ECONOMICS OF PRIVATE SCHOOLING INDUSTRY IN KOHIMA, NAGALAND (INDIA)

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I. The System of Private Schools as an Industry: The present study is concerned with an analysis of the "*enterprise of providing for schooling by the private sector*" to those who are ready to pay at much higher rate for the services that otherwise (and conventionally) are imparted at a very cheap rate by the system of schools run by the government in India. Since the last three decades or so, many towns in India have experienced the flourishing of private schools of various types. It has been observed that there is an ever growing demand for private schooling in almost all states in India and the enterprise of private schooling has established itself so well that it has now assumed the characteristics of a full-fledged industry in the tertiary sector. Private schools are flourishing in almost all towns in India; they have come up in large numbers in the rural areas as well.

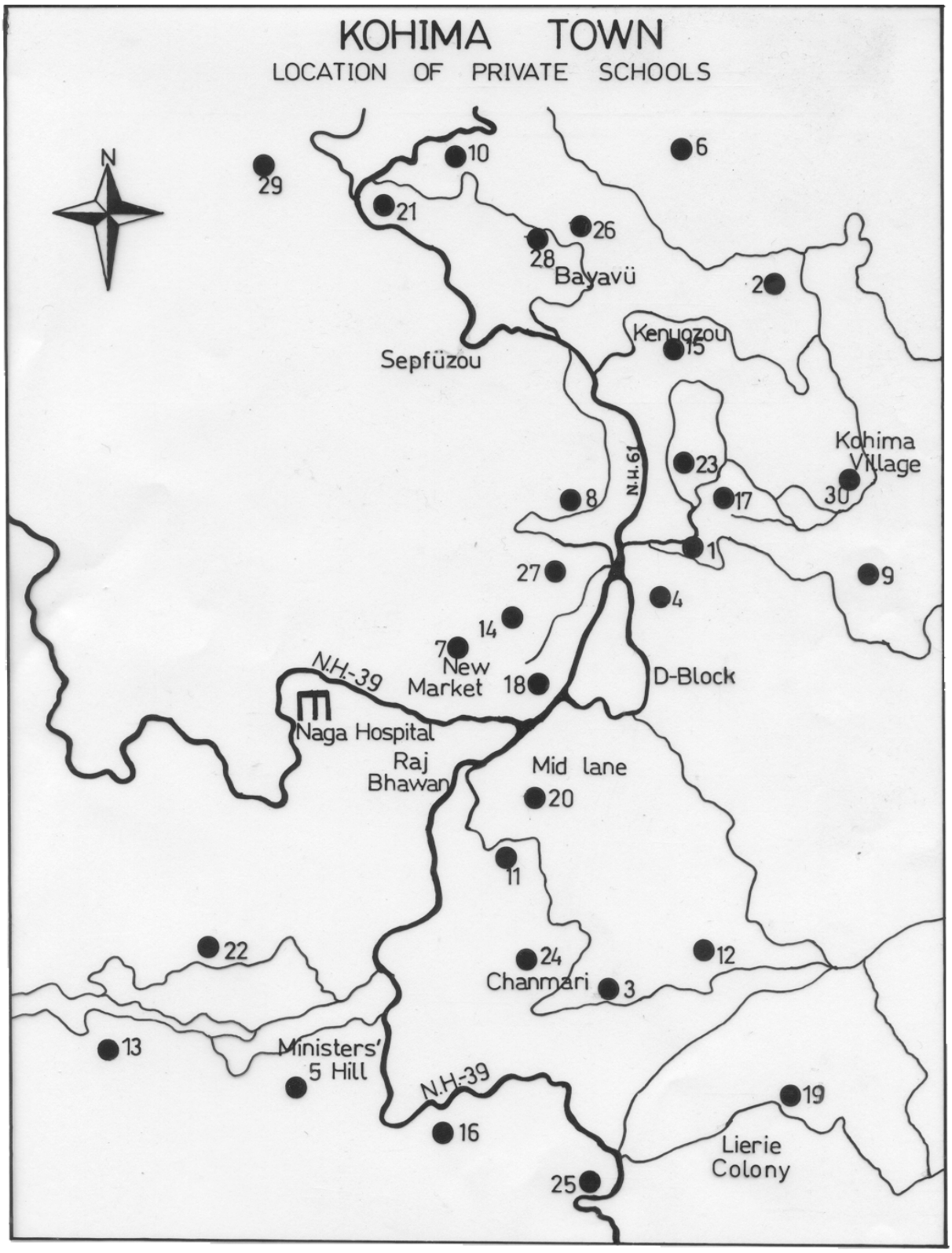
Most of these private schools have been established to earn profit. They employ teachers at a very low salary (often about one third of the salary drawn by a teacher in the schools run by the government), charge substantial amount as admission and tuition fees, often provide for residential facilities to enhance profitability, and yet, at many instances, remain unmindful to providing enough facilities to students. On scrutiny, one may have only a mixed type of feelings about the academic standard of these schools. However, in general, private schools strive hard to impress their clients and exhibit remarkable salesmanship to attract them, whereas the schools in the govt. sector have no incentives or urge to do so.

The system of private enterprises catering to the demand of the clients (parents/students) for schooling have all major characteristics of an industry: (a) profit motive, (b) investment, (c) hiring of factors of production like skilled and unskilled labour, infrastructure like building/land, etc, (d) catering to the demand in the market, (e) product differentiation, (f) technology and innovation, (g) advertising, (h) pricing policy, (i) competition, coalition, leadership and other types of organizational manifestations, (j) location decisions and localization, and so on. Since any system that sales its product in the market and exhibits the characteristics mentioned above would be labeled as an industry, there is no reason why the system of private schools should not be labeled as an '*industry*'. **Wadhwa** (2003, p.49) quotes Shomie Das, a Dehradun-based education consultant saying: "*People have realized that in these times of recession, schools make for regular, stable income. And given our growing population, the demand for school will only increase. The land and infrastructure remain assets forever. Plus the respectability and status that come from being in the education business are intangible profits.*" This view of education business can only make private schools an industry.

Little has been done to study the microeconomics of schooling industry in India. Observing the scanty literature directly related to the economics of private schooling industry, **Kipgen** (1988, pp. 12-13) has remarked that in spite of her best efforts to locate a research work directly studying the *economics of private schooling industry*, she has failed to find even a single published research paper, article or book. Hence, she had to be content only with a few small articles in some daily newspapers. However, there is now a growing recognition of the system of private schooling as an alternative to state-run schooling system and a perspective has emerged in which they may be compared and evaluated (*Government Vs Private Schools*. Delhi Times, June 11, 2001). Economics of private schooling enterprise is drawing the attention of many ones now. **Wadhwa** (2003, p.49) documents: "*The Great Indian School Bazar is booming as never before. In a country where demand for good schools has traditionally outstripped supply, and a new generation of upwardly mobile parents want to give their children only the best, businessmen of every hue – realtors, traders, hoteliers, industrialists, NRIs, franchise chains – are setting up schools*" and "*People have realized that in these times of recession, schools make for regular, stable inc*ome". Also, "*The Pune Zilla Parishad has received 32 applications in just the last 20 months for starting private schools*" and "The Jain Group of Bangalore plans to set up about 100 Jain International Schools in the next 10 years, each at a cost of Rs. 22 crore", etc. **Choudhury et al.** (2003) also make interesting observations.

II. Private Schooling in Kohima: An Overview: Our study area is Kohima, the State Capital of Nagaland, India. Kohima is an administrative center where a large number of people are engaged in the tertiary sector (service). At present, the town occupies an area of 23 sq. kms. and has a total population of about 78.5 thousand (provisional figure, Census 2001, District Census Handbook, Kohima District). The present density of population in the town works out to be about 30 persons per hectare (about 3000 person per sq.km.), which is lower than the national standard (45.75 persons per hectare).

Today, Kohima is the centre of school education in Nagaland, with 34 high schools in total. Additionally, there are 8 middle/primary schools. Among the high schools, thirty-one (31) are run by private organizations and only three (3) are fully managed by the Government of Nagaland. The largest among the high schools run by the government has an enrollment of 845 students. In total, government high schools cater to the schooling needs of a little over 1.5 thousand students in Kohima. However, private high schools (31 in number) cater to the schooling needs of over 25 thousand students. These figures are for the year 2000. In 1963, there were only 2 proceeding high schools. The growth of population in the town from 34.3 thousand in 1981 to 51.4 thousand in 1991, and further to about 76 thousand in 2000, and the inability of the government to establish more schools have encouraged the growth of private schools in the town. This has been reinforced further due to better performance shown by the private schools in the Board Examinations.


KOHIMA TOWN
LOCATION OF PRIVATE SCHOOLS
N
29
10
6
21
26
28
Bayavü
2
Kenuozou
15
Sepfüzou
N.H.61
23
Kohima
Village
8
17
30
1
27
9
4
14
7
New
Market
18
D-Block
N.H-39
Naga Hospital
Raj
Bhawan
Mid lane
20
11
22
24
12
Chanmari
3
13
Ministers'
5 Hill
N.H-39
19
16
Lierie
Colony
25

III. Govt-run vs. Private Schools in Kohima: It would be facilitating to present some distinctive features of private schools in comparison with the government run schools in the study area. The three govt.-run high/higher secondary schools enroll some 1.6 thousand students while private schools, 31 in number, enroll some 25 thousand students. Of the govt.-run schools, all enroll students from a modest economic background exclusively, while among the private schools several have a clientele (18 out of 30 private schools surveyed by us) of well-to-do/medium income group/class exclusively, while the rest (12 out of 30 private schools) have a clientele base formed by the parents of a modest income group. Others enroll students from a mixed economic background. In general, govt.-run schools perform much poorer than their counterpart (private schools). It is interesting to note that while (during 1996-200) enrollment in govt. run schools has not made any progress (rather a decline is observed), the enrollment in private schools has substantially increased. Unlike for the Govt-run schools, enrollment and performance are highly correlated for private schools. While during 1996-2000 the Govt-run schools had no student securing I division at the HSLC examinations, private schools succeeded in turning out about 24 percent of the examinees (in HSLC exams) in I division. All these data support the popularity of private schools among the parents who can pay for sending their children to the private schools.

IV. Average Salary of the Teaching and the Non-teaching Staff: Private schools in Kohima employ (in the year 2000) 766 teachers of whom about 60% are Graduates, 18% Matriculates, 13% Post-Graduates and the rest either theology teachers or computer teachers. Among the non-teaching staff (140 in number), the majority are Grade-IV employees (65%). Matriculate non-teaching staff are 27% while Graduate non-teaching staff make up only 8% of the total. On an average, a Grade-IV non-teaching staff earns Rs. 1870 (per month). On the other hand, the mean salary of PG teachers amounts to Rs. 4241 per month. Computer teachers earn a little more than the general Graduate teachers. Matriculate teachers earn no more than the matriculate non-teaching staff, while a Graduate teacher earns significantly more than a Graduate non-teaching staff. According to the **ILO** (1996) definition of subsistence wages (the hourly wage sufficient to buy one kg. of the lowest priced staple cereal), the employees of these schools barely earn a subsistence wage.

Table 1. Average Salary (Rs./month) of Teachers in Private Schools in Kohima

Year 2000	**Teachers with Different Qualifications**					
No. of Schools = 30	**Matriculate**	**Graduate**	**PG**	**Theology**	**Computer**	**Total**
Total No. of Teachers (Percent to Total)	136 (17.75 %)	463 (60.44 %)	102 (13.32%)	36 (4.70 %)	29 (3.79 %)	**766 (100 %)**
Total Salary Bill/Month	384038	1693591	432585	130804	112998	**2754016**
Average Salary/Month	2823.81	3657.86	4241.03	3633.44	3896.48	**3595.32**

Table 2. Average Salary (Rs./month) of Non-teaching Staff in Private Schools in Kohima

Year 2000	**Non-teaching Staff with Different Qualifications**			
No. of Schools = 30	**Grade IV**	**Matriculate**	**Graduate**	**Total**
Total No. of Non-teaching Staff (Percent to Total)	91 (65.00 %)	38 (27.14 %)	11 (7.86 %)	**140 (100 %)**
Total Salary Bill/Month	170170	107488	32280	**309938**
Average Salary/Month	1870.00	2828.63	2934.55	**2213.84**

V. Sources of Revenue of Private Schools in Kohima: Primarily, the sources of revenue of a private school are: (a) Admission fees and (b) Tuition fees collected from the students enrolled in the school. These two are the common and dominant sources of revenue. The prospects and the popularity of exposure to computers to the children have imparted a new impetus to the avenues of earning. Some schools, therefore, have computer exposure programmes and they charge fees for the same. Additionally, some schools receive aid (grants) from the Government as well as individuals. Tuition fees generate 50% (approx) of the total revenue followed by Admission fees (43%), making up 93% of the total revenue of private schools. On an average, computer fees contribute 6.8% to the total revenue. However, computer fees are not a source of revenue to all schools. Only 18 schools provide for computer exposure. In these schools, computer fees contribute Rs. 60.26 lakh (8.26%) to the total revenue. Grants and aid from Government and individuals are available only to a few (11) schools. The revenue from grants & aid make up a meager 0.9 percent of the total revenue in these schools (on an average). Grants & aid from Government make up less than one third of the total revenue from Grants & aid. The details of revenue from different sources (school-wise) are presented in the table below.

Table 3. Revenue of Private Schools in Kohima (Year 2000)

Sources of Revenue No. of schools = 30	**Tuition Fee**	**Admission Fee**	**Computer Fee**	**Govt. Grants**	**Individual Aid**	**Total**
Revenue (Rs. 000)	43964.88	38268.07	6026.06	141.50	330.00	88730.51
Revenue (%)	49.549	43.128	6.791	0.159	0.372	100.000

VI. Items of Expenditure of Private Schools in Kohima: Salary to teachers is the dominant item of expenditure incurred by the schools. Private schools employ 766 teachers (in the year 2000) of whom 463 are Graduates, 136 matriculates and 102 PG degree holders. Many schools employ theology as well as computer teachers. Their numbers are 36 and 29 respectively. The annual salary bill of these teachers amounts to Rs. 3.3 crores of which Rs. 2.03 crores (61.50%) are paid to Graduate teachers, Rs 46.08 lakhs (13.94%) to Matriculate teachers, Rs 51.91 lakhs (15.71%) to PG teachers, Rs. 15.7 lakhs (4.75%) to theology teachers and Rs. 13.56 lakhs (4.10%) to computer teachers. These private schools employ 140 non-teaching staff whose salary bill (annual) is Rs. 37.19 lakhs. Grade-IV staff are in majority (91 in number) whose salary bill amounts to Rs. 20.42 lakhs (54.91% of the total salary bill of the non-teaching staff). The salary bill of matriculate non-teaching staff is Rs. 12.9 lakhs (34.68%) while the salary bill of of graduate non-teaching staff amounts to Rs. 3.87 lakhs (10.41%). The **total salary bill** (teaching and non-teaching staff put together) amounts to Rs. 377.67 lakhs, shared by teachers (90% approx) and the non-teaching staff (10% approx).

Another important item of expenditure is a collection of **overhead expenses**, which include expenses on infrastructure, scholarships and awards to students and the miscellany including school functions. The total amount of overhead expenses (in the year 2000) was of the order of Rs. 86.47 lakhs, of which about 71.22% were spent of infrastructure, 14.4% on scholarships and awards and 14.36% on miscellaneous heads including school functions.

The third major head of expenditure is the **house rent** paid to the owner of the building/premises which houses the school. Only some schools (5 in number) pay rent to the owners of the building. Additionally, one of the schools pays Rs 4000 (annually) as land

rent. The total amount of rent paid by the schools (annually) is Rs. 13.03 lakhs (including the land rent of Rs. 4000 mentioned above). The schools that pay rent (explicitly) spend 12.32% (of the total expenses) on rent, 77.08% on salary of teaching and non-teaching staff and 10.59% on overheads.

VII. Estimation of Profit (Loss): The private schooling industry (comprising 30 private schools) in Kohima earned the revenue of Rs. 88.26 million (Rs. 88.73 million if grants & aid received by the schools are included) and spent Rs. 51.14 million in the year 2000. Thus, the industry earned a profit of Rs. 37.11 million (Rs. 37.48 million if grants & aid are included), a little over 42 percent of the total revenue (income). Except four schools that have very small size of enrolment and mostly due to which they have incurred a loss, other schools earned profits.

Table 4. Gross Indicators of Private Schooling Industry in Kohima, Nagaland

Items/Attributes/Indicator	Measure	Items/Attributes/Indicator	Measure
No. of Private Schools	30	Revenue from Tution Fees (Rs.)	43964880
No.of Students	24049	Revenue from Admission Fees (Rs.)	38268065
No. of Matriculate Teachers	136	Revenue from Computer Fees (Rs.)	6026060
No. of Graduate Teachers	463	Government Aid and Grant (Rs.)	141500
No. of P-G Teachers	102	Private Aid (Rs.)	330000
No. of Theology Teachers	36	Total Aid & Grants (Rs.)	471500
No. of Computer Teachers	29	**Gross Annual Revenue** (Rs.)	**88259005**
No. of Grade IV Staff	91	Gross Annual Income (Rs.)	88730505
No. of Matriculate Staff	38	**Profits** (Rs.)	**37114545**
No. of Graduate Staff	11	Gross Profit Rate on Expenses	72.57 %
No. of Rooms	752	Share of Teachers in Income	37.25 %
No. of Class Rooms	536	Share of Staff in Income	4.19 %
Salary to Teachers (Rs.)	33048192	Share of Other Expenses in Income	1.77 %
,, to Non-teaching Staff (Rs.)	3719256	Share of Students' Scholarships, etc	1.41 %
Total Salary (Rs.)	36767448	Share of Miscellaneous Expenses*	1.40 %
Scholarships and awards (Rs.)	1247100	Share of Infrastructure expenses	6.94 %
Expenses on Infrastructure(Rs.)	6157914	Share of Rent in Income	6.91 %
Miscellaneous Expenses *(Rs.)	1241500	Share of Capital in Income	6.94 %
Expenses on Rent **(Rs.)	6130498	Share of Labour in income	41.44 %
Total Expenses (Rs.)	**51144460**	Share of Entrepreneur (Profits)	41.83 %

Note: All measures are at the annual level (No. in Number, Amounts in Rs.) and refer to the Year 2000.

- Includes expenses on School Functions. ** Rent explicitly paid (Rs. 13.03) + Imputed (Rs. 48.75) lakh.

Table 5. Distribution of Private schools Making profit/Loss in Kohima

	Loss-making				Profit-making			
%P/L	(-70) – (-50)	(-50) – (-30)	(-30) – (-10)	(-10) - 0	0 - 10	10 - 30	30 - 50	50 - 70
No.	3	1	0	0	2	6	13	5
Cu No.	3	4	4	4	6	12	25	30

Note: % P/L means Profit/Loss as percentage to Total Revenue earned in the Year 2000

VIII. Explanation of Profit Rate in Private Schooling Industry in Kohima: We have seen that in the year 2000, the private schooling industry in Kohima imparted educational services to 24049 students, employed 766 teaching and 140 non-teaching staff, generated

the revenue of Rs. 88.26 million, spent Rs. 51.14 million and earned a profit of Rs. 37.11 million. It is now pertinent to investigate into the determinants of the rate of profit as well as to inquire if this industry operates according to the laws of the market. A real life market is seldom perfectly competitive since it has to operate under the conditions that are extra-ideal. Yet, the nature of imperfection may at times be very acute and at other times it may be mild. Mild imperfection goes in favour of the consumers while acute imperfection goes in favour of the producers.

There could be several indicators of market imperfection. One of these indicators is the proportion of total output of an industry produced by the largest (or first few large) firms. In case of the private school industry that we are concerned here, it would mean the proportion of the total number of students enrolled by the largest (or first few large) schools. Another indicator of imperfection is the gap between the price charged and the marginal revenue at the equilibrium output level that equates it to the marginal cost. Yet another indicator of imperfection may be the existence of barriers to the entry of new firms in the industry, which may be of several types. There could exist a tacit or explicit coalition among the firms to fix the price of output much above the cost of production and such an instance may introduce severe imperfection in the market. In this case, the entire industry may work like a gigantic firm (a cartel). There could exist a leader firm having advantages (diminishing returns to scale) over other firms and it may fix a price at which other firms supply their output.

Degree of Imperfection in the Private Schooling Market in Kohima: We make an attempt here to measure the degree of imperfection in the Private Schooling Market in Kohima. We use two popular measures of the degree of imperfection, (a) Concentration index (ratio) and, (b) Herfindahl-Hirschman index (**Byrns** & **Stone**, pp. 546-547). We envisage that the degree of imperfection may explain the Profit index, a simple percentage of revenue over cost, that is, the Profit Index (P_i) = (Revenue earned by the i^{th} school /Cost incurred by the i^{th} school)*100 for each school. The two indices of imperfection are defined as follows:

a). ***Concentration Index*** $[C] = \Sigma(100.N_i/N)$: i = 1, 2, …, n.

b). ***Herfindahl-Hirschman Index*** $[H] = \Sigma(100.N_i/N)^2 = \Sigma(S_i)^2$; i = 1, 2, …, n.

It may be observed that the first four schools (together) serve 30.5 percent of the total number of students in the industry and first eight schools (together) serve 53.7 percent of the clientele. The values of cumulative Herfindahl indices for first four and the first eight schools are 237.81 and 372.95 respectively, which as percentages to the overall Herfindahl index (for the industry = 492.61) are 48.27 and 75.70 respectively. These indices explain variations in the profit index significantly.

IX. Equilibrium in the Private Schooling Market: It may be interesting to investigate if the private schooling market in Kohima has a tendency to seek for profit maximization. Are economic measures like average (and marginal) cost & revenue meaningful in explaining the output and pricing policies of the schools at individual level as well as at the industry level ? Are the private schools profit maximizers or output maximizers, or these two alternative objectives reinforce each other ?

Among the private schools there are two large schools (# 20 and # 24) that turn out to be gross outliers, not only regarding to their size but also the economic measures that they exhibit. Further, there is a school (# 4), very small in size, which enrolls students only

up to standard II (a Tiny Tot or Nursery School). We will keep this fact in mind since inclusion (or exclusion) of these schools in the analysis may significantly affect the estimated values of parameters of the model that we use.

Estimation of Cost Functions: Generally it is assumed that the total cost function is cubic in output since this specification allows it to take a U-shape. Further, it has been suggested (**Intriligator**, pp. 281-284) that instead of estimating the total cost function, one may estimate the average cost function to avoid the problems of heteroskedasticity in estimation. From the *estimated average cost function*, one may obtain the *marginal cost function* directly. More explicitly (denoting C as Cost and N as output),

$C = a_0 + a_1N + a_2N^2 + a_3N^3 + u$: the total cost function (of a firm).
$AC = C/N = a_1 + a_0N^{-1} + a_2N + a_3N^2 + \eta$: the average cost function (of a firm) *to estimate*.
$MC = (\delta C/\delta N) = a_1 + 2 * a_2N + 3 * a_3N^2$: the marginal cost function (of a firm).

Estimation of Revenue Functions: Generally it is assumed that the total revenue function is quadratic in output since this specification allows the marginal revenue function to respond to changes in output. However, the revenue function is much more exposed to the global forces working at the industry level, since individual firms may not be able to price their output so freely. On the other hand, cost functions are localized (specific) to an individual firm. Due to this fact, the total revenue function may be linear and the marginal revenue function may not respond to the level of output produced by the firm. As in case of cost functions, instead of estimating the total revenue function, one may estimate the average revenue function to avoid the problems of heteroskedasticity in estimation. From the *estimated average revenue function*, one may obtain the *marginal revenue function* directly. More explicitly (denoting R as revenue and N as output),

$R = b_0 + b_1N + b_2N^2 + v$: the total (quadratic) revenue function (of a firm).
$AR = R/N = b_1 + b_0N^{-1} + b_2N + \varepsilon$: the average revenue function (of a firm) *to estimate*.
$MR = (\delta R/\delta N) = b_1 + 2 * b_2N$: the (linear) marginal revenue function (of a firm).

In case of linear revenue function, we have:
$R = b_0 + b_1N + v$: the total (linear) revenue function (of a firm).
$AR = R/N = b_1 + b_0N^{-1} + \varepsilon$: the average revenue function (of a firm) *to estimate*.
$MR = (\delta R/\delta N) = b_1$: the (constant) marginal revenue function (of a firm).

*Dropping out the two large (Outlier) Schools***:** We have already mentioned regarding the two large schools that may pose problems in estimation of the cost and the revenue functions. On dropping them out, we find that the average cost curve is (flattened) U-shaped and the marginal cost curve is first falling and then rising. The marginal cost curve intersects the average cost curve at (around) 900 (size of enrolment) and the marginal revenue curve at (around) 1600 (size of enrolment), yielding an equilibrium price (aggregate annual fees per student) ranging between Rs. 3500-3600 and the average (annual) cost around Rs. 2150. We have noted earlier that the total revenue (annual) of the private schooling industry (all 30 schools) is Rs. 88.26 million and the total cost (annual) is Rs. 51.14. The total output (enrolment) is 24000 (approx.). From these values we obtain

average revenue of Rs 3670 and the average cost of Rs. 2126 (per student per year). These (latter) averages are very close to the estimates obtained from marginal analysis described above.

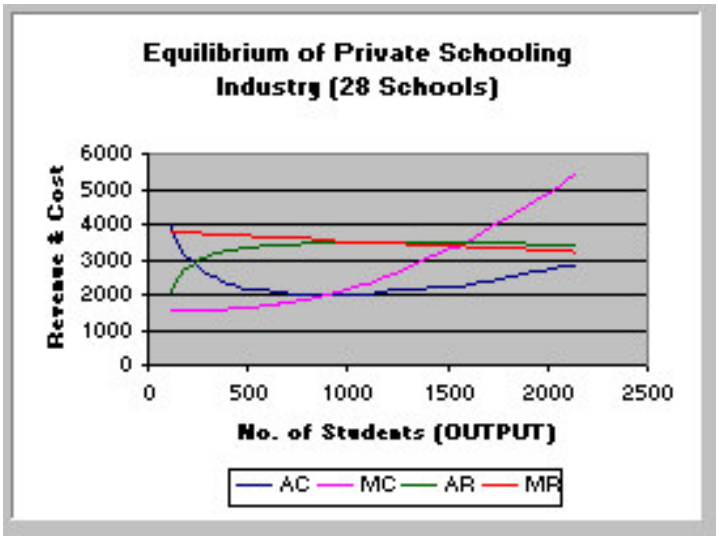


Table 6. Revenue Functions (Dropping 2 large Schools out)

Model : AVR = f(* *)		Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.245$	(Constant)	3652.201	180.481		20.236	.000
F = 8.46; n = 28	N^{-1}	-181810.849	62512.394	-.495	-2.908	.007
Model : AVR = f(* *)		Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.249$	(Constant)	3814.340	481.911		7.915	.000
F = 4.154	N^{-1}	-208971.579	98050.724	-.569	-2.131	.043
n = 28	N	-.142	.389	-.097	-.364	.719

Table 7. Cost Function (Dropping 2 large Schools out)

Model : AVC = f(* * *)		Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.551$	(Constant)	1634.761	1023.535		1.597	.123
F = 9.80	N^{-1}	297738.113	136006.164	.835	2.189	.039
n = 28	N	-.289	1.842	-.204	-.157	.877
	N^2	3.668E-04	.001	.468	.437	.666

Dropping out the two large (Outlier) Schools and a small Nursery School: Next we drop out the tiny tot (nursery) school that imparts education only up to standard-II. We observe that the estimated cost curves have become steeper (in both the sides around the cusp). The marginal revenue curve also has a steeper rate of decline. Due to these changes in the shapes of the cost and the revenue curves, the equilibrium output level (enrolment size) has shrunk into the range of 1400-1500 (depending on whether we take the constant or the linearly declining marginal revenue function). The equilibrium price (fees) also has declined to lie in the range of Rs. 3600-3400 (around Rs. 3500 approximately). Usually a decline in the equilibrium output should be accompanied by an increase in the equilibrium price. However, a closer examination of school # 4 (Nursery school) reveals that it has the average revenue of Rs. 2900 and the average cost of Rs. 1600 only. Its exclusion from

estimation has therefore a more depressing effect on the revenue function than the cost function.

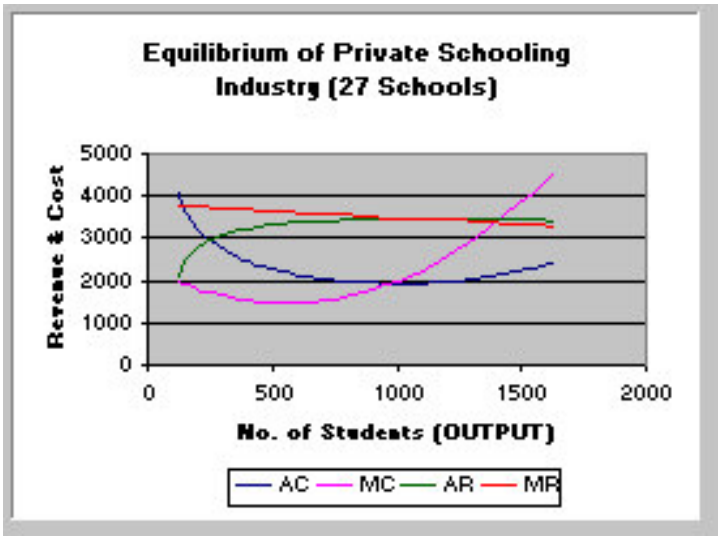


Table 8. Revenue Functions (Dropping 3 Schools out)

Model : AVR = f(* *)		Coefficient	Std. Err	Beta	t value	Sig.
R^2 = 0.230	(Constant)	3627.703	183.600		19.759	.000
F = 7.45; n = 27	N^{-1}	-176766.362	64762.416	-.479	-2.729	.011
Model : AVR = f(* *)		Coefficient	Std. Err	Beta	t value	Sig.
R^2 = 0.235	(Constant)	3811.504	490.985		7.763	.000
F = 3.682	N^{-1}	-207169.878	99905.806	-.562	-2.074	.049
n = 27	N	-.161	.397	-.110	-.405	.689

Table 9. Cost Function (Dropping 3 Schools out)

Model : AVC = f(* * *)		Coefficient	Std. Err	Beta	t value	Sig.
R^2 = 0.676	(Constant)	2300.703	886.552		2.595	.016
F = 16.031	N^{-1}	240375.251	115999.352	.681	2.072	.050
n = 27	N	-1.500	1.596	-1.069	-.940	.357
	N^2	8.942E-04	.001	1.160	1.232	.231

A word of caution, however, is necessary. We have estimated revenue and cost functions statistically and, therefore, all the estimated parameters are averages (in some sense) that have their standard errors of estimate. All the derivatives obtained from these estimated parameters are probabilistic and they suggest only a range in which they are most likely to lie. Starting from the accuracy of data, specification of the model to estimate, the assumptions about the residual term, the method of estimation and the choice of the loss function to minimize are a few of the major factors that introduce uncertainty in statistical analysis. This is over and above the uncertainty in economic theory that may not always be very relevant to the reality that we attempt to analyze and understand. We have assumed that the schools are profit maximizers. We have also assumed that the same (identical) revenue and cost functions are operative in all the schools, which amounts to assume that all the schools have identical production function and demand function. The reality is, however, that the schools do not follow any standard blue print and each of them has its

own constraints, prospects and even the objective and goal. They innovate to improve their own lot, meet their own objectives, and adopt different strategies to perform best within their constraints. Our findings should be taken in the light of all these considerations.

X. Identification of the Leader School: Two private schools (#25 and #2) closely vie to emerge as the *optimal representative school*. We cannot decide between their precedence over each other since they are of equal size (# 25 with 1538 students and # 2 with 1536 students). Furthermore, school #5 is only slightly larger than school #25 and it may be a close competitor for the same. It appears that most of the schools do not follow the two largest schools (# 20 and # 24) in fixing fees and the salary structure.

A number of methods may be devised to identify the leader school that most of other schools in the industry look towards to determine their fees structure and the salary structure. We may use some sort of 'distance' to measure the leader-follower relationship. Distance might be defined in several ways among which the RMS (Root-Mean-Square) has a popular appeal. Absolute distance may be another measure. We use the RMS here. Hence, we define the measure,

$$M_\lambda = \{\Sigma_i (X_i - X_\lambda)^2 / n_i\}^{0.5} ;$$

where, $\lambda \subseteq L$ (the index set associated with the set of members, S_L, that vie for leadership) and $i \subseteq I$ (the index set associated with the set of members, S_I, that do not vie to emerge as leaders, but aspire to follow some leader). The two sets of aspirant leaders and aspirant followers are *complementary* to each other and make up the set of all private schools ($S = S_L \cup S_I$ and $S_L \cap S_I = \varnothing$) in the private schooling industry in Kohima. Here X stands for the criterion vector, M for the measure of RMS distance and n_i is the total number of elements in the set I. A successful leader would obtain the smallest value of M.

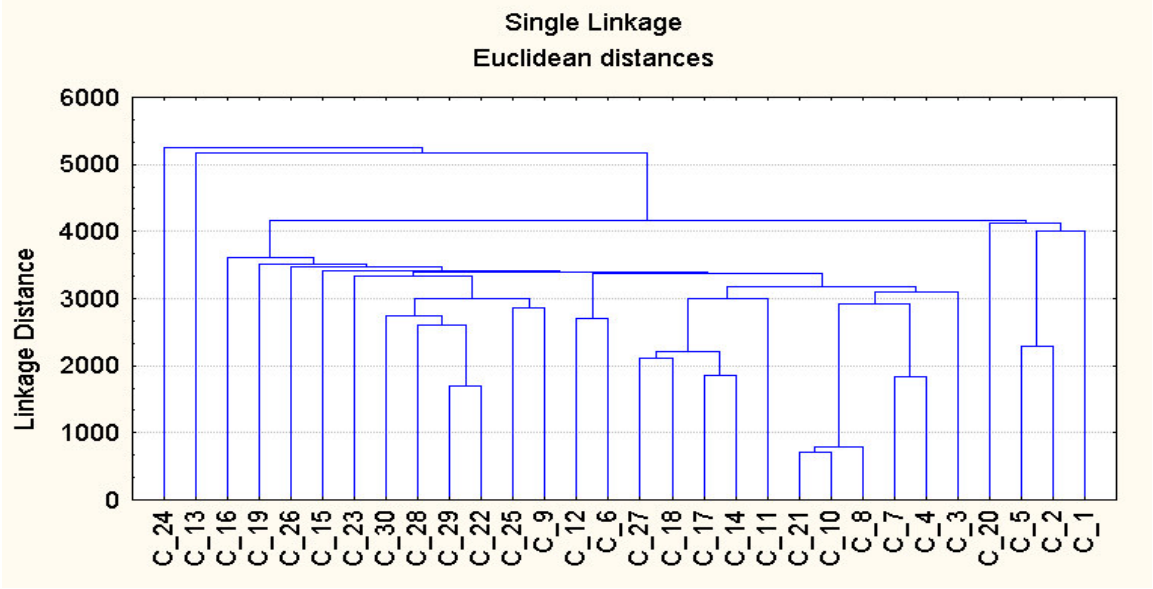
According to this measure, the school #25 has the smallest values of M_λ for all the criteria except computer fees (for which school #5 obtains the smallest value of M_λ). No other school has the next smallest values of M_λ so uniformly.

The two largest schools (# 20 and # 24) operate under the increasing returns to scale, mostly by admitting more students. They are also likely to have strong government and private patronage. They charge very high admission fees. It appears that they are not cooperating with other schools and thrive on economies of scale, monopoly power and patronage. It may be that there is some rivalry among them and the Leader school (# 25).

Table 10. Root-Mean-Square of Deviations (M_λ) of Annual Fees (Rs.) and Salaries (Rs.) in Private Schools in Kohima.

School (λ)	Admission Fees (Rs./Year)		Computer Fee (Annualized) In Rs.		Salary of Teachers (Rs./Year)		
	Lower	Secondary			Matriculate	Graduate	PG
#2	458.61	679.66	239.37		21720	27600	34800
#5	556.17	629.55	***106.12***		24000	21600	26400
#20	1369.28	2112.00	156.70		24120	25200	48000
#24	1020.44	1788.73	156.13		22800	19200	26400
#25	***436.03***	***616.76***	195.80		***21720***	***15600***	***18000***

Dendrogram of Hierarchical Clusters among Private Schools in Kohima



This conclusion is also supported by the results obtained from Cluster Analysis (criteria used: Admission Fees of Lower, Secondary and Higher Secondary standards, annual Computer Fees, and monthly salaries of five categories of teachers and three categories of non-teaching staff). It is interesting to look into the distance matrix obtained from Cluster Analysis and the *dendogram* depicting how different schools join the cluster. The *followers' mean distance* (F-Mean) for school #25 is the minimum. Further, the L-mean distance of school #25 is very close to the maximum. These findings indicate that the School # 25 emerges as the leader. Further, they indicate that aspirant leader firms are largely non-cooperative among themselves.

Therefore, we may conclude that the ***school # 25 is the Leader School*** that provides guidelines to other (follower) schools in matters of decision on the admission fees and the salary of teachers. Since most of the schools have uniform tuition fee structure, we have not used this criterion. If we did, our conclusion would remain unaltered. We have already noted that the ***School # 25 is also the optimal school.***

Table 11. Distance Matrix obtained from Cluster Analysis
(Distances between 6 Aspirant Leaders and 24 Followers have been presented)

School #	School #1	School #2	School #5	School #20	School #24	School #25
Aspirant Leader Schools						
1	0	4800.781	4008.815	6965.883	5420.62	5321.419
2	4800.781	0	2298.717	4123.958	6483.489	6693.654
5	4008.815	2298.717	0	5179.973	5255.732	5197.894
20	6965.883	4123.958	5179.973	0	7640.18	7935.151
24	5420.62	6483.489	5255.732	7640.18	0	6619.337
25	5321.419	6693.654	5197.894	7935.151	6619.337	0
L-Mean	**5303.50366**	**4880.12**	**4388.226**	***6369.029***	**6283.872**	***6353.491***
Aspirant **Follower** Schools						
3	8698.563	10530.55	8959.889	11777.88	8374.552	5933.169
4	9016.513	10972.92	9143.965	12878.95	8595.675	6567.724

6	6243.358	8943.658	7518.958	10464.62	5693.277	4763.09
7	9467.313	11306.52	9540.682	13246.24	9028.877	6982.299
8	8005.567	10016.82	8282.131	11927.04	9200.393	5845.306
9	5320.479	6006.663	5157.528	7141.08	7732.763	2860.944
10	8076.373	10130.91	8385.846	12262.52	9257.642	5910.778
11	7131.521	9397.133	8019.551	10426.76	6343.637	5292.457
12	5852.658	8555.705	7217.576	9657.956	5408.348	4344.088
13	7909.015	9838.269	8296.182	10796.83	7537.649	5773.173
14	8299.271	9724.988	7954.401	11476.4	7370.076	5378.327
15	4174.712	7464.631	6174.125	8462.503	6329.324	3407.305
16	6793.464	7848.799	6609.292	8488.414	8004.844	3614.298
17	8613.217	9984.738	8202.566	11935.97	7582.257	5733.672
18	8364.593	9733.546	8106.32	11049.31	7508.215	5084.577
19	6311.509	7156.965	6082.404	8100.212	8023.726	3516.397
21	8010.605	10029.82	8339.328	12112.53	9262.339	5881.267
22	6083.379	7471.613	5579.436	8855.756	6536.293	3440.203
23	6923.012	8151.479	6578.184	9530.395	5930.871	3343.74
26	7003.396	8422.676	6724.505	10369.91	8166.865	4435.726
27	7923.699	9075.379	7611.15	10476.97	7183.184	4619.794
28	6715.653	7891.356	6202.371	9518.914	7430.654	4247.882
29	5901.11	7495.105	5564.396	9305.344	6870.242	2994.261
30	4485.532	7584.161	5924.475	9505.805	6545.619	3882.074
F-Mean	**7138.521**	**8905.6**	**7340.636**	**10407.01**	**7496.555**	***4743.856***

Note: Distance: Euclidean; L-Mean = Among Aspirant Leader's; F-Mean = Among Aspirant Followers.

XI. The Market Structure: Our analysis indicates to an interesting structure that characterizes the Private Schooling market in Kohima. On the one hand, there is a cartel type coalition among some (25 or so in number) private schools led by the optimal school # 25. The members of this coalition exhibit a remarkable uniformity in matters of fee, salary and enrolment policy. On the other hand, there are a small number of schools, quite large, enjoying several advantages, including economies of scale, government as well as private patronage and reputation and goodwill of the people. These latter schools are in all likelihood not in coalition among themselves. They have their own policies regarding fee & salary structure and enrolment of students. Thus, the Private Schooling Market in Kohima is an example of an oligopolistic market.

Due to their advantages over other schools, the two (or 3) largest schools set relatively much higher admission fees (with a premium over other schools), enroll large number of students in spite of over-crowding in the class-rooms, thereby generating the economies of scale, and earn larger profit (per student/year). Overall, they pay higher salaries to their staff. Other schools largely follow the salary & fees structure of the leader school, charging less admission fees, but also paying less to their staff. The latter schools earn less profit per student/year.

Kinked Curve Model of equilibrium of Oligopolistic Private Schools: It would be interesting to inquire as to how the private schools in Kohima determine prices (fees) and output (enrolment) under the conditions the envisaged oligopolistic conditions. An attempt may be made to estimate the kinked curves for their revenue and cost. The kinked revenue curve model of oligopoly is well known. However, we envisage that there could be kinks in the cost curve as well. Some schools (especially, # 20, # 22 and # 24) exhibit conspicuous cost advantages as well as revenue advantages over others. School # 22 is a small school. It

cannot emerge as a leader. However, it may help in estimation of revenue and cost functions in the kinked curve model.

Table 12. Estimated Parameters of Kinked Average Revenue Function

Model: AR= f (* * *)		Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.783$	(Constant)	3600.243	442.142		8.143	.000
F = 9.89	N^{-1}	-173024.442	89420.679	-.388	-1.935	.064
	Dummy	1228.086	868.558	.464	1.414	.170
	N	-0.04535	.354	-.032	-.128	.899
	Dummy * N	0.241	.560	.160	.430	.671

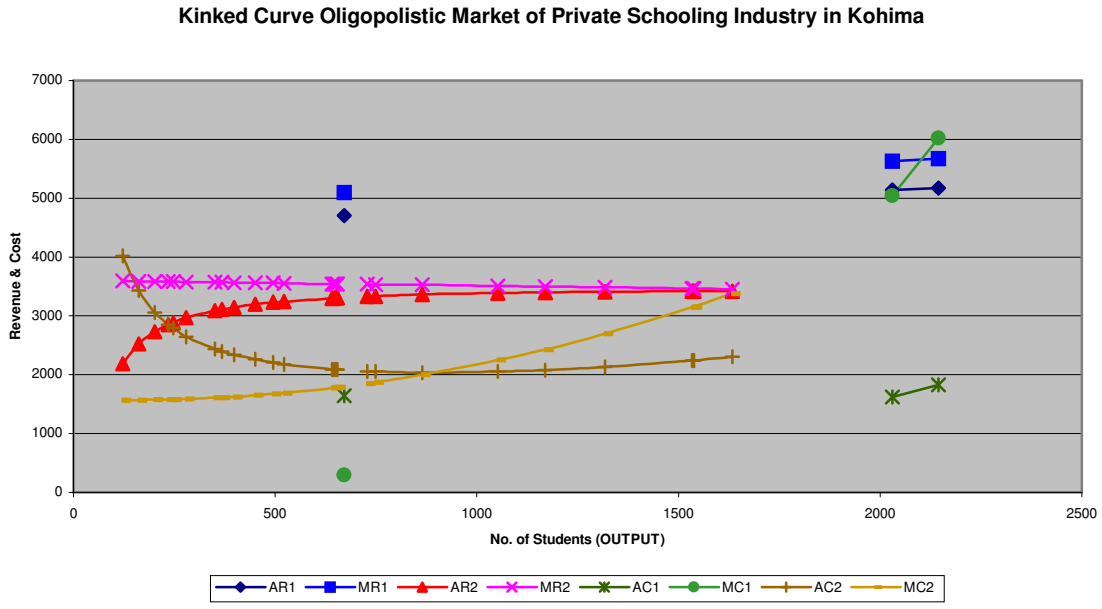


Table 13. Estimated Parameters of Kinked Average Cost Function

Model: AR= f (* * *)		Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.771$	(Constant)	1587.439	1028.411		1.544	.136
F = 5.612	N^{-1}	300480.992	136513.415	.843	2.201	.038
	Dummy	1021.338	5793.064	.482	.176	.862
	N	-.111	1.859	-.097	-.060	.953
	Dummy * N	-2.755	11.291	-2.294	-.244	.809
	N^2	2.690E-04	.001	.510	.317	.754
	Dummy * N^2	8.686E-04	.004	1.489	.211	.835

D = 1 for schools exhibiting conspicuous advantages in average revenue and cost; = 0 for others.

We observe the following:

(1). In case of the cartel like coalition of 27 schools (dummy = 0) the average cost is almost flat in the range of (enrolment) 650 – 1150 and the marginal cost curve intersects the average cost at the enrolment = 1050 students. The marginal cost curve intersects the marginal revenue curve at (around) enrolment = 1633, at the price Rs. 3377. At this point,

the average revenue is equal to the marginal revenue (=marginal cost). For this equilibrium enrolment, the average cost is Rs. 2307. The profit earned (normal) is Rs. 1070, which is about 31.68 percent of the average revenue.
(2). In case of the three schools that have cost as well as revenue advantages, the marginal cost curve intersects the marginal revenue curve at an output level about 2100 (students). At this point the marginal revenue is Rs. 5600, the average revenue is around Rs. 5100 and the average cost is around Rs. 1750. The difference between the average revenue and the average cost at this point is Rs. 3350. It is to be noted that these schools are functioning under increasing returns to scale and therefore they continuously strive for increasing the enrolment. Since their marginal revenue is larger than their average revenue, they will continue enrolling more students until cost advantages are fully used up. This finding explains why in these schools the growth rate of enrolment was observed quite substantial though they are already over-crowded.

An Alternative Model-I: We may postulate a different model to explain how the market of private schooling in Kohima operates. We may assume that the schools in the industry have an identical L-shaped average cost function with a fixed marginal cost. The marginal cost is throughout lower than the average cost though it has a tendency to equalize with the average cost asymptotically. However, five large firms (schools # 1, #2, #5, # 20, and #24) have a different demand curve than the rest of the schools. Overall, the schools face two different demand curves, but the common L-shaped average cost curve. On these assumptions we estimate the model. We find that at the point of kink (average revenue curve) the enrolment size is about 1537 students. At this point, marginal revenues are Rs. 2958 and Rs. 6195 and average revenues is Rs. 3355 (common point of kink). The average and the marginal costs are Rs. 1937 and Rs. 1770 respectively.

Table 14. Estimated Parameters of General L-shaped Cost Function

Model: AR= f (* * *)		Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.519$	(Constant)	1769.825	130.509		13.561	.000
F = 30.20	N^{-1}	256871.217	46744.413	.720	5.495	.000

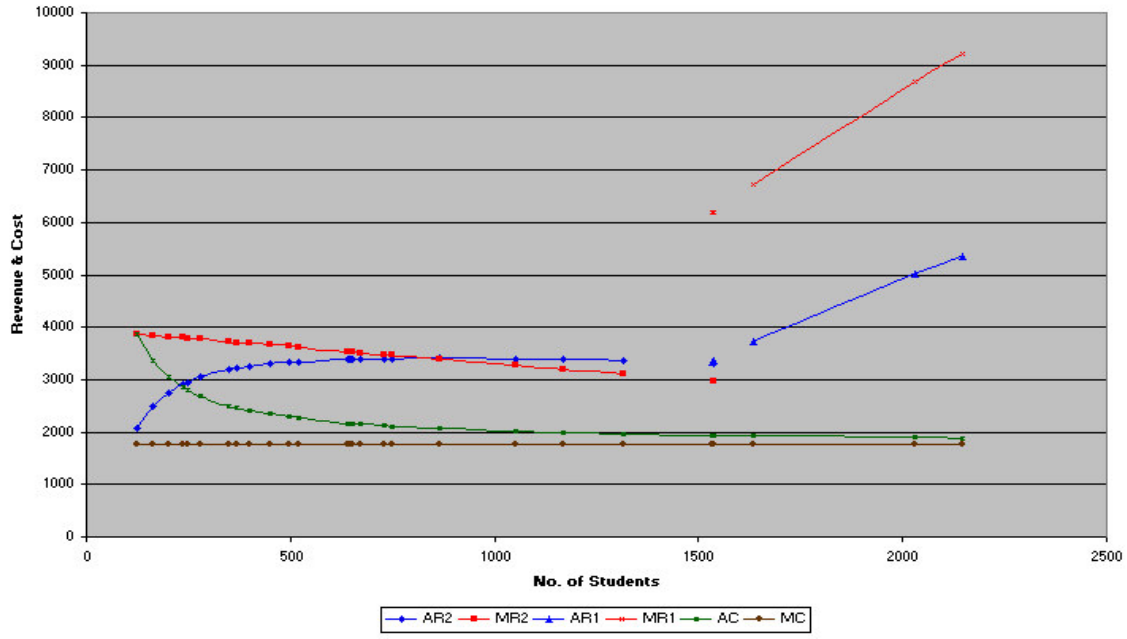
Table 15. Estimated Parameters of Kinked Average Revenue Function

Model: AR= f (* * *)	**Alt-Model-I**	Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.540$	(Constant)	3948.092	555.724		7.104	.000
F = 7.33	N^{-1}	-227157.509	104477.494	-.509	-2.174	.039
	DN^{-1}	-4816059.948	1679298.404	-1.314	-2.868	.008
	N	-.322	.525	-.225	-.615	.544
	DN	2.074	.654	1.750	3.173	.004

The most interesting thing about this kink is that it is the common point at which the average revenue curve of the coalition members (who face downwards sloping demand curve) meets the average revenue curve of the non-members (with upwards sloping demand curve). The school # 25 is at this meeting point. Thus, the floor fee of the non-members of the coalition makes the ceiling fee to be charged by the coalition members. The maximal

profit (Rs. 1418) of the coalition members is the minimal profit of non-members. It may provide some hint to the pricing policy prevailing in the private schooling market in Kohima. The schools with advantages set a '*mark up price (fees)*' to yield a minimum specified rate of profit (over the average cost or as a percentage of the average revenue). This rate of profit is 73 percent over the average cost (or 42 % of the average revenue). We would recall that the overall profit (for the industry as a whole) is about 42 percent of the total revenue (Rs. 37.11 million profit over Rs. 88.26 million of revenue).

The Kinked Demand with Common L-shaped Average Cost Model–I of the Oligopolistic Private Schooling Industry in Kohima



An Alternative Model-II : We may postulate a yet different model to explain how the market of private schooling in Kohima operates. With reference to the Alternative Model-I, we drop N (number of students) from the list of explanatory variables of the average revenue function (which means that the total revenue of a school is no longer quadratic in N). This alteration is suggested by the statistical significance of the coefficient associated with N in the average revenue function estimated in the Alternative model-I. We maintain other assumptions of the Alternative model-I. We estimate the model and find that at the point of kink (average revenue curve) the enrolment size is about 1537 students. At this point, the marginal revenues are Rs. 3630 and Rs. 6296 (against Rs. 2958 and Rs. 6195 in model-I)and the average revenues are Rs. 3514 and Rs. 3355 (against Rs. 3355 in model-I). The average and the marginal costs are Rs. 1937 and Rs. 1770 respectively, as in the Alternative Model-I.

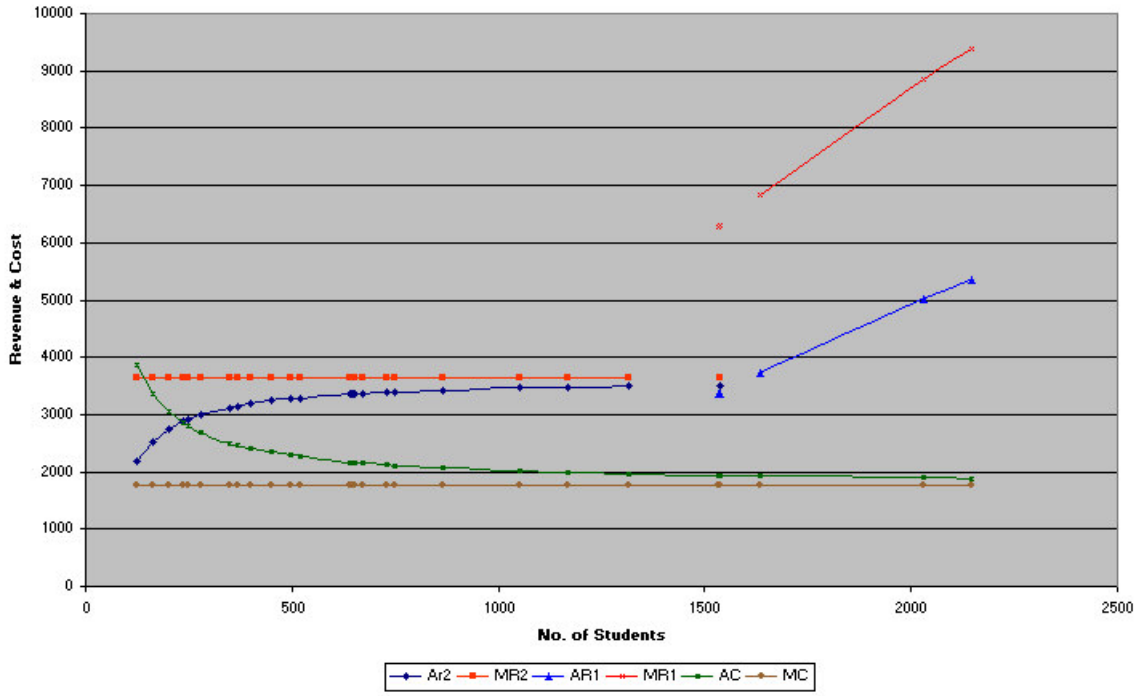
Table 16. Estimated Parameters of General L-shaped Cost Function

Model: AR= f (*)		Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.519$	(Constant)	1769.825	130.509		13.561	.000
F = 30.20	N^{-1}	256871.217	46744.413	.720	5.495	.000

Table 17. Estimated Parameters of Kinked Average Revenue Function

Model: AR= f (* * *)	**Alt-Model-II**	Coefficient	Std. Err	Beta	t value	Sig.
$R^2 = 0.533$	(Constant)	3629.548	198.399		18.294	.000
F = 9.88	N^{-1}	-177317.314	65104.151	-.398	-2.724	.011
	DN^{-1}	-4581308.629	1615622.233	-1.250	-2.836	.009
	DN	1.839	.524	1.552	3.512	.002

The Kinked Demand with Common L-shaped Average Cost Model-II of the Oligopolistic Private Schooling Industry in Kohima



The effect of dropping N from the list of explanatory variables of the average revenue is that now (for the coalition members) the marginal revenue is not falling with an increase in the number of students. Due to this, the average revenue remains throughout less than the marginal revenue. The floor price (Rs. 3355) of the non-members is lower than the ceiling price (Rs. 3514) of the coalition members by about Rs. 158. This difference is well within the standard error of estimate (± Rs. 350 around Rs. 3500) of the average revenue at the relevant point N (1537 students). Therefore, the alternative model-II cannot be preferred (or deferred) to the Alternative Model-I.

Table 18. A Comparative Over-view of Alternative Models (I and II) of Fee Determination

Sl no	**Attributes and Measures**	**Alternative Model-I**	**Alternative Model-II**
1	Average Cost Curve (Common)	L-shaped	L-shaped
2	Marginal Cost Curve (Common)	Parallel to X axis	Parallel to X axis
3	Average Revenue Curve	Kinked non-monotonous	Kinked upper-monotonous
4	Marginal Revenue Curve	Kinked non-monotonous	Kinked monotonous
5	Marginal Revenue at the kink-point	Below the Average Cost	Above the Average Cost
6	Average Revenue at the kink-point	Coincident	Non-coincident

7	Abscissa at the Kink point	N = 1537 (approx)	N = 1537 (approx)
8	Average Cost at the kink point	Rs. 1937 (aaprox)	Rs. 1937 (aaprox)
9	Marginal Cost at the kink point	Rs. 1770 (approx)	Rs. 1770 (approx)
10	Average Revenue at the kink point	Rs. 3355 (approx)	Rs. 3355 – 3514 (aaprox)
11	Marginal Revenue at the kink point	Rs. 2958 – 6195 (approx)	Rs. 3630 – 6296 (approx)
12	Pricing Policy (Floor profit rate)	Mark up (42% floor Profit)	Mark up (42% floor Profit)
13	Explicit Gain from Coalition	None	8 % over the average Cost

It is difficult to choose among the models that we have estimated in our exercise. The last one (Alternative Model-II) appears to be statistically better (incorporating only those variables that are statistically significant), but the Alternative Model-I is theoretically attractive and empirically more consistent. In the midst of statistical risks of estimation, our only solace is that the results obtained by us are very close to what we find by a keen observation of figures (on observed average cost and average revenue) of individual schools. Hence, we hold that our findings are not much different from the reality.

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