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Determinants of the Propensity to Export: The Case of Small Firms in the Diesel Engine and Chemicals Industries in Gujarat[1]

P.K. KESHARI and RANGA KOTA

While much has been written about 'entrepreneurial traits', attempts to analyse whether, and to what extent, these traits determine the sectoral choice of an entrepreneur have been few and far between. Using a sample of small-scale enterprises in Gujarat, one of the most industrialised states in India, this paper attempts to examine the discriminating characteristics of exporting and non-exporting firms in terms of entrepreneurial attributes.

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India, inward-looking till recently, has been undertaking macroeconomic policy reforms vigorously since mid-1991. One of the chief objectives of these reforms is to promote exports of Indian goods. The efficacy of macroeconomic policy reforms in improving India's overall export performance, however, is debatable.[2] Yet there is no denying that unless certain measures at the micro level are taken to induce non-exporting firms to export and already exporting firms to substantially increase their share of exports in total sales, the government's aim of maintaining a comfortable balance of payments position on a regular basis, or, for that matter, developing an export-oriented economy, cannot be achieved. This will require knowledge and understanding of the factors which make one type of firm exporters and the other type non-exporters, both operating under similar circumstances.

In recent years, scholars have shown a growing interest in understanding the firm-level export behaviour of small and medium enterprises.[3] The researchers in this field have shown that the decision-maker or entrepreneur in a small firm with his personality traits and

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perception is the main actor who can translate the abstract concept of international competitive advantage into reality[4] and thereby can put a country on the export map of the world. Several studies have also found various enterprise-specific economic factors (particularly size) to be a significant discriminant between exporting and non-exporting firms.[5] In the context of Indian small firms, however, researchers have not analysed the factors which influence a firm's propensity to export. To identify these is the basic objective of this paper.

Hypotheses on Discriminating Factors

As compared to the domestic market, the international market is generally more competitive, risky and demanding. Therefore, the firms which operate in the export market are required to possess a greater degree of entrepreneurial attributes than those confined to the domestic market. Entrepreneurial attributes are defined to include: (*i*) need for unique achievement, (*ii*) need for autonomy, (*iii*) creativity, (*iv*) moderate and calculated risk-taking, and (*v*) drive and determination.[6] A combined measure of these attributes is called general enterprising tendency (GET).[7]

We therefore hypothesise that the possession of the higher level of these attributes (individually or in combination) may be positively related to probability to export, if other factors causing a firm to export are controlled for.[8]

In comparison to selling exclusively for the domestic market, extension of a business in the international market requires a firm to devote extra resources for market intelligence, information, skill, contact building, etc. Therefore, the large size, which is positively associated with the amount of resources, could be advantageous for a firm willing to initiate or continue in the export business. Two studies, however, have concluded that very small firms are not inclined to export but as firms grow in size a relationship is found between size and exporting up to a certain point; beyond that no further correlation is observed.[9] As the focus of our study is small firms, which have not yet exhausted the economies of scale in production, the advantages of large size may cause a firm to export, provided the other factors likely to influence the probability to export are controlled for.[10]

The age of a firm can lend itself to two types of interpretations: (*i*) it can approximate the business experience available with the firm and (*ii*) it may reflect the vintage effect on plant and productivity. As the export normally takes place in the later stages of the product cycle or after some years of a firm's business in the domestic market, the older firms, according

to the first interpretation, may be involved in export activity while the younger ones may not be inclined to do so. If we follow the second interpretation, the older firms may not be able to export due to their lower level of productivity (or cost disadvantage) whereas the younger ones may involve themselves in export business; for, the lower age of a firm may signify technological dynamism and competitive strength required for international business.

India is a labour-abundant country. Therefore, its comparative cost advantage, according to the Heckscher-Ohlin theorem, lies in labour-intensive products.[11] Even within the same industry (or product group), relatively labour-intensive firms may be able to export due to low labour cost while the less labour-intensive ones may not be able to penetrate into the international market. Hence, we postulate that the capital-intensity of the group of exporting firms is expected to be less than that of the non-exporting firms. Besides, capital-intensity may have a negative influence on propensity to export.

Methodology

The study is based on firms in the small-scale sector belonging to two industry groups, chemicals and diesel engines. The chemicals sample consisted only of dyes and pharmaceutical manufacturing firms. There were four main reasons for selecting small-scale units for the present study. First, small-scale units have shown capability to export by capturing about 25 per cent of total exports from India during 1981–82 to 1990–91, of which more than 90 per cent consisted of non-traditional goods.[12] Second, many of the small-scale units have the potential to exploit market opportunities existing abroad but lack necessary entrepreneurial competency, information, and human and financial resources required for export activity. Third, there is a general scarcity of studies on exports of small-scale industries in developing countries, especially India. Fourth, since the small-scale sector is labour-intensive, promoting exports from this sector would contribute significantly to the Indian economy in terms of employment generation and skill formation. The diesel engine and chemicals industries were chosen because small units claim significant shares in the total export of each of these industries.[13] Besides, there still exist a large number of non-exporting firms in these industries which could be induced to export.

Two samples of equal size, each consisting of fifty firms, were utilised for the study. The first sample included an equal number of exporting and

non-exporting diesel engine manufacturing firms located in Rajkot. The second sample consisted of firms producing chemicals, equally divided into exporters and non-exporters, located in Ahmedabad.

Each sample was deliberately selected from a single location and from a single industry. This helped us even out the external influences (e.g., industry- or location-specific policies, availability of infrastructural facilities, raw material supply, labour and socio-cultural factors) acting on the firms. Ahmedabad and Rajkot were selected because the chemicals and diesel engine industries respectively are the 'lead' industries in these cities.

Sample firms of the study fulfilled the following criteria: (*i*) fixed assets of a firm remained in the range of Rs. 1 lakh to Rs. 60 lakh at the end of March 1992; (*ii*) the number of regular employees working in a firm during 1991–92 did not exceed 100; (*iii*) experience in export of a firm belonging to the exporter category was at least three years at the end of March 1993. The first two criteria, in addition to removing outliers, ensured sufficient variation in size across firms in a sample. The third criterion ensured that the firms were not fly-by-night exporters.

The salient features of the sample in terms of profiles of the entrepreneurs and enterprises are presented in Tables 1 and 2. Both tables reveal that the profiles of firms and entrepreneurs differ between exporter and non-exporter groups, as also between two industries.

TABLE 1

Profile of the Entrepreneurs: Frequency Distribution, 1991–92

(Per cent)

Parameters	*Diesel Engine*		*Chemicals*	
	EX	NEX	EX	NEX
Age Group				
20–30 Years	8.00	20.00	0.00	8.00
30–40 Years	32.00	24.00	44.00	40.00
40–50 Years	36.00	36.00	44.00	44.00
50–60 Years	12.00	20.00	8.00	8.00
60 Years and above	12.00	0.00	4.00	0.00
Total	100.00	100.00	100.00	100.00
Business Experience				
Below 5 Years	4.00	0.00	4.00	8.00
5–15 Years	24.00	36.00	32.00	44.00
15–25 Years	36.00	36.00	52.00	44.00
25–35 Years	32.00	24.00	8.00	4.00
35–45 Years	0.00	4.00	4.00	0.00
45 Years and above	4.00	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00

EX : Exporter
NEX : Non-Exporter

TABLE 2
Profile of the Enterprise: Frequency Distribution, 1991–92
(Per cent)

Parameters	*Diesel Engine*		*Chemicals*	
	EX	NEX	EX	NEX
Age of Enterprise:				
Below 10 Years	0.00	0.00	20.00	32.00
10–20 Years	28.00	16.00	76.00	68.00
20–30 Years	64.00	80.00	4.00	0.00
30 Years and above	8.00	4.00	0.00	0.00
Total	100.00	100.00	100.00	100.00
Form of Enterprise:				
Proprietory	8.00	8.00	32.00	32.00
Partnership	88.00	92.00	60.00	56.00
Private Ltd	0.00	0.00	8.00	12.00
Public Ltd	4.00	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00
Fixed Assets:				
(Rs. in Lakhs)				
Below 10	4.00	52.00	24.00	40.00
10–20	52.00	36.00	28.00	16.00
20–30	32.00	4.00	20.00	32.00
30–40	4.00	8.00	20.00	4.00
40 and above	8.00	0.00	8.00	8.00
Total	100.00	100.00	100.00	100.00
Number of Employees:				
Below 10	16.00	96.00	24.00	40.00
10–20	24.00	4.00	20.00	36.00
20–30	24.00	0.00	32.00	16.00
30–40	12.00	0.00	8.00	0.00
40–50	12.00	0.00	8.00	4.00
50 and above	12.00	0.00	8.00	4.00
Total	100.00	100.00	100.00	100.00
Average Sales Turnover				
Below 50	4.00	56.00	40.00	72.00
50–100	8.00	32.00	28.00	12.00
100–150	28.00	8.00	12.00	12.00
150–200	12.00	4.00	8.00	0.00
Over 200	48.00	0.00	12.00	4.00
Total	100.00	100.00	100.00	100.00

The relevant data for the study was collected through two structured schedules. The first schedule incorporated fifty-four questions related to five types of general enterprising tendencies (GET) or attributes of the entrepreneurs.

To measure each of these attributes a GET test was conducted (Durham

University Business School, 1988). The main entrepreneur of each firm was asked to go through the schedule of fifty-four questions divided into five sections corresponding to each of the entrepreneurial attributes. Thereafter, he was asked to indicate his agreement or disagreement with the same on an answer-sheet with shaded and unshaded boxes. The suitable number was assigned to the answer of each statement and the aggregate score corresponding to each section and for each enterprise was computed. In this way we could get firm-specific observations for each industry on each type of entrepreneurial attribute. By summing up relevant observations on each attribute we obtained the aggregate measure of GET for individual firms belonging to each industry.

The second schedule consisted of questions related to: (*i*) the characteristics of entrepreneurs; (*ii*) profile of the enterprise; and (*iii*) extent of use of intermediaries in exports. Answers to these questions were also obtained through personal interviews with the entrepreneurs.

Two types of statistical techniques were used in our study. First, a student t-test was performed to know whether the exporters differ significantly from non-exporters in terms of entrepreneurial attributes and economic characteristics such as size, age and capital-intensity. Second, a multivariable logit model was estimated to analyse the determinants of propensity to export.

Results on Discriminating Characteristics of Exporting and Non-Exporting Firms

Entrepreneurial Attributes

The result of the analysis reported in Table 3 suggests that the mean value of the risk-taking attribute in the diesel engine industry is significantly higher for export entrepreneurs than for non-export entrepreneurs. On the other hand, no significant difference in risk-taking among export and non-export entrepreneurs is observed in the chemicals industry. In chemicals, the need for achievement is found to be greater among export entrepreneurs than among non-export entrepreneurs but the difference is weakly significant. By focusing again on Table 3 we also find that the individual mean scores of the other entrepreneurial attributes, viz., need for autonomy, creativity, and drive and determination, and overall GET measure do not differ significantly between exporters and non-exporters belonging to each industry.

TABLE 3

Student T-Tests for Differences Between Entrepreneurial Attributes of Exporter and Non-Exporter Firms

Variable	*Group*	*Diesel Engine*		*Chemicals*	
		Mean	T-Value	Mean	T-Value
1. Need for unique achievement	EX	8.92	0.50	8.92	1.95**
	NEX	8.72		8.08	
2. Need for assessment	EX	2.72	–1.29	3.68	0.85
	NEX	3.08		3.40	
3. Creativity	EX	6.68	1.18	6.20	–0.62
	NEX	6.12		6.60	
4. Moderate calculated risk-taking	EX	6.32	3.14*	6.92	0.10
	NEX	5.40		6.88	
5. Drive and determination	EX	7.20	–0.69	8.12	0.24
	NEX	7.52		8.00	
6. Overall GET	EX	31.80	1.00	33.80	0.58
	NEX	30.88		32.96	

* and ** denote significant levels at 1 per cent and 10 per cent respectively.

EX = Exporter.

NEX = Non-exporter.

Two explanations can be forwarded for the insignificance of most of the variables of entrepreneurial attributes. First, the firms in our sample export standardised products whose specifications correspond to the last phase of the product life-cycle (PLC) model.[14] The main characteristics of these products are that they are internationally competitive due to price factor rather than non-price factors. Thus, in view of the ready demand for these products, their sale in the international market may not require a considerably greater degree of entrepreneurial attributes than their sale in the domestic market.

Second, most of the firms in our sample channelise predominant proportions of their exports through the intermediary organisations (see Table 4). These organisations and not the exporters themselves may have possessed the additional level of entrepreneurial attributes required for export business.

TABLE 4

Percentage Distribution of Indirect Exports by Sample Firms, 1991–92

(Per cent)

Indirect Export	*Diesel Engine*	*Chemicals*
100	84	72
90	42	8
80	4	0
70	4	0
60	0	8
50	4	4
Below 50	0	8

Economic Factors

Firm size has been widely used as a determinant of export behaviour. Value added is considered to be the most suitable measure of a firm's size.[15] Depending on the availability of data, size is measured by number of employees, fixed assets, sales turnover or value added. Our data set permits us to employ only the first three variables as measures of firm size.

The results of the t-test reported in Table 5 suggest that there exists a significant difference in the mean value of each measure of firm size between exporters and non-exporters in the diesel engine industry. In chemicals, however, the number of employees is found to be significant, average sales to be weakly significant and fixed assets to be insignificant. Weak significance and insignificance of the latter two variables have resulted from very high standard errors. Nevertheless, our results strongly support the hypothesis that, irrespective of industry, exporters are significantly larger in size than non-exporters when size is measured by the number of employees of a firm.

TABLE 5

Economic Characteristics of Exporting and Non-Exporting Firms, 1991–92

Characteristics	*Category*	*Diesel Engine*		*Chemicals*	
		Mean	T-Value	Mean	T-Value
1. Number of employees	EX	27.7	4.98*	26.2	2.33*
	NEX	5.8		14.8	
2. Fixed assets (Rs. lakh)	EX	20.5	3.58*	22.1	1.41
	NEX	10.2		16.8	
3. Average annual sales (Rs. lakh)	EX	283.7	4.37*	131.3	1.87***
	NEX	56.2		44.3	
4. Age of firm	EX	22.9	–0.84	12.4	–1.84
	NEX	24.2		10.3	
5. Capital-intensity	EX	1.22	–1.61	0.93	–2.07**
	NEX	2.26		1.42	

*, ** and *** denote significance levels at 1 per cent, 5 per cent and 10 per cent respectively.

Age of a firm in our study is measured by the length of time between the incorporation of a firm and the year 1991–92. The result on age of non-exporting and exporting firms in each industry shows that the average age of the latter is lower than that of the former (Table 5). However, the difference in mean value is insignificant in the diesel engine industry and weakly significant in chemicals. Thus, the age factor works according to the second interpretation mentioned earlier. However, it does not vary

significantly between exporters and non-exporters in general.

The mean value of capital-intensity (fixed assets as a ratio of number of employees) given in Table 5 shows that it is indeed lower for the exporting group than for the non-exporting group in each industry. However, the t-value measuring difference in mean is significant only for the chemicals industry. Thus, the Heckscher-Ohlin theory of factor proportion has been validated at least in the case of the chemicals industry.

Determinants of Propensity to Export

Model

To study the factors that influence the propensity to export, one can employ an econometric model in which the dependent variable is dichotomous, i.e., if a firm exports, the dependent variable assumes value 1, otherwise 0. In particular, we decided to use the logit model represented by the following expression:[16]

$$P = E(Y = 1; X) = (1 + e)^{z-1} \qquad (1)$$

Where,

$z = X'b, -< e^z < +$

X = vector of independent variables

b = vector of corresponding parameters

Y = dependent variable

e = base of the natural logarithm

E (Y = 1; X) = conditional expectation that export will occur, given X

P = probability that export occurs

Expression (1), known as cumulative logistic distribution function, can be transformed into the following linear expression:

$$L = \ln (P/1-P) = z = X'b \qquad (2)$$

Where,

1–P = probability that export does not occur

P/1–P = the ratio of probability that a firm will export to probability that it will not do so

ln = natural log

L is called logit and the set of equations represented by (2) is known as

the logit model. This model cannot be estimated by the ordinary least square method. Therefore, the maximum likelihood technique is used.

Empirical Estimation and Results

Whether a firm exports or not depends on several factors. The analysis of discriminating characteristics between exporting and non-exporting firms carried out in the foregoing suggests that firm size, capital-intensity, certain entrepreneurial attributes, age of the firm and industry-specific influences could be important in shaping the export decision of a firm. However, the analysis in the preceding section does not establish a causal relationship between explanatory variables and a firm's decision to export. The analysis unrealistically assumes that each variable influences the export decision independently. The logit model causally links the dependent variable with all the explanatory variables through a logit function.

The following equation is estimated by the maximum likelihood method:

$$EXPO = bo + b1.GET1 + b2.GET2 + b3.GET3 + b4.GET4 + b5.GET5 + b6.SIZE + b7.AGE + b8.CAPI + b9.IND \quad (3)$$

Where,

EXPO = In (P/1-P), $0 < P < 1$
GET1 = Need for unique achievement
GET2 = Need for autonomy
GET3 = Creativity
GET4 = Moderate and calculated risk-taking
GET5 = Drive and determination
SIZE = Average sales turnover during 1990–91 and 1991–92
AGE = Age of a firm
CAPI = Capital-intensity of a firm
IND = Industry-specific dummy variable which takes value 1 for chemicals and 0 for diesel engine firms.

In the estimation of the logit model, data on all the 100 firms was utilised. An additive dummy (IND) was used to control industry-level influences. For several reasons the size of the firm was measured by sales turnover.[17]

We now turn to our statistical analysis. Table 6 provides the descriptive statistics of all the variables used in the model. Table 7 presents the matrix

of correlation coefficients between explanatory variables. Scanning of the correlation matrix reveals that there is no serious problem of multicollinearity. The influence of independent variables on the propensity to export can be discerned from the estimated equation presented in Table 8. The equation shows that none of the variables measuring entrepreneurial attributes is significant. This implies that, contrary to our expectation, entrepreneurial attributes, after controlling for economic factors, do not significantly influence the propensity to export.

TABLE 6
Descriptive Statistics

Variables	*Mean*	*Standard Deviation*
AGE	17.45	7.77
CAP I	10.41	31.60
SIZE	128.17	195.15
GET 1	8.67	1.48
GET 2	3.21	1.13
GET 3	6.36	2.03
GET 4	6.37	1.37
GET 5	7.72	1.71
No. of observations = 100		

TABLE 7
Correlation Matrix of Explanatory Variables

Variables	*AGE*	*CAP I*	*SIZE*	*GET 1*	*GET 2*	*GET 3*	*GET 4*	*GET 5*
AGE	1.00							
CAP I	-0.27	1.00						
SIZE	0.14	-0.11	1.00					
GET 1	0.12	-0.12	0.02	1.00				
GET 2	-0.21	0.25	0.03	0.12	1.00			
GET 3	-0.07	-0.07	-0.03	0.17	0.16	1.00		
GET 4	-0.33	0.09	0.02	0.02	0.20	0.34	1.00	
GET 5	-0.10	0.22	-0.11	0.24	0.02	0.07	0.22	1.00
IND	-0.79	0.27	-0.21	-0.11	0.29	0.02	0.39	0.20

Among the economic factors, CAP I, SIZE and IND are found to be significant while AGE turns out be insignificant. The positive sign of the coefficient of the SIZE variable confirms our hypothesis that the large firms tend to export. The negative sign of CAP I is consistent with our expectation based on the Heckscher-Ohlin theorem, i.e., higher capital-intensity has an adverse impact on a firm's propensity to export. The positive sign of the coefficient IND implies that the chemical firms have a greater propensity to export than the diesel engine firms.

TABLE 8
Determinants of Probability to Export

Variables	*Coefficients*	*Coefficients*
CAP I	−0.4879	−0.4696
	(−2.84)*	(−2.83)*
AGE	−0.0640	−0.0610
	(−0.95)	(−0.94)
SIZE	0.0240	0.0248
	(3.33)*	(3.45)*
GET 1	0.3278	—
	(1.41)	
GET 2	−0.3442	—
	(−0.99)	
GET 3	0.0326	—
	(0.16)	
GET 4	0.0151	—
	(0.06)	
GET 5	0.0316	—
	(0.06)	
IND	2.1824	1.8076
	(1.94)**	(1.84)***
Constant	−2.9564	−0.6223
	(−0.98)	(−0.37)
Log likelihood	−30.24	−32.01
No. of observations	100	100

Figures in parentheses are the t-values for the respective coefficients. *, ** and *** denote levels of significance at 1 per cent, 5 per cent and 10 per cent respectively.

Conclusions

Given the importance of the small-scale sector in Indian exports, this study examined some factors which could make a group of firms exporters within a sample of firms in an industry. Two separate samples of small firms drawn from the diesel engine industry of Rajkot and from the chemicals industry of Ahmedabad were utilised for the analysis. The most important conclusion which emerges from the study is that the entrepreneurial attributes in the presence of economic factors do not have any significant impact on a firm's propensity to export. Among the economic factors, propensity to export was positively influenced by size and negatively affected by capital-intensity. These findings imply that export trade of small-scale firms is predicated on the strength of resources available with them and conforms to the Heckscher-Ohlin theorem.

Notes

1. This paper originated with a study initiated by the EDI with the financial support of the Friedrich *Naumann* Stiftung. Two former members of the EDI faculty, Ranga Kota and Sanjay Thakur, started the research and collected relevant data. However, they left the Institute before completing the study. Using the data collected by them and with additional research the first author completed a report which was submitted to the funding agency. This paper has made some use of the report but is essentially based on further research and analysis. Rakesh Basant of the Indian Institute of Management, Ahmedabad gave extremely valuable comments and suggestions during the post-report research and analysis for which we are greatly indebted. However, the usual disclaimer applies.
2. D. Nayyar, 'Indian Economy at the Crossroads: Illusions and Realities', *Economic and Political Weekly*, XXVIII-15 (1993).
3. For an excellent review of the literature see J.K. Miesenbock, 'Small Businesses and Exporting: A Literature Review', *International Small Business Journal*, VI-2 (1988).
4. Ibid.
5. Refer to J.L. Calof, 'The Impact of Size on Internationalization Process', *Journal of Small Business Management*, XXXI-4 (1993); W.K. Cheong and K.W. Chong, 'Export Behaviour of Small Firms in Singapore', *International Small Business*, VI-2 (1988); and Miesenbock, 'Small Businesses and Exporting' (n. 3 above).
6. Refer to Durham University Business School, *General Enterprising Tendency (GET) Test* (Durham: Durham University Business School, 1988).
7. Ibid.
8. Export activity can also result in a greater level of entrepreneurial attribute. Therefore, the estimated regression equation may not be free from simultaneity bias. However, developing a simultaneous logit model for this purpose is a difficult proposition.
9. Refer to J.J. Withey, 'Difference between Exporters and Non-Exporters: Some Hypotheses Concerning Small Manufacturing Business', *American Journal of Small Businesses*, V-2 (1980); Calof, 'The Impact of Size' (n. 5 above).
10. The export activity can also lead to large size for a firm. However, developing a simultaneous equation model for this purpose will be a difficult task.
11. The Heckscher-Ohlin theorem proposes that the cause of international trade is found largely in differences between the factor endowments of different countries. In particular, a country has a comparative advantage in the production of that commodity which uses more intensively the country's more abundant factor.
12. Refer to S.K. Chaddha, 'Export Performance of Public Sector and Small Sector: A Review', *SEDME*, XIX-2 (1992).
13. There is no readily available information on the export contribution of small-scale units in diesel engines or dyes and pharmaceutical industries. However, data available on the export shares of small-scale units in the engineering goods and in chemicals, which stood at 22 per cent and 25 per cent respectively in 1987–88, can be considered as rough indicators of the contributions of diesel engines and dyes and pharmaceuticals to the export sector. For the available data see Table 14 in K.V. Ramaswamy, 'Small Scale Manufacturing Industries in India: Some Aspects of Size, Growth and Structure',

Economic and Political Weekly, XXIX-9 (1994).

14. Refer to R. Vernon, 'International Investment and International Trade in the Produce Cycle', *Quarterly Journal of Economics*, LXXX-2 (1966).
15. For a discussion on this issue see P.K. Keshari, *Export Performance in Indian Engineering Industry* (Delhi: Seema Publications, 1988).
16. D.N. Gujarati, *Basic Econometrics* (New York: McGraw-Hill Book Company, 1988).
17. We have preferred to measure size by sales turnover for three reasons. First, the data on value added—the best measure of firm size—was not available. Second, in India a firm is classified as small if the value of its fixed assets does not exceed a certain limit. Therefore, the small firms generally expand by substituting labour for capital. Thus, measuring size in our study merely by the value of fixed assets would amount to underestimation of size. Moreover, measuring size by the value of fixed assets in any case ignores the contribution of labour to firm size. Similarly, the use of 'number of employees' as a measure of size does not take into account the contribution of capital to firm size. And finally, as a measure of firm size, sales is most widely used in empirical research.