These circumstances lead to an overall situation of damage and despairin the socio economic condition of IT employees. The layoff of 10-20% experienced workers at the time of business slowdown is almost like 'shed out extra fat 'without considering that they have family to support (Business Today).

V. CONCLUSION

The paper estimates market structure of the Indian computer industry in the situation of a threat to the IT employees. In the wave of automation and US H1 B visa policy, IT firms are obliged to recruit foreign labour not only to diversify the risk in the situation of demand uncertainty but also to exploit economiesof scale. Perhaps, the Indian computer industry is oligopolistic in structure. The market structure is measured by applying PR model. PR statistics or H statistics is defined as the sum of elasticities of reduced form revenue equation with respect to factor price. Our data set reveal that Indian computer industry is oligopolistic in nature as the values of elasticity falls between $0<H<1$. Strategic interaction among the firm may depict the activities of rivalry. If a rival firm decides to increase profit, then the firm also sets its strategy to maximize profit. Ultimately, theshift towards automation and foreign expertise replace domestic IT employee. They become insecure of being dismissed from job.The liberalization periodinvoking integrity to intensifying insecurity is in the ascending. Social relationship family values and morality are now associated with market ethics of individualism and efficiency. The ramification of intensifying the insecurity becomes more visible. In the present situation, it is essential to implement new form of regulation and protection.

REFERENCES

[1]. Cukrowski J., E. Aksen.2001. "Perfect competition and intra industry trade"
[2]. Cohen M.W., R.Levin.1989. "Empirical Studies of Innovation and Market Structure" in R. Schmalensee and R.D.Willig(eds.), Handbook of Industrial Organization, Elsevier Science Publishers, Amsterdam, The Netherlands
[3]. Duystera G., J. Hagedoon.2000. "Core competences and company performance in the world-wide computer industry" The Journal of High Technology Management Research, 11(1):75-91.
[4]. Hagedoorn J., E. Carayannis, Jeffrey Alexande.2001. "Strange bedfellows in the personal computer industry: technology alliances between IBM and Apple" Journal of Research Policy, 30:837-849.
[5]. Kahneman D, Jack L. Knetsch, R Thaler.1986. "Fairness as a constraint on profit seeking: entitlements in the market", The American Economic Review, 76(4):728-741
[6]. Khanna T.1995. "Racing behavior Technological evolution in the high-end computer industry" Journal of Research Policy, 24:933-958.
[7]. Malerba F. R Nelson, L .Orsenigo and S. Winter. 2006. "History-friendly' models of industry evolution: the computer industry"Oxford Journals of Social Sciences on Industrial and Corporate Change, 8:3-40.
[8]. Panzar C.J.1989. "Technological determinants of firm and industry structure" in R. Schmalensee and R.D.Willig (eds.), Handbook of Industrial Organization, Elsevier Science Publishers, Amsterdam, The Netherlands.
[9]. Standing G.2002. Beyond the new paternalism, Verso, London, New York
[10]. Teece, D.J. 1986. "Firm organization, Industrial structure and technological innovation"
[11]. Tirole J.1988. The Theory of Industrial Organisation, MITpress,Cambridge

Kalpita Ray*. "Market Structure of the Indian Computer Industry and Cynicism Layoff." International Journal of Business and Management Invention, vol. 06, no. 12, 2017, pp. 60-64.