INDUSTRIAL ENTREPRENEURSHIP IN INDIA: A REEVALUATION

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INTRODUCTION

A PRINCIPAL issue in entrepreneurship research is the identification of the appropriate unit of analysis. Is the emergence of entrepreneurship and the degree of entrepreneurial success a group phenomenon distributed disproportionately across a population or is there no relationship between groups and incidence of entrepreneurial endeavor? Examinations of industrial entrepreneurship in India have placed special emphasis on this issue because of the presumed influence of caste stratification. Studies of Indian industrial entrepreneurship by James J. Berna, R. A. Sharma, and E. Wayne Nafziger have yielded considerable data on the relationships between entrepreneurial activity and social community identification [1] [6] [8]. The present study applies formal statistical hypothesis testing procedures to these data in order to: clarify certain methodological problems in each of the studies which undermine substantive interpretation; reanalyze the data to focus more directly on the question of individual versus group explanations of entrepreneurship.

I. INDUSTRIAL ENTREPRENEURSHIP IN MADRAS STATE, 1957

J. J. Berna interviewed fifty-two firms out of a population of fifty-nine medium-size light-engineering firms in the South Indian state of Madras in 1957. Firms employing between 50 and 250 employees were considered as being medium-size. Berna focused on the individuals responsible for the existence of new industrial enterprises. He sought among other objectives to evaluate their performance, principally through analyses of enterprise growth and size. He concluded that no single social community or occupational background dominates in accounting for origin of firms.

Berna's data have been reclassified and are reported in Table I. Industries are classified as agricultural producer goods, nonagricultural producer goods, and nonagricultural consumer goods. There are four categories of occupational background: domestic merchant or importer; rural artisan, factory worker, or manufacturer; graduate engineer; and miscellaneous (four cultivators, two bus operators, one textile mill technician, one teacher, one construction salesman, and one shoe salesman). Social community is classified into Naidu, Brahman, Chettiar, Naicker, and miscellaneous (Asari, Christian, Gounder, Gujerati, Muslim, and Punjabi).

TABLE I

INDUSTRIAL ENTREPRENEURSHIP IN MADRAS STATE

	Employment				Investment 1956 ($)	Age of Firm (yrs)	Industry			Occupational Background				Social Community				
	Firm I.D. No.	Initial	1956	Average Annual Increase			I_0	I_1	I_2	O_0	O_1	O_2	O_3	S_0	S_1	S_2	S_3	S_4
Firms established by rural artisans	1	n.a.	72	—	34,650	73	1				1							1
	2	n.a.	52	—	30,666	41	1				1							1
	3	n.a.	55	—	35,700	36		1			1							1
	6	n.a.	218	—	229,320	33	1				1			1				
	33	5	124	9.2	23,100	13		1			1						1	
Firms established by former factory workmen	17	6	72	4.4	64,680	15	1				1			1				
	18	12	118	8.2	91,770	13	1				1			1				
	31	2	75	9.1	19,320	8	1				1			1				
	40	16	80	10.7	22,050	6		1			1						1	
	47	22	52	15.0	20,370	2	1				1			1				
	48	35	51	16.0	23,100	1		1			1			1				
Firms established by domestic merchants and importers	4	20	144	3.5	63,000	35		1		1					1			
	5	n.a.	67	—	47,880	34	1			1						1		
	8	12	122	4.8	137,340	23			1	1					1			
	13	79	68	0.6	47,250	17		1		1							1	
	14	n.a.	53	—	30,870	16		1		1							1	
	20	10	51	3.4	85,050	12	1			1						1		
	21	17	54	3.4	24,150	11		1		1						1		
	28	25	100	7.5	68,040	10		1		1							1	
	34	25	103	9.75	16,170	8			1	1						1		
	42	27	51	4.8	28,980	5			1	1							1	
	38	n.a.	65	—	46,620	5			1	1						1		
	43	57	200	28.6	171,990	5			1	1							1	
	44	19	77	14.5	n.a.	4			1	1						1		
	45	25	65	10.0	59,010	4		1		1					1			
	46	n.a.	60	—	n.a.	2		1		1					1			
Firms established by graduate engineers	10	n.a.	100	—	36,750	22		1				1			1			
	11	18	53	1.9	23,100	18	1					1				1		
	15	6	82	4.8	66,990	16		1				1			1			
	16	3	72	4.6	36,120	15	1					1			1			
	19	10	80	5.8	85,050	12		1				1			1			
	23	20	248	20.7	n.a.	11		1				1		1				
	30	11	57	5.1	30,450	9		1				1			1			
	35	12	56	5.5	31,920	8			1			1			1			
	36	10	79	8.6	41,580	8	1					1		1				
	52	53	53	0.0	27,090	1		1				1		1				
Firms established by manufacturers	27	9	53	4.4	22,890	10	1				1					1		
	29	27	65	3.8	131,250	10			1		1					1		
	37	60	150	11.3	111,930	8			1		1			1				
	51	20	60	40.0	23,100	1	1				1			1				

TABLE I (Continued)

	Firm I.D. No.	Employment: Initial	Employment: 1956	Employment: Average Annual Increase	Investment 1956 ($)	Age of Firm (yrs)	Industry: I_0	Industry: I_1	Industry: I_2	Occupational Background: O_0	Occupational Background: O_1	Occupational Background: O_2	Occupational Background: O_3	Social Community: S_0	Social Community: S_1	Social Community: S_2	Social Community: S_3	Social Community: S_4
Firms established by entrepreneurs of miscellaneous backgrounds	7	n.a.	89	—	39,270	31	1						1	1				
	9	n.a.	87	—	26,250	22		1					1		1			
	12	29	90	3.4	85,050	18		1					1	1				
	24	70	250	16.4	123,270	11			1				1				1	
	25	18	114	9.6	47,880	10		1					1	1				
	32	9	52	5.4	15,750	8		1					1	1				
	39	3	53	8.3	22,890	6		1					1		1			
	41	27	58	5.2	18,690	6	1						1	1				
	49	30	75	45.0	28,350	1		1					1	1				
	50	n.a.	60	—	n.a.	1			1				1	1				

Source: [1, pp. 45, 50, 57, 61, 71, 79].

Note: Industry: $I_0=1$ if agricultural producer goods (base group); $I_1=1$ if nonagricultural producer goods; $I_2=1$ if nonagricultural consumer goods. Occupation: $O_0=1$ if domestic merchant or importer (base group); $O_1=1$ if rural artisan, factory worker, or manufacturer; $O_2=1$ if graduate engineer; $O_3=1$ if miscellaneous. Social community: $S_0=1$ if Naidu (base group); $S_1=1$ if Brahman; $S_2=1$ if Chettiar; $S_3=1$ if miscellaneous; $S_4=1$ if Naicker.

The statistical model which will be employed to analyze the data of Table I is the general linear regression model. Some of the variables are quantitative (age of firm and two versions of the dependent variable, employment and investment) and some are qualitative (industry, occupation, and social community). The statistical objective is to determine the impact of industry, occupation, and social community on investment (and employment) of the firm, after the effect of age of firm is taken into account.

Industry, occupation, and social community are dummy variables which take on a value of 1 if the indicated attribute is present and a value of 0 otherwise. It is necessary that one industry, one occupation, and one social community be used as a base group [10, pp. 548–51]. Accordingly, the regression coefficient of, e.g., Brahman ($S_1=1$) will, if it is positive, indicate that Brahman firms hire more workers (or have more investment) than a Naidu (base-group) firm. If the t-value of the regression coefficient is $+2.68$ (-2.68) or greater, then Brahman firms are significantly better (worse) than Naidu firms with respect to number of employees or amount of investment.

Two of Berna's firms have been excluded from Table I which contains, in the first column, the identification number he gave to his firms. His firm No. 26 had 412 employees in 1957 and was a branch of firm No. 22 which had 4,434 employees. As can be seen from Table I, no other firm had over 250 employees and the inclusion of these two large firms would have distorted the results considerably (in favor of nonagricultural producer goods, Naidus, and graduate engineers). For this reason these two firms were deleted and the net sample size is fifty firms.

The statistical analysis was performed by the BMD-03R multiple regression program. The results are reported separately below for the two variants of the dependent variable (Y), employment and investment in the firm. The t-values are reported in parentheses underneath the regression coefficients. The base groups have been suppressed[1] (I_0=agricultural producer goods, O_0=domestic merchants or importers, S_0=Naidu) and the regression coefficients for the reported industry, occupation, and social community groups are measured relative to the respective base groups. Hence, the null hypothesis is that there is no difference between the base group intercepts and those for the dummy variable groups. The t-values for regression coefficients which are significant at the .01 level are denoted by asterisks (*).

LEVEL OF EMPLOYMENT IN 1956 AS DEPENDENT VARIABLE (Y)

$$Y = 47.0 + \underset{(3.43)*}{2.52}\ \text{Age} + \underset{(1.13)}{20.3}\ I_1 \text{ (nonagricultural producer good)} + \underset{(2.89)*}{60.6}\ I_2 \text{ (nonagricultural consumer good)} + \underset{(.62)}{13.0}\ O_1 \text{ (artisan, factory worker, or manufacturer)} + \underset{(.94)}{19.5}\ O_2 \text{ (graduate engineer)} - \underset{(-.01)}{.2}\ O_3 \text{ (miscellaneous occupation)} - \underset{(-1.77)}{37.1}\ S_1 \text{ (Brahman)} - \underset{(-2.13)}{47.3}\ S_2 \text{ (Chettiar)} + \underset{(.17)}{3.9}\ S_3 \text{ (miscellaneous social community)} - \underset{(-3.24)*}{133.1}\ S_4 \text{ (Naicker).}$$

$R = .62 \qquad F(10, 50) = 2.39^{**}$

**Significant at .05 level.

The following conclusions can be drawn from the above regression equation: (1) The only variables significant at the .01 level are age of firm, nonagricultural consumer goods, and the Naicker social community. Age of firm is significantly positively correlated with level of employment.[2] Nonagricultural consumer goods are significantly superior to agricultural producer goods, and the Naidus are significantly superior to the Naickers, as far as level of employment is concerned. (2) The best industry in terms of impact on employment is the consumer goods industry. The best occupational background in the same sense is that of graduate engineer. Brahman firms hired fewer employees than the Naidu, but the worst firms in this regard were the Chettiar and Naicker.

LEVEL OF INVESTMENT IN 1956 AS DEPENDENT VARIABLE (Y)

$$Y = \$32{,}964 + \underset{(2.75)*}{\$1{,}994}\ \text{Age} + \underset{(.13)}{\$2{,}330}\ I_1 \text{ (nonagricultural producer good)} + \underset{(2.67)}{\$56{,}206}\ I_2 \text{ (nonagricultural consumer good)} + \underset{(.49)}{\$9{,}894}\ O_1 \text{ (artisan, factory worker, or manufacturer)} - \underset{(-.75)}{\$9{,}816}\ O_2 \text{ (gradute engineer)} - \$16{,}155\ O_3$$

[1] "Suppression" of base groups means that the data in columns I_0, O_0, and S_0 were not punched on the data cards for the BMD program. If they had been, the data matrix would have been "singular" and as a result the required matrix inverse would not have existed.

[2] This was also a finding of Nafziger [6, p. 32].

$$\text{(miscellaneous occupation)} - \underset{(-.62)}{\$13{,}608\ S_1}\ \text{(Brahman)} - \underset{(-1.52)}{\$32{,}862\ S_2}\ \text{(Chettiar)}$$
$$- \underset{(-.55)}{\$12{,}198\ S_3}\ \text{(miscellaneous social community)} - \underset{(2.77)*}{\$109{,}674\ S_4}\ \text{(Naicker).}$$

$R = .61 \qquad F(10, 50) = 2.03^{**}$

**Significant at .05 level.

The following conclusions can be made from the above regression equation: (1) The only variables significant at the .01 level are age of firm and the Naicker social community (relative to the Naidu base group). However, only three Naickers were included in the fifty firms and the statistical significance is due primarily to the narrow range of variability in the three firms sampled. (2) The best industry in terms of impact on investment is the nonagricultural consumer goods industry (significantly best at the .05 level but not at the .01 level). (3) The best occupational background for investment impact is that of artisan, factory worker, or manufacturer, rather than that of graduate engineer which is now second worst. (4) The best social community for its impact on investment is the Naidu.

After allowing for age, industry, and occupation and relative to the Naidu base group, investment is $13,608 less in Brahman firms, $32,862 less in Chettiar firms, and $109,674 less in Naicker firms (this last result should be regarded as a statistical anomaly, not only because there were only three Naicker firms but also because these were also the three oldest firms).

A. *Employment Growth of Firms*

Berna has pointed out that it is not only important that entrepreneurs establish new enterprises, but also that their firms expand in size (at least up to a point) so as to achieve economies of scale and to exploit the expertise which is generated by experience (learning curve). He also wished to test McCrory's hypothesis that small firms rarely develop into medium- and large-scale units [5].

Table II presents the employment growth experience of the thirty-eight firms for which the data are available by industry, occupational background, and social community. With the exception of the miscellaneous occupational group, all groups manifested an employment growth rate which was significant at the .05 level. An unusually high growth rate by the Brahmans (8.56 standard errors above a zero growth rate) is due in part to the limited amount of variation for the Brahman firms whose growth ranged over a narrow interval of 3.5 to 10.0 employees per year per firm, with an average growth of 5.82.

Annual employment growth by type of industry (product) and by occupational background was examined but no significant relations emerged. For annual employment growth by social community, it was found that the Naidu had a significantly higher growth rate than the Brahman or the Chettiar.[3]

[3] The t-test for the Naidu-Brahman comparison was based on $t = (13.46 - 5.82) \div \sqrt{3.35^2 + .68^2}$ and for the Naidu-Chettiar comparison, $t = (13.46 - 5.89) \div \sqrt{3.35^2 + 1.72^2}$.

TABLE II

AVERAGE ANNUAL EMPLOYMENT GROWTH

Grouping	Sample Size	Sample Average	Standard Error	*t*-value
A. Industry				
Nonagricultural consumer good	9	11.06	2.67	4.14**
Agriculture	11	9.53	3.24	2.94*
Nonagricultural producer good	18	9.32	2.43	3.84**
	38			
B. Occupational background				
Miscellaneous	7	13.33	5.52	2.41
Artisan, factory worker, mfgr.	11	12.01	3.05	3.94**
Trader-merchant	11	8.15	2.39	3.41**
Engineer	9	6.33	1.97	3.21*
	38			
C. Social community				
Naidu	15	13.46	3.35	4.02**
Miscellaneous and Naicker	7	10.94	3.55	3.08*
Chettiar	7	5.89	1·72	3.42*
Brahman	9	5.82	.68	8.56**
	38			

Note: Asterisk(s) denotes that average annual employment growth is significantly different from zero at the .05 (.01) level of significance.

B. *Berna Summarized*

Berna concluded that "It has not been possible to correlate entrepreneurs' performance with social or economic background. Enterprising and capable industrialists are found in all groups" [1, p. 217]. In other words, he argued it was not possible to sustain a group explanation. Our own reanalysis of Berna's data, however, indicates that age of firm, type of industry, and Naicker social community are significant variables. Type of industry would lend itself to either side of the issue we are exploring. Age of firm might also except that, if we remember that Berna sampled surviving firms, it would seem to suggest that age of firm might be a surrogate for factors which account for organizational growth and perseverence rather than entrepreneurial skills per se.

The regression equations did not demonstrate the clear superiority of any one social community, or occupational background, in association with successful entrepreneurship. There is evidence, however, of a systematic relationship between Naicker social community status and relatively "low" entrepreneurial success.

The dynamic growth of small firms has been confirmed for all social communities, industry categories, and major occupational groupings. This may be regarded as evidence against the McCrory hypothesis that small firms stay small, but there is an important difference between arguing that all firms which survive also grow and arguing that the likelihood of entrepreneurial emergence is not related to group level factors. As we suggested earlier, since all of Berna's firms

were successfully surviving organizations, we cannot use his data to go beyond exploring relative degrees of success.

II. INDUSTRIAL FAMILY-ENTREPRENEURSHIP IN INDIA, 1947–72

R. A. Sharma recently sampled 317 manufacturing firms, which came for public issue, out of approximately 400 public issues undertaken between 1947 and 1972 by manufacturing and nonmanufacturing companies which became incorporated over that time-span. Noticing that most of the company promoters could be "easily grouped into families" [8, p. 39], he examined the background of the most important family in each firm. Since many families are active in more than one company, a total sample of 233 families was obtained. Families were classified as "old families" (composed of large industrial houses, as enumerated by the Industrial Licensing Policy Inquiry Committee, and families which also started their companies before independence in 1947 but whose firms were not yet large) and "new families" which founded their firm after independence. Sharma's data facilitate an assessment of the significance of independence for patterns of entrepreneurial development in Indian industry, specifically through comparison of the strengths of established (pre-independence) and emerging (post-independence) entrepreneurial families. In his analysis Sharma seeks to "identify those who are participating" in the development of new firms and to "shed light on the cadres the entrepreneurs are being drawn from" [8, p. 39].

TABLE III

OLD- AND NEW-FAMILY ENTREPRENEURSHIP BY GEOGRAPHIC ORIGIN

	Old Family	New Family	
Bengalis	1 (3.7)	9 (6.3	10
Gujaratis	19 (19.9)	35 (34.1)	54
Maharashtrians	4 (3.7)	6 (6.3)	10
Marwaris	22 (17.3)	25 (29.7)	47
Punjabis	10 (10.3)	18 (17.7)	28
South Indians	20 (16.2)	24 (27.8)	44
Uttar Pradesh	4 (3.7)	6 (6.3)	10
Miscellaneous	6 (11.1)	24 (18.9)	30
Total	86	147	233

Source: [8, pp. 53–54].
Note: The table shows observed number of family-entrepreneurs with number expected listed in parentheses. Number expected is the number which would be expected if geographic origin and newness of entrepreneurship were independent.

Sharma's conclusions are that: (1) The major initiative for new industry has come from the old families. (2) The Brahmans, Kammas, Kayasthas, Khatris, Naidus, Patels, Sikhs, and Sindhi Hindus have made rapid advances. (3) Punjab, Bengal, Maharashtra, Haryana, and Uttar Pradesh have become significant new geographical sources of supply of entrepreneurs, in addition to the already famous areas of South India, Gujarat, and Marwar.

These conclusions, however, are problematical. Table III indicates the numbers observed and the numbers expected (shown in parentheses) on the assumption of no relationship between geographical origin and newness of family. Sharma's analysis is contravened at several points. Table III demonstrates that those from South India, Marwar, Maharashtra, and Uttar Pradesh have fewer than expected among the new families and those from Punjab and Gujarat have just about the number expected. Only the Bengalis and the miscellaneous (composed of a scattering of Parsis, Sindhi Hindus, Oriya, Kashmiri Brahman, other North Indians, and Rana of Nepal) have representations much greater than expected.

A direct statistical test based on Table III can be made to determine if the major initiative for new industry has come from the old families. If this con-

TABLE IV

OLD- AND NEW-FAMILY ENTREPRENEURSHIP BY SOCIAL ORIGIN

	Old-Family Entrepreneurs	New-Family Entrepreneurs	Total
Banias	42 (38.0)	61 (65.0)	103
Brahman	12 (11.8)	20 (20.2)	32
Kammas and Naidus	5 (3.3)	4 (5.7)	9
Kayasthas	0 (2.6)	7 (4.4)	7
Khatris	8 (6.3)	9 (10.7)	17
Mudaliar	3 (2.2)	3 (3.8)	6
Muslim	0 (1.8)	5 (3.2)	5
Patels	3 (4.8)	10 (8.2)	13
Sikhs	0 (2.2)	6 (3.8)	6
Not known	5 (4.1)	6 (6.9)	11
Miscellaneous	8 (8.9)	16 (15.1)	24
Total	86	147	233

Source: [8, pp. 53–54].

Note: The table shows observed number of family-entrepreneurs with number expected listed in parentheses. Number expected is the number which would be expected if social origin and newness of entrepreneurship were independent.

clusion is true, one should be able to reject a null hypothesis of no relationship between geographical origin and newness of entrepreneurship. A chi-square test was conducted and the null hypothesis of no relationship was accepted at the .05 level of significance.[4]

Table IV indicates the numbers observed and the numbers expected (shown in parentheses) on the assumption of no relationship between social origin and newness of family. Table IV suggests that the Brahman, Khatris, Kammas, and Naidus have *fewer* than expected among the new families, the Kayasthas and Sikhs somewhat more than expected, and the Patels, "Not known," and "Miscellaneous" (a scattering of Baidya, Bhatia, Chettiar, Gounder, Jats, Lohanas, Marathas, Parsis, Rajput, Rana, Sindhi Hindus, Suvarnabanik, and Syrian Christian) about the number expected.

A chi-square test can also be based on Table IV to determine if the major initiative for new industry has come from the old families. The null hypothesis, however, cannot be rejected at the .05 level of significance.[5] Thus, while there is evidence of some relationship between particular groups and regions and entrepreneurial activity, Sharma's attempt to argue that the relationship extends to a specific breakdown of entrepreneurial agents—old and new families—is not sustained.

III. SMALL-SCALE MANUFACTURING ENTREPRENEURS IN ANDHRA PRADESH, 1971

E. Wayne Nafziger interviewed fifty-four entrepreneurs out of a population of fifty-eight small-scale manufacturing firms in Vizag City, Andhra Pradesh. The fifty-eight firms were those firms employing five or more employees which were registered with the Industrial Department of Vizag District between 1958 and 1970 and which were still in business early in 1971. One entrepreneur had three firms, another had two and one firm could not be located so that the sample consisted of fifty-four entrepreneurs. Nafziger's objective was to identify factors related to the supply of entrepreneurs, particularly the distribution of these factors between various portions of the population. Nafziger sought to locate such factors through delineation of the differences between characteristics of entrepreneurs and the population as a whole. This is an important nuance because it is a step towards making testable some basic assumptions about what are uniquely entrepreneurial attributes.

The following are some of the conclusions reached by Nafziger: (1) A disproportionally high percentage of entrepreneurs are from high Hindu castes—Brahman, Kshatriya, and Vaishya. (2) The Sudras, although 57 per cent of the population, are only 28 per cent of the entrepreneurs. (3) Entrepreneurship

[4] The computed chi-square value was 10.4 whereas the tabled .05 level chi-square value was 14.1. Computed values which are larger than the tabled critical values lead to rejection of the null hypothesis of no relationship. See [3, pp. 301–4].

[5] The computed chi-square value was 15.2 whereas the critical chi-square value at the .05 level of significance is 18.3.

is hierarchically predetermined: "The evidence in the study indicates that members of high castes and dominant classes can avert the threat of democratization and industrialization by using their property, influence and education to accumulate more wealth, to obtain favorable concessions in jobs and businesses, and to invest in education, training, and industrial capital" [6, p. 48].

A reanalysis of Nafziger's data, however, suggests these conclusions are misleading. Table V provides a comparison between entrepreneurial groups as a percentage of the sample of entrepreneurs and as a percentage of the population of Vizag City.

A statistical test (column 6 of Table V) was made of the significance of the difference between the observed percentages (column 2) and the expected percentages (column 3). Nafziger was correct in asserting that a disproportionately high proportion of entrepreneurs were from the twice-born (high) castes composed of Brahman, Kshatriya, and Vaishya (the observed number of high-caste entrepreneurs was 3.13 standard errors above the number expected on the assumption of independence). This is, however, a misleading assertion because the proportion of Brahman entrepreneurs was actually below expectation (.08 standard errors below expectation) and the proportion of Kshatriya in the sample of entrepreneurs was not significantly different from their proportion in the population of Vizag City. The significance of twice-born castes is due to the fact that the observed proportion of Vaishya was much higher (4.88 standard errors higher) than was expected.

Table V does reveal that the Sudras are underrepresented in the sample of entrepreneurs. Nevertheless, the underrepresentation is not significant at the .10 level.[6] Furthermore, the Sudras are a highly heterogeneous group for which

TABLE V

INCIDENCE OF ENTREPRENEURS BY SOCIAL COMMUNITY IN VIZAG CITY

Group	(1) Sample Size	(2) Proportion in Sample of Entrepreneurs	(3) Proportion in Population of Vizag City	(4) Difference (2) − (3)	(5) Standard Error of Difference[a]	(6) z-value (4) ÷ (5)
Twice-born castes[b]	28	.5184	.2595	.2589	.0828	3.13*
Brahman	11	.2036	.2145	−.0109	.1237	−.08
Kshatriya	5	.0926	.0235	.0691	.0677	1.03
Vaishya	12	.2222	.0215	.2007	.0419	4.88*
Muslim	7	.1296	.0130	.1166	.0428	2.76*
Sudra	15	.2778	.5685	−.2907	.1279	−2.28
Nonlocal-born entrepreneurs	18	.259	.059	.200	.0555	3.64

Source: [6, p. 49].

[a] Calculated as $\sqrt{p(1-p)/n}$ where for the Brahman, e.g., $p=.2145$, $n=11$.

[b] Composed of Brahman, Kshatriya, and Vaishya ("high castes").

* Significant at the .02 level.

[6] It is difficult to assess the level of significance when multiple comparisons are made using the Student's t-test since the comparisons are not independent. An approximation of the

generalizations are at best risky: "In the middle regions of the varna *hierarchy,* caste standing is at times vague and flexible. In fact, the Sudra categories range from powerful and rich *jatis* with a relatively high ritual status to those whose assimilation into Hinduism is only marginal."[7] Among the Sudra *jatis* are the Kammas, a farming caste, and the Naidus, a relatively new group (there were no separate Naidu *jati* before 1900) [6, p. 8]. Berna's data suggest that the Naidu were the best entrepreneurial group with respect to investment and second best with respect to employment. Contrarily, Sharma's data point to underrepresentation of the Naidus (and Kammas) among the new-family entrepreneurs. Even generalization with regard to the Naidu *jati* appears risky.

The Vaishyas of Table V were typically not born within Andhra Pradesh [6, p. 9] and hence have a higher incidence of nonlocal-born entrepreneurs. That the status of being an immigrant might be a significant factor in determining entrepreneurship was recognized by Nafziger: "In general, immigrants from other states, who were less likely to be bound by local values, obligations, sanctions, and caste mores, were more highly represented and more successful than entrepreneurs from within the state" [6, p. 47].

Table V confirms that nonlocal-born entrepreneurs are overrepresented in the sample of entrepreneurs by a highly significant amount (3.64 standard errors above expectation). The significantly high representation of entrepreneurs among the Vaishya appears due at least in part to the fact that nonlocal-born entrepreneurs are overrepresented within the Vaishya entrepreneurs. Of twelve Vaishya entrepreneurs, 67 per cent were nonlocal-born; of the Vizag City populace, only 5.9 per cent were nonlocal-born.

Table VI shows that the observed number of nonlocal-born is higher than expected by a somewhat wide margin for both the Vaishya and the "Miscellaneous" (Parsi, Sikh, and Syrian Christian). A statistical test was undertaken to determine if the null hypothesis of no relationship between social community and immigrant status could be rejected. A chi-square test revealed that a significant relation does exist at the .001 level.[8] As a result, it appears that Nafziger's results can be explained on the basis of interaction between immigrant status and social community rather than on the basis of social community alone.

That is not an unexpected result. The Vaishya community, particularly of Gujerati or Marwari origin, is widely recognized as a community in which migration and the founding of new enterprises have high incidence. The same

upper bound of the overall significance level can be obtained by multiplying the number of comparisons (5: Brahman, Kshatriya, Vaishya, Muslim, and Sudra) by the chosen a priori significance level for a single test (1 per cent per tail in a 2-tailed test=.02). Hence, 5×.02 yields a .10 overall level of significance. See [7, p. 80].

[7] See [6, p. 4]. The *varna* classification system for Hindus consists of (1) Brahman (priest); (2) Kshatriya (ruler and warrior); (3) Vaishya (trader); (4) Sudra (artisan, peasant, and laborer); (5) Harijan (untouchable). More specific social strata classifications can be made on the basis of *jati.*

[8] The computed chi-square value was 22.7 and the critical tabled chi-square value at the .001 level is 20.5.

TABLE VI

NATIVITY OF ENTREPRENEURS BY SOCIAL COMMUNITY

Social Community	Local-Born Entrepreneurs	Nonlocal-Born Entrepreneurs	
Brahman	9 (7.3)	2 (3.7)	11
Kshatriya	5 (3.3)	0 (1.7)	5
Vaishya	4 (8.0)	8 (4.0)	12
Sudra	14 (10.0)	1 (5.0)	15
Muslim	4 (4.7)	3 (2.3)	7
Miscellaneous	0 (2.7)	4 (1.3)	4
Total	36	18	54

Source: [6, p. 49].

Note: The table shows observed number of entrepreneurs with number expected listed in parentheses. Number expected is the number which would be expected if nativity of entrepreneur and social community were independent.

association of high incidence of migration and founding of few enterprises is also characteristic of Parsis, Sikhs, and Syrian Christian communities.[9]

CONCLUSION

A reading of the literature on entrepreneurship suggests that two hypotheses are rivals for consideration: (1) H_0 (null hypothesis). There is no relationship between groups of individuals and successful entrepreneurial endeavor. Entrepreneurial ability, like the ability to sing, is randomly distributed throughout a society. Entrepreneurship is a very democratic phenomenon. (2) H_A (alternative hypothesis). There is a significant relationship between group level processes and entrepreneurial activity. Particular groups of individuals can be identified as entrepreneurial-prone. Entrepreneurial supply can best be elicited by focusing attention on these groups rather than by diffuse macro level policies. Entrepreneurship is not democratic in nature—some groups of individuals can be viewed as the "elite" insofar as entrepreneurial ability is concerned.

The evidence presented in this paper strongly suggests that there is no *abiding* and *generalized* relationship between entrepreneurial success and groups of individuals distributed over regions and over time. As one example, Berna's 1957 graduate engineers had the best impact on level of employment but had close to the worst impact on level of investment. As another example, Berna's 1957 Brahman was close to the worst with respect to both level of employment and investment, but Singer's 1964 Brahman in Madras State dominated entrepre-

[9] The authors acknowledge the assistance of Mr. Richard Morse for bringing this point to our attention.

neurship (nine of the nineteen entrepreneurs were Brahman) [9, p. 299]. And, although Kammas and Naidus were underrepresented among new family entrepreneurs according to Sharma's study in 1973, the Naidus were the most successful entrepreneurs in terms of level and growth of employment according to Berna's 1957 data.

But certain caveats need to be entered. The studies cited herein say very little about probabilities of entrepreneurial emergence, although they direct themselves to a specific joint probability: a group will yield entrepreneurs *and* the entrepreneurs will be successful. The group-individual issue in entrepreneurship modeling resides not in the latter part of the joint probability—that of success—but principally in the first part—that individuals will appear—and secondarily in the joint probability that individuals will appear and be successful.

A second caveat is that in order to provide evidence on the factors related to the identification and distribution of that joint probability across a population, it is critical to study those who emerge as entrepreneurs but *fail*. Kenneth Bock has argued that: "If a statement of process is to be tested and possibly refuted, then we must guard against using procedures of verification suggested by the assumptions implicit in the statement itself. . . . We cannot, in other words, test a generalization by means that imply the truth of the generalization" [2, p. 116].

We believe this admonition applies to entrepreneurial research. More rigorous hypothesis testing needs to be implemented. Until then, we have to conclude that the entrepreneur will remain analogus to the Heffalump in Winnie-the-Pooh: "The Heffalump is a rather large and very important animal. He has been hunted by many individuals using various ingenious trapping devices, but no one so far has succeeded in capturing him" [4, p. 1].

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