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Determinants of Labor Supply in a Developing Economy : An Integration of Demographic and Non-Demographic Factors

Introduction

THE focus of this paper is on the determinants of labor supply in the con- text of developing economies. More particularly, our concern is to identify the critical factors which influence the behaviour of labor force participation rates, unemployment rates, and the industrial structure of the labor force. Previous studies have tended to attribute principal importance to population variables such as age structure and the rate of growth of population. Myrdal, however, has argued for an expanded discussion of these issues to take into account such elements as nutrition, levels of living, health, and education.[1] This study seeks to enlarge on previous inquiries by considering the influence of various socio-economic and cultural variables in addition to the role of demographic factors. In particular, the impact on labor supply of changes in income, health, education, urbanization, and population growth will be explored in an integrated framework. These multiple aspects, when viewed together, constitute a relatively unexplored area of research in developing countries.

1. Gunnar Myrdal, *Asian Drama : An Enquiry into the Poverty of Nations,* Volume II, New York : Pantheon, 1968, p. 592.

The orga nization of the paper is as follows : in Section I we review earlier empirical findings on the relation of income, health, education, and urbanization, demographic and cultural factors to labor supply in India—the country we have selected for analysis; Section II develops a new theoretical framework and concludes with three hypotheses which are tested in Section III using data from the 1961 Census of India. The final section briefly explores some of the policy implications which flow from the empirical results.

Review of the Literature in the Case of India

The purpose of this section is to examine the available longitudinal evidence in order to assess the historical relation in India between labor supply on the one hand and assorted demographic and non-demographic influences on the other. The review focuses, successively, on labor force participation rates, unemployment, and the composition of the labor force by primary, secondary, and tertiary industries. Our two principal sources of data on the labor force in India are the decennial censuses and the various rounds of the National Sample Survey.

Labor Force Participation

Table 1 presents data on the growth the work force from 1911 to 1961.[2] From the table it is clear that the work force has been growing at a slower rate than that of the total population, resulting in a secular decline in crude activity rates (column 3) up to 1961.

It is evident that changes in age structure from census to census do not by themselves account for the decline in crude activity rates. For instance, between 1931 and 1951 changes in age composition could explain only one-half of the decrease in activity rates from 43.3 per cent to 39.1 per cent.[3] More-

2. There was no tabulation of the economic status of the population in the 1941 Census of India.

3. This can be seen by assuming that age composition was the only variable which changed between 1931 and 1951, in other words, by multiplying the 1931 ratio between the work force and the population aged 15-59 (i.e , 0.7195) times the 1951 proportion of the population in the age interval 15-59 (i.e., 0.5707). The resulting product equals 41.06, a figure approximately half-way between 43.3 and 39.1.

over, crude activity rates for both males and females increased between 1951 and 1961 when the proportion of the population aged 15 to 59 declined for both sexes. Thus we must look for other factors, in addition to changes in population structure, which affect labor force participation over time.[4]

TABLE 1—GROWTH OF WORK FORCE IN INDIA, 1911-1961

Year	*Sex*	*Percentage of workers to total Population*	*Percentage of population in age 15-59 to total population*	*Percentage of work force to total population in age 15-59*
(1)	*(2)*	*(3)*	*(4)*	*(5}*
1911	Persons	48.07	60.23	79.81
	Males	61.90	60.35	102.56
	Females	33.73	60.11	56.13
1921	Persons	46.92	59.64	78.65
	Males	60.52	59.84	101.13
	Females	32.67	59.44	54.96
1931	Persons	43.30	60.19	71.95
	Males	58.27	60.59	96.17
	Females	27.63	57.77	*623
1951	Persons	3910	57.07	68.49
	Males	54.05	57.55	93.30
	Females	23.30	56.57	41.19
1961	Persons	42.98	54.41	78.99
	Males	57.12	54.77	104.28
	Females	27.96	54.03	51.74

SOURCE : B. R. Kalra, "A Note on Working Force Estimates, 1911-1961," Census of India (1961), *Paper No. 1 of 1962, Final Population Totals,* New Delhi, 1962, Appendix I

4. While it is probably true that changes in definitions, concepts, and enumeration practices from census to census have accounted for some alterations in labor force participation rates over time, our concern is to identify social, economic, and cultural institutional factors related to these occurrences.

The relative growth of the urban population and, especially, the growth in the size of the larger cities have had an impact on labor force participation. The percentage of India's population residing in urban areas increased steadily from 11.4 per cent in 1921 to 18 per cent in 1961.[6] Since labor force parti cipation rates tend, typically, to be lower for both males and females in urban areas than in rural areas,[6] the historical impact of urbanization on crude acti vity rates has been negative.

As recently as 1961 in India, about 62 percent of males of all ages and 85 per cent of all females wera illiterate ; only three per cent of all males and less than one per cent of females possessed a higher education,[7] Despite these discouraging figures, dramatic progress in enrolments has been made over the past two decades. During the period 1951-1965, the average annual rate of growth in the number of students enrolled at various levels of education ranged from 5.6 per cent for the pre-primary level to 11.3 per cent for the higher secondary level.[8] The general tendency of increased enrolments is to depress labor force participation rates at the younger ages. This is particularly true when the beneficiaries of compulsory education belong to low-income groups because it is at these status levels that education competes most effectively with labor market activity for a person's time. Among higher income groups, a more common alternative to schooling for children aged 6-15 is staying at home, a fact which mitigates the negative effect of education on activity rates.

India is known to have one of the lowest levels of income per capita of any country in the world. In 1965, for example, the per capita Gross Domestic Product equalled 80 dollars compared with 175 dollars for the developing nations taken together.[9] In addition, there are severe disparities in income distribution. Based on several estimates, the lowest 20 per cent of households shared only four to eight per cent of pre-tax income, and the lowest half of

5. A. Mitra, *Census of India, 1961,* Vol. I, Part II-B (i). General Economic Tables. New»Delhi, 1964.

6. *Ibid.*

7. *Ibid.*

8. J. P. Naik, "A Review of the Achievements of the First Three Five-Year Plans (1951-1965)," *The Education Quarterly,* Vol. XIX, No. 4 (January, 1968), p. 33.

9. United Nations, *World Economic Survey, 1969-70,* New York, 1971, Table A-I.

households garnered only about 20 to 25 per cent of the total income.[10] Given the general aversion to manual work and the social stigma attached to it, it is likely that, as income rises, those people who can afford to reduce their participation in the labor force will to some extent do so and that activity rates will decline as a result.[11]

The most disadvantaged sections of the population are the people belonging to scheduled castes and scheduled tribes. In 1961 over 64 million persons (14.7 percent of the population) were listed as members of scheduled castes and 30 million (nearly seven percent of the population) as members of scheduled tribes, Nearly 90 percent of those in the former category and 97 percent of those in the latter are rural dwellers as against 82 percent of the population. Illiteracy rates among these two groups run as high, as 90 percent of the population. They are also situated in the lowest brackets of the income distribution. Given this combination of characteristics, it is not surprising that participation rates for both males and females are higher for scheduled castes and scheduled tribes than they are for the population at large. In 1961 we find, for example, that the economic activity rates were 47.1 percent for scheduled castes, 56.6 percent for scheduled tribes, and 43.0 percent for the general Indian population.[12]

Unemployment and Underemployment

The available data on unemployment indicate that the percentage of unemployed workers in the labor force is higher in urban areas than in rural. In

10. These figures come from sources cited in Gunnar Myrdal, *op. cit.,* Vol. Ill, Appendix 14, p. 2185. According to the National Council of Applied Economic Research, the lowest 20 percent of households shared only 4 percent of total income, and the lowest half of households shared 14 percent in i960. The Reserve Bank estimated the corresponding figures at 8 percent and 20 percent in the period 1953-54 to 1956-57. Kuznets estimated that the lowest 20 percent of households shared 8 percent of income and the lowest 40 percent of households shared 17 percent in 1949-50.

11. This argument is supported by some of the available cross-sectional evidence. As Myrdal has observed, "Though no segment of the agricultural community completely escapes the throttling effects of social stigma attached to work, participation ratios are undoubtedly much greater in the lower than in the higher strata." See Gunnar Myrdal, *op. cit.,* Vol. II, p. 1072.

12. J. P. Aries, "The Economic and Social Promotion of the Scheduled Castes and Scheduled Tribes," *International Labor Review, Vol.* 103, No. I (January, 1971), pp. 29-64.

1961 the male rates of unemployment were 3.23 percent in the urban areas and just 0.50 percent in the countryside. The corresponding rates for females were 1.42 and 0.10 percent.[33] Moreover, in urban areas, rates of unemployment tend to vary directely with the size of the city. Data from the National Sample Survey show that the unemployment rate in the stratum I (the four largest cities in India) was 6.5 percent; in stratum II (cities with at least 300,000 inhabitants), 5.4 percent; and in stratum III (all other urban areas), 5.1 percent.[14]

Regarding the age distribution of the unemployed, there is a pronounced concentration in the young adult ages. Among the urban unemployed, nearly half were in the 15-26 age bracket, while for rural areas, one-third fell into this category.[15]

Evidence from the 1960-61 National Sample Survey for urban areas suggests the existence of a nonlinear relation between education and unemployment. Rates of unemployment were 1.2 percent among illiterates, 2.7 percent for those with from one to five years of education, 7.0 percent among those who had between six and eleven years of education, and 2.8 percent for those with 12 or more years of education, Paralleling these tendencies, the duration of unemployment among the primary and secondary school leavers is higher than it is for either the illiterates or the graduates.[16]

Unemployment rates seem to be lower in the lower socio-economic status groups. For instance, the reported rates of unemployment among the scheduled tribes were almost negligible.[17] While the unemployment rate among the slum dwellers in Delhi City was about 4.0 percent, the figure for Calcutta

13. A. Mitra, *Census of India, 1961,* Vol. I, Part II-B (iii), General Economic Tables, November, 1964. The unemployment rate was calculated by dividing the number of unemployed persons aged fifteen and over by the number of workers in the same age category. Data from the National Sample Survey, however, indicate that female unemployment rates in rural areas are higher than census figures would suggest. See Pravin Visaria, "Some Characteristics of the Unemployed in India," in Ishrat Z. HuSain (ed.), *Population Analysis . and Studies,* Bombay : Somaiya Publications, 1972, pp. 227-246.

14. D. Turnham and I. Jaegar, *The Employment Problem in Less-Developed Countries,* "Paris : Development Center of the Organization for Economic Cooperation and Development, 1971, p. 138.

15. *Ibid.*

16. *Ibid.,j?.S\.*

17. J. P. Aries, *op. cit.,* p. 37.

City as a whole was 18.1 percent.[18] Visarias observe a similar phenomenon when they point out that, except in three southern states, the incidence of Unemployment among the weaker sections (households of "small cultivators and non-cultivating wage earners") appears to be smaller than expected.[19]

- Attempts were made in the National Sample Survey to estimate the "intensity of employment," in other words, to gauge the prevalence and magnitude of underemployment. Using as a measure of underemployment the number pf gainfully employed persons who are available for an additional *29* hours or more of work per week, the extent of underemployment was estimated at 7.49 percent of the total labor force.[20]

There is additional evidence which bears on various aspects of unemployment and underemployment but the results differ from one source to another and are not conclusive. For instance, Desai and Majumdar computed production functions for two kinds of farm units separately, those which hired labor and those which did not. For the former group, the marginal productivity of laboi was positive, whereas it was negative in the latter case.[21] On the other hand, Paglin's results not only indicated a positive marginal product of labor but also tended to support the hypothesis that the rationalization and improvement of agricultural techniques which are generated by developmental efforts exert a strong upward pull on the demand for agricultural labor. He cautioned that the commonly held assumption that economic development will create a large agricultural labor surplus is in need of drastic revision.[22] Finally, using an approach ou the adequacy of income, Dandekar and Rath estimated the extent of rural unemployment and underemployment in 1970

, 18. Gunnar Myrdal, o;>. *cit.,* Vol. II, Table 23-1, p. 1122. Unfortunately, comparisons for the same city were not available.

19. Pravin M. Visaria and L. Visaria, "Employment Planning for Weaker Sections in .Rural India," *Economic and Political Weekly,* Vol. VIII, Nos. 4-6, Annual Number 1973, pp. 269-276.

20.. K. N. Raj, "Employment and Unemployment in the Indian Economy : Problems of Classification, Measurement, and Policy," *Economic Development and Cultural Change,* Vol. II, No. 3, April, 1959, p. 266.

21. MiDesai and D. Majumdar, "A Test of the Hypothesis of Disguised Unemployment," *Economica,* Vol. 37, No. 145, February, 1970, pp. 39-52.

22. M. Paglin, "Surplus Agricultural Labor and Development: Facts and Theories," *American Economic Review,* Vol. 55, No. 4, September, 1965, pp. 815-834.

to be 8,224 million rupees which amounted to approximately three percent of national income in 1970.[23]

Labor Force Structure

The pattern of employment distribution of Indian workers is one of marked concentration in agriculture with a considerably smaller fraction involved in industry. The data in Table 2 show that the percentage employed in the primary sector remained almost constant between 1911 and 1961. Recent decades have witnessed a slight decrease in the proportion of males in agriculture which has largely been offset by heavier concentrations of females.

Our review has shown that the secular decline in India's crude activity rates cannot be explained solely in terms of changes in age composition, and a

TABLE 2-PERCENTAGE DISTRIBUTION OF WORKERS OF EACH SEX BY THREE SECTORS 1911-61

Year	*Sex*	*Total*	*Primary*	*Secondary*	*Tertiary*
1	*2*	*3*	*4*	*5*	*6*
1911	Persons	100.00	74.86	11.13	14.07
	Males	100.00	73.66	10.97	15.37
	Females	100.00	77.14	11.45	11.41
1921	Persons	100.00	75.99	10.41	13.60
	Males	100.00	74.54	10.51	14.95
	Females	100.00	78.80	10.21	10.99
1931	Persons	100.00	74.75	10.21	15.04
	Males	100.00	74.08	10.43	15.49
	Females	100.00	76.23	9.74	1403
1951	Persons	100.00	72.12	10.62	17.76
	Males	100.00	69.08	11.59	19.33
	Females	100.00	79.57	8.76	12.17
1961	Persons	100.00	72.27	11.70	16.02
	Males	100.00	67.98	1268	19.34
	Females	100.00	81.58	9.59	8.83

SOURCE : B. R.JCalra, "A Note on Working Force Estimates," *op. cit.*

23. V. M. Dandekar and N. Rath, "Poverty in India—II," *Economic and Political Weekly,* Vol. VI, No. 2, January, 1971, pp. 106-146.

number of isolated non-demographic factors (urbanization, education, income, and socio-cultural factors) are also of presumed importance. Furthermore, it is possible that these factors also influence unemployment rates and the structure of the labor force. In the next section an attempt is made to integrate these demographic and non-demographic influences into a single theoretical framework.

II

Theoretical Framework

The Prevailing Theory

The size and age distribution of the total population primarily determine the size of the labor force in any country and the rate of population growth and the factors associated with it, exert an impact on labor force participation rates, on labor force structure, and on unemployment and underemployment. The predominant viewpoint seems to be that, in general, the effects of these demographic factors on the potential labor supply outweigh, as a rule, those caused by social and economic development.[24] However, in the case of women and of younger and older males, socio-economic and cultural factors seem to exert a significant influence on labor force participation.[25]

The importance of the age structure in determining crude labor force participation rates is well recognized.[26] Countries with high crude activity rates for males are generally those with a high proportion of their population between the ages of 15 and 64. In most developing countries, however, this proportion is generally smaller than in industrialized nations. This unfavorable age distribution arises from higher rates of growth of population currently experienced by low-income countries. These high growth rates are due, in turn, to rapid declines in death rates, not been matched by corresponding

24. J. Van den Boomen, "Population and Labor Force Growth in Selected Latin American Countries," *Proceedings of the World Population Conference,* Vol. IV, Belgrade, 1965, p. 258.

25. International Labor Office, "The World's Working Population : Some Demographic Aspects," *International Labor Review,* Vol. 73, 1956, pp. 152-176.

26. In the opinion of many authors, age composition is the most important factor in determining the crude activity rate. See, for example, Joseph J. Spengler, "Population and World Economic Development," *Science,* 131, I960, pp. 1497-1502 ; and United Nations, *Demographic Aspects of Manpower : Sex and Age Patterns of Participation in Economic Activities,* New York, 1962, p. 4.

declines in birth rates. Thus, age distributions in developing countries tend to be characterized by large numbers of children, leading in effect to increase in the number of people in non-active ages relative to those in active ages.[27] What is true across countries we would also expect to hold good among regions of the same country ; that is, other things remaining the same, we would expect those regions with the highest growth rate to have the lowest crude activity rates, at least as far as the male population is concerned.

Age composition has also been found to be related to the incidence of unemployment and underemployment in the less-developed countries. Since unemployment rates are observed to vary with age and are frequently highest in the young adult age groups (15-24), the higher the proportion of population in these ages, the higher the unemployment rates. Since the reduction of mortality is not generally accompanied by a concomitant decline in fertility levels, the rate of entry into the labor force is much higher than the rate of withdrawal.[28] Sadie estimated that for 100 men separated from the labor market due to death and retirement there are, on the average, 232 men entering the labor force in agricultural countries compared to 168 in the advanced nations. In some of the poorest countries the figure exceeds 300 and promises to rise further as mortality declines continue to enlarge the proportion of successive birth cohorts which survives to the working ages.[29] Thus large net additions to the work force caused by high rates of population growth exacerbate the problems of unemployment and underemployment in low-income countries.

27. See Frank Lorimer, "Dynamics of Age Structure in a Population with Initially High Fertility and Mortality," *in Population Bulletin of the United Nations,* No. 1, December, 1951, pp 31-41 ; and Eduardo E. Arriaga, *Mortality Decline and Its Demographic Effects in Latin America,* Population Monograph Series No. 6. Berkeley : University of California, 1970, p. 220.

28. For instance, under stable population conditions, with a gross reproduction rate of 1.0 and an expectation of life at birth of 30, 50, and 70.2 years, the ratio of population in the age group 5-14 to that aged 60 to 74 will be 0.72, 0.74 and 0.85 respectively. With a gross reproduction rate of 3.0 and identical life expectancies, the ratio of population aged 5-14 to that in the interval 60-74 will be 6.56, 7.13, and 8.19 respectively. See United Nation*, *The Concept of Stable Population : Application to the Study of Population of Countries with Incomplete Demographic Statistics,* Population Studies No. 39, New York, 1968, Appendix III, Table A.

29. J. L. Sadie, "Labor Supply and Employment in Less-Developed Countries/' *The Annals of the American Academy of Political and Social Sciences,* January, 1967, pp. 121-130.

Finally, the impact of rapid population growth has relevance for analyzing labor force structure. The process of structural transformation,[30] a process thought vital for the suceess of economic development, will be slow for countries in which 70 to 80 percent of the labor force is in agriculture and where total population and labor force are growing at the rate of 2 to 3 percent annually.[31] Dorving has estimated that if the present share of agriculture of 70 percent were to be changed to 40 percent in the face of a population growth rate of two percent per annum, and if non-agricultural employment were to increase, alternatively, at 3, 3.5, and 4 percent per year, it would then take 70, 50, and 35 years, respectively, for this transformation to be accomplished.[32]

The impact of demographic conditions on labor force in the developing areas may be summarized as follows ;

1. The "inefficient" age structure and its changes over time have led to a decline in total labor force participation rates, other things remaining the same.

2. High rates of population growth and the large additions to the labor force which these high rates cause albeit with a time lag, lead to high rates of unemployment and underemployment.

3. Rapid population growth acts as a deterrent to the structural transformation of the labor force.

It is notable, however, that non-demographic factors have an important influence on female labor force participation. This theme will be the topic of subsequent discussion.

30. Structural transformation is normally understood to mean the relative decline of the agricultural sector and the increasingly dominant position of secondary and tertiary sectors. However, in our discussion, structural transformation will mean that at least half of the total labor force should be engaged in non-agricultural occupations. See F. Dorving, "The Share of Agriculture in a Growing Population," *Monthly Bulletin of Agricultural Economics and Statistics,* Food and Agricultural Organization, Vol. VII, Nos, 8-9, 1959, pp. 1-11.

31. B. F. Johnston, "Agriculture and Economic Development: The Relevance of Japanese Experiment/' *Food and Research Institute Studies,* Stanford University, Vol. VI, No. 3, 1966, pp. 251-312.

32. F. Dorving, *op. cit.*

Modification of the Prevailing Theory : Importance of Socio-Economic, Cultural, and Institutional Factors

There exists a variety of non-demographic factors which too have an impact on labor supply. Principal among such factors which have received considerable attention are the levels of and the changes in urbanization, education, and income. Added to these, are the attitudes and institutions whose importance Myrdal has stressed in the context of South-East Asian countries.

Before proceeding to outline the impact of such factors on labor force supply, it seems appropriate to elaborate the context in which we label countries as "underdevloped" or "developing" and to discuss some of the changing characteristics of these countries as they proceed in the direction of development.

Our discussion here and the hypotheses we intend to formulate are appliable to those countries which are assumed to be in one of the first three stages of growth described by Rostow.[33] During the early stages of growth in these countries, the population pressure has already assumed significant proportions. As nored by Leibenstein, "Whereas countries that have developed earlier had to overcome a population hurdle which to a great extent raced along with their attempts at development, low income countries that develop today find that the population growth hurdle is already reasonably high in the early stages, and that more than in the past they have to strain to maintain their existing level of per capita income."[34] In addition, these countries are attempting to accelerate their development from a lower economic level than was true for the presently industrialized countries at the time of their 'take-off'.

As these countries move from one stage to another, they move from a predominantly agrarian economy to a semi-industrialized phase. Secondary

33. The "stages" scheme that was proposed by Rostow identifies five phases : traditional society, preconditions for take-off, take-off, drive to maturity, and the age of high mass consumption. See W.W. Rostow, *The Stages of Economic Growth : A Non-Communist Manifesto,* Cambridge University Press, 1960.

34. Harvey Leibenstein, "Population Growth and Take-Off Hypothesis," in W. W. Rostow (ed.), *The Economics of Take-Off into Sustained Growth ; Proceedings of a Conference Held by the International Economic Association,* London : Macmillan and Co., Ltd., 1964, p. 180.

industry begins to develop along with urbanization. Education spreads from the elite to the common man and public works in fields such as transportation, hospitals, and welfare activities begin to emerge. In the early stages of growth, however, there exists the possibility of a low-level equilibrium that perpetuates itself and which can result in economic stagnation.[35] But this "vicious" circle can be turned "virtuous" when the efforts reach the "critical minimum level", and the upward process can be started.[86] One example of a potential upward spiral is that improvements in the quality of the labor force resulting from extended education and better medical care, for example, can lead to enhanced labor productivity which, in turn, generates additional resources for a further expansion of educational and health services,[37] It is in this context that we proceed to outline the impact of non-demographic factors on labor supply.

RURAL-URBAN MIGRATION. In developing countries the principal type of internal migration is the rural to urban movement. This movement has accelerated the growth of urban areas as migrants from rural areas search for jobs, education, and higher incomes. To some extent migrants are "pulled" to the cities by the facilities for higher education and higher incomes. However, there are frequently insufficient employment opportunities compared to the number of new job seekers. Some authors, therefore, subjugate the lure of economic opportunities in the cities to the "push" factors operating in rural areas.[38] Many of the new job seekers in any case lack the skills required by an urban economy. Adaptation to the new environment is slow and difficult, especially for women and elderly persons. Moreover, child-rearing and labor market pursuits compete for the mother's time more in an urban setting than in a rural one.[39] The occupational structure in the cities tends

35. R. Nurske, *Problems of Capital Formation in Underdeveloped Countries,* Oxford : Basil Blackwell, 1953, p. 4. According to Nurske, the "vicious circle" idea implies "a circular constellation of forces tending to act and react upon one another in such a way as to keep a poor country in a state of poverty."

36. The critical minimum effort thesis is attributable to Harvey Leibenstein, *Economic Backwardness and Economic Growth,* New York : John Wiley and Sons., 1957, Chapter 8.

37. Paul Streeten, *Economic Integration : Aspects and Problems,* 2nded., Leyden : A. W. Sythoff, 1961, p. 56.

38. United Nations, *The Determinants and Consequences of Population Trends,* Vol. I, Population Studies No. 50, New York, 1973, pp. 314-315.

39. An inverse relation between the number of children and the economic activity of married women does appear in the cities of less-developed countries. See United Nations, *The Determinants and Consequences of Population Trends, op. cit.,* p. 307.

also to inhibit the entry of women and 'children into the work force. For such reasons rural to urban migration tends to lead to a decline in activity rates on the one hand and to an increase in unemployment on the other.

EDUCATION. School enrolment rates and levels of educational attainment have recently registered improvement in the developing areas. The educational programs initiated by the respective governments favor compulsory education for all children at least at the primary level. The relationship between increased enrolments, the length of schooling, and labor force participation is clear; the higher the number of children enrolled in the schools and the greater the length of schooling they receive, the lower will be the participation rates in the young ages.[40]

Among those who have already left school, the relation between educational attainment and labor force participation is less clear. Educated persons seem to develop attitudes against taking up manual work and so their participation in economic activity depends upon the availability of white collar jobs.[41] In India for instance, urban activity rates were found to be lower for literate than for illiterate women, although within literate groups, advanced education appeared to favor increased labor force participation. On the other hand, in Puerto Rico, a strong positive association was observed between economic activity rates and all levels of education of women.[42] These results seem to indicate that a positive association between educational level and rates of economic activity can be expected only when the educational attainment reaches a certain minimum threshold level.

The incidence of unemployment also tends to be higher among the educated than among illiterates, particularly for new entrants into the work force.

40. There is frequently a third category of persons who are neither in school nor economically active, but who remain at home. In Indonesia, for instance, males in this situation constituted 12.7 percent of the male population in the 0-34 age interval and 10.1 percent for the 15-19 age bracket. See United Nations, *Methods of Analyzing Census Data on Economic Activities of the Population,* Population Studies No. *43,* New York, 1968, p. 58. If the increase in enrolments draws from persons in this third category rather than from those actively employed, then the inverse relation discussed in the text between education and participation rates will be weakened.

41. Gunnar Myrdal, *op. cit.,* Vol. II, Chapter 22.

42. United Nations, *The Determinants and Consequences of Population Trends, op. cit.,* p. 317.

Myrdal has remarked that "the members of one group—'the educated' — have displayed a remarkable ability to sustain themselves without gainful work, largely by relying on family assistance and support."[43]

Finally, education, to the extent that it equips a person with a wider range of skills and creates attitudes favorable to both geographic and occupational mobility, enhances the opportunities for the structural transformation of the labor force to occur.

INCOME. According to one hypothesis, an increase in income exerts two contrary influences upon the propensity to work : an "income effect" which is negative in that higher family income means that fam i!y members can afford to devote less time to labor market activities and more time to leisure, and a "substitution effect" which is positive because higher income from employment raises the opportunity cost of not working. It is argued that, in the developed nations, the income effect is dominant in the case of men while the substitution effect may be stronger in the case of women,[14] In the developing countries, however, the income effect seems to dominate so that the percent in the labor force is less, *ceteris paribus,* when and where the average income is greater.[45] This effect holds for both men and women, but is pronounced for women.[46]

At subsistance, levels of living, the rate of open unemployment would be low, but as the family economic position improves unemployment and under-employment may show up in larger and larger proportions.[47] Cohen has argued that "in a number of these economies, in fact, the unemployment rate has been rising, an experience that lends support to the contention that un-employment increases can be anticipated as development occurs."[48]

43. Gunnar Myrdal. *op. cit.,* Vol. II, p. 1124.

44. United Nations, *The Determinants and Consequences of Population Trends, op. cit.,* p. 316.

45. United Nations, *The Determinants and Consequences of Population Trends,* Population Studies No. 17, New York, 1953, pp. 204-205.

46. See J. N, Sinha, "Dynamics of Female Labor Force Participation in a Developing *Economy," Proceedings of the World Population Conference, Vol.* IV. Belgrade, 1965, pp. 336-337.

47. Harvey Leibenstein, "The Theory of Underemployment in Backward Economies," *Journal of Political Economy,* Vol. 65, No. I, February, 1957, pp. 91-103.

48. S. Cohen, "A Note on the Burden of Dependency in Low Income Countries : A Comment," *Economic Development and Cultural Change,* Vol. 19, No. 3, April, 1971, pp. 409-410.

Lowl evels of living and the poor health of workers discourage members of the labor force from seeking new avenues of employment. The possibility of having to confront unfamiliar ways of living and the potential necessity of adapting to new techniques and to new modes of working constitute additional disincentives to change from the traditional lines of employment. As a consequence, barriers to the structural transformation of employment become more difficult to remove.

ATTITUDES AND INSTITUTIONS. Myrdal has attributed much significance to attitudinal and institutional factors in his discussion of labor utilization in Southeast Asia.[49] The social and institutional environment of traditional agriculture in these countries tends to generate, in varying degrees, a negative attitude toward work among all classes of rural population.[50] The consequence is to depress participation rates. In addition, "Sanskritization," a process of upward social mobility from a low to the next higher status, tends to lower participation in economic activity. Within India, in fact, the highest female labor force participation rates are observed for the lowest caste groups. As pointed out by Thorner, "the primary aim of all classes in the agrarian structure has not been to increase their income by adopting more efficient methods but to rise in social prestige by abstaining insofar as possible from physical labor.[51]

To summarize the influences of non-demographic factors on labor supply in a developing country as it proceeds from one to the next stage of socio-economic development : *(a)* lower labor force participation rates for both sexes, *(b)* higher rates of unemployment, and *(c)* a somewhat lower proportion of the work force in the primary sector.[52]

49. See Gunnar Myrdal, *op, cit.,* Chapters 21-24, Vol. Ill, Appendix 2.

50. Ibid., pp. 1070-1071.

51. Daniel Thorner, *The Agrarian Prospect in India.* Delhi: The University Press, 1956, p. 12.

52. As we have previously emphasized, these generalizations are presumed to hold only within or between the first three stages of growth outlined by Rostow. This framework is an accurate characterization of India's present stage of development. The generalizations do not necessarily extend^ however, to the fourth and fifth stages. In fact, the experience of the United Sfates with respect to the labor force participation of married

Footnote 52 contd. on p. 32

Adaptations of the Theory to a Cross-Sectional Setting

We have, in the above, presented essentially a longitudinal theory about what happens to the labor force in a country as that country undergoes both demographic change and socio-economic development. Yet, we attempt to test this theory on the basis of data for states from the 1961 Census of India. We must, therefore, modify our theory to fit the cross-sectional context. This is simply done by assuming that the data from individual states constitute episodes or observations from the development process of a single, hypothetical country. Thus, other things being the same, we would expect states with the highest levels of socio-economic development to have the lowest labor force participation rates. Likewise, other things being the same, we would expect states with the largest proportions of their population between the ages of 15 and 64 to have the highest labor force participation rates. Accordingly, we formulate the following three specific cross-sectional hypotheses :

1. Labor force participation rates will be *inversily* related to the level of economic and social development, and *directly* related to the proportion in the adult ages;

2. Rates of unemployment will be *directly* related to the level of socio-economic development, and *directly* related to the rates of growth of population and labor force; and

3. The proportion of the labor force in primary industries will be *inversely* related to the level of socio-economic development, aad *directly* related to the rate of population growth.

Footnote 52 contd. from page 31

women since 1900, for example, strongly suggests that generalizations which may be appropriate to low-income countries are not easily transferable to developed ones. In 1900 only 5 percent of married women between the ages of 14 and 54 participated in the labor force. This figure had risen to 24 percent by 1950 and to an estimated 37 percent by 1967. See William G. Bowen and T. Aldrich Finegan, *The Economics of Labor Force Participation.* Princeton : Princeton University Press, 1969, p. 88.

III

Empirical Tests of the Hypotheses

Data

Data for this study come primarily from the 1961 Census of India.[53] We have obtained information for fourteen of the fifteen states, the state of Jammu-Kashmir and the union territories having been excluded due to incompleteness and insufficient comparability of data. The variables utilized in this investigation have been chosen to accord with our previously developed theoretical framework, and their selection has in addition been based on the availability, uniformity, and comparability of data across states. A list of the variables employed in the empirical portion of this paper is presented in Table 3.

Preliminary Analysis

We begin to test the three hypotheses of our study by investigating the simple correlations between pairs of variables. The signs (positive or negative) of the simple correlations shown in Tables 4 and *5* are strongly supportive of the first hypothesis that labor force participation rates are inversely related to levels of socio-economic development and directly related to the proportion of the population in the adult ages. Work participation rates for males are negatively associated with each of the education, urbanization, health, and income variables. The positive correlation between the work participation rate and the cultural variable (percent of the population belonging to scheduled castes and scheduled tribes) is also consistent with this hypothesis since we consider a high value for the cultural variable to be indicative of low levels of social development. With regard to the demographic variables, a direct relaion between worker participation rates and the proportion of *adults in* the population is equivalent to an inverse relation with the proportion of *children.* This part of the first hypothesis is supported by the signs of each of the correlations with the demographic variables. We notice also that the strongest correlations occur for the rate of population growth (variable 3) and the number of health personnel (variable 10). Turning to female work participation rates (Table 5), we see that the signs of the simple correlations

53. Data from the 1971 census were just becoming available as this study was nearing completion.

TABLE 3 -LIST OF VARIABLES USED IN THE STUDY

Variables	*Source*
1. Labor Force Variables :	
1. Work participation rate	Census of India, 1961
2. Unemployment rate	Census of India, 1961
3. Per cent of workers in the primary sector	Census of India, 1961
4. Per cent of workers in the secondary sector	Census of India, 1961
5. Per cent of workers in the tertiary sector	Census of India, 1961
II. Demographic Variables :	
6. Crude birth rate	Census of India, 1961
7. Crude death rate	Census of India, 1961
8. Decennial rate of growth of population, 1951-61	Census of India, 1961
9. Child-woman ratio	Census of India, 1961
III. Non-Demographic Variables :	
10. Per cent of population literate	Census of India, 1961
11. Percent of population with primary education	Census of India, 1961
12. Per cent of population with higher education	Census of India, 1961
13. Per cent of population urban	Census of India, 1961
14. Per cent of population belonging to scheduled castes and scheduled tribes	Census of India, 1961
15. Number of persons per 1000 population engaged in public health and medical care	Census of India, 1961
16. Per capita government expenditure on public health and medical care, 1961	Ministry of Health, Government of India
17. Calorie equivalent of daily diet	National Sample Survey (17th round, 1961-62)
18. Per capita income	National Council of Applied Economic Research

TABLE 4—INTERCORRELATIONS AMONG VARIABLES FOR DIFFERENT STATES IN INDIA : MALES

Demographic						*Education*			*Urb.*	*Cul.*		*Health*		*Inc.*
Labor Force Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
1. Work Participation Rate (Males)	-.30	.49	-.55	-.44	-.22	-.50	-.51	-.06	.42	-.59	-.36	—.44	-.37
2. Unemployment Rate (Males)	—.16	—.58	.34	—.03	.43	.46	.69	.35	—.39	.79	.61	.42	.52
3. Per cent of Workers in Primary (Males)	.35	.67	—.10	.17	-.44	—.55	—.77	—.49	.65	—.88	-.66	-.57	—.48
4. Per cent of Workers in Secondary (Males)	—.35	—.59	.06	—.21	.32	.56	.75	.61	—.72	.90	.67	.48	.47
5. Per cent of Workers in Tertiary (Males)	—.32	—.68	,13	—.13	.50	.51	.73	.36	—.56	.82	.61	.59	.45

NOTES : 1. Crude birth rate
2. Crude death rate
3. Decennial rate of growth of population
4. Child-woman ratio
5. Per cent of population literate
6. Per cent of population with primary education
7. Per cent of population with secondary and higher education
8. Per cent of population urban
9. Per cent of population belonging to scheduled castes and scheduled tribes
10. Number of persons per 1000 population engaged in health and medical services
11. Per capita government expenditure on medical care and public health
] 2. Calorie equivalent of daily diet
13. Per capita income

TABLE 5—INTERCORRELATIONS AMONG VARIABLES FOR DIFFERENT STATES IN INDIA: FEMALES

Demographic				*Education*			*Urb.*	*Cul.*		*Health*		*Inc. 13*
Labor Force Variables	*1*	2	5	*4*	*5*	6	7	*8*	*9*	*10*	*11*	*12*	
1. Work Participation Rate (Females)	-.09	.30	-.24	-.18	-.27	—.25	—.32	-.01	.06	—.30	—.00	-.00	-.39
2. Per cent of Workers in Primary (Females)	.23	.37	-.23	.15	-.87	-.41	-.61	.04	.22	—.59	-.57	-.55	-.14
3. Per cent of Workers in Secondary (Females)	.10	-.19	.53	.17	.78	.35	.48	-.14	—.20	.57	.64	.42	.16
4. Per cent of Workers in Tertiary (Females)	-.63	—.52	—.23	—.54	.76	.38	.64	.11	—.19	.47	.33	.58	.08

NOTES:!. Crude birth rate
2. Crude death rate
3. Decennial rate of growth of population
4. Child-woman ratio
5. Per cent of population literate
6. Per cent of population with primary education
7. Per cent of population with secondary and higher education
8. Per cent of population urban
9. Per cent of population belonging to scheduled castes and scheduled tribes
10. Number of persons per 1000 population engaged in health and medical services
11. Per capita government expenditure on medical care and public health
12. Calorie equivalent of daily diet
13. Per capita income

are the same, variable by variable, as they were for males. The generally lower (in absolute value) magnitudes of the correlations, however, suggest that the relations are perhaps not as strong for females as they were for males.

The second hypothesis states that rates of unemployment will be directly related to the level of socio-economic development, and directly related to the growth of population and of labor force. From Table 4 we notice that the correlations are generally consistent with this hypothesis. The variables having to do with education, urbanization, health, and income are positively correlated with the unemployment rates for males.[51] The negative correlation between the unemployment rate and the cultural variable is also as expected since unemployment among the weaker sections was observed to be much lower than the other sections of the community. The anticipated positive correlation between the unemployment rate and the rate of growth of population and the labor force is confirmed by the signs of the coefficients for the decennial rate of population growth (variable 3) and death rate (variable 2—a *ceteris paribus* decline in the death rate raises the growth rate). However, the signs of the two natality measures (the crude birth rate and the child-woman ratio) are the opposite from expected, but the absolute value of these two coefficients is small. In general, education and health variables seem to be more important than others in explaining the behavior of the un-employment rate.

In the third hypothesis it was stated that the proportion of the labor force in primary industries will be inversely related to the level of socio-economic development and directly related to the rate of population growth. From Table 4 it can be seen that, with the exception of variables numbered 2 and 3 (the crude death rate and the decennial rate of population growth), the signs of the remaining correlation coefficients are in agreement with this hypothesis. The education, urbanization, health, and income variables are negatively correlated with the percentage of male workers in primary industries. The population belonging to scheduled castes and scheduled tribes lives mainly in rural

54. The consensus seems to be that unemployment rates in the 1961 Census have been underestimated, especially so for females. See, for example, J.N. Sinha, "Economic Analysis of the 1961 Census : Rapporteur's Report," *Proceedings of the Forty-Fifth Annual Conference of the Indian Economic Association,* 1965, pp. 9-13 ; and P. Visaria, "Some Characteristics of the Unemployed in India," *op cit.* Thus, in this analysis, we have **only** examined unemployment rates for males.

areas and is heavily concentrated in the primary activities. Consistent with the second part of the third hypothesis are the positive associations with the measures of natality—the crude birth rate and the child-woman ratio. In the case of females in Table 5, with the exception of the coefficient on urbanization, all other correlation coefficients have the same sign as they did for males. Regardless of sex, the correlation with education and health variables tend to be relatively higher (in absolute value) than correlations with other variables.

With regard to the percent of workers in non-agricultural industries, the opposite conclusions generally hold true. Once again, the directions of the relations shown in Tables 4 and 5 lend added credence to this hypothesis, the exceptions, when they occur, tend to be concentrated among the demographic variables.

To summarize the evidence presented in Tables 4 and 5, an examination of these simple correlation coefficients reveals that a preliminary analysis of our data is strongly supportive of the three principal hypotheses being tested. Yet, an analysis of these correlations alone is inadequate for a complete and convincing test of our hypotheses, because simple correlations fail to control for the influence of other variables. We shall rely on the technique of factor analysis for a more complete test.

The preliminary analysis of the data suggests that the available information could best be used by reducing the number of variables to a few meaningful factors or dimensions. For instance, we have used three measures of education, three indicators of health, and two measures of natality. The number of variables in relation to the number of observations *(N* = 14) also suggests the need to condense the number of variables for analytic purposes. Hence, the use of factor analysis instead of the economist's traditional tool, multiple regression analysis, is particularly appealing under the present circumstances.

Empirical Results Using Factor Analysis

Table 6 presents rotated factor matrix for participation rates for males. Given the particular choice of underlying procedures,[55] the rotated factor loadings (i.e., the elements in the table) can be interpreted as the partial

55. The principal axes method and the varimax rotation procedure have been employed here.

TABLE 6—ROTATED FACTOR MATRIX FOR WORK PARTICIPATION RATE (MALES) TOGETHER WITH THIRTEEN OTHER VARIABLES FOR **STATES** IN INDIA

	Variables	*Rotated Factor Loadings**		
		F_1	F_2	F_3
1.	Work Participation Rate (Males)	.36	.54	(-.55)
2.	Crude Birth Rate	.12	(-.93)	—31
3.	Decennial Rate of Growth of Population	-.08	(-.94)	.16
4.	Child-woman Ratio	.00	(-.95)	-.07
5.	Crude Death Rate	.46	—.03	(-.65)
6.	Per Capita Government Expenditure on Public Health and Medical Care	-.42	-.16	(.65)
7.	Number of Persons per 1000 Population Engaged in Public Health and Med. Care	(-.71)	-.12	.61
8.	Calorie Equivalent of Daily Diet	.10	.05	(.87)
9.	Per cent of Population Literate (Males)	.22	.29	(.77)
10.	Per cent of Population with Primary Education (Males)	(-•78)	—.22	—.10
11.	Per cent of Population with Higher Education — Matriculation and Above (Males)	(-.82)	.05	.36
12.	Per cent of Population Urban	(-.88)	.23	—.10
13.	Per cent of Population Belonging to Scheduled Castes and Scheduled Tribes	(.66)	—.15	—.28
14.	Per Capita Income	(-.85)	-.30	—.06

*Figures within the parentheses show the factor to which each variable has been assigned.

correlation coefficients between each factor (i.e., F_l F_2 or F_3) and each observed variable. Once the factor loadings have been determined, the factors must be linked to some meaningful sociological or economic concepts in order to specify the underlying forces the factors may represent. To accomplish this objective, we have linked each observed variable in the left-hand margin to that factor with which it is most strongly correlated and have en-

closed the corresponding factor loading within parentheses to aid in interpretation.[56] The interpretation of each factor is then derived from those variables with which it is most strongly correlated. For example, we notice that the variables associated with the first factor *(F^* are the number of persons engaged in health, the percent of the population with primary and higher education, the percent of population urban, the percent of the population belonging to scheduled castes or scheduled tribes, and per capita income. This factor can then be interpreted to represent the stage or level of socio-economic development or modernization.

The third factor (F_3) is associated with the labor force participation rate, the crude death rate, government expenditure on health and medical care, nutritional levels, and the percent of the population literate. We interpret this factor to represent a dimension of health. We should notice here that the death rate is associated with the health factor and not with other demographic variables. Furthermore, according to the factor analytic results, levels of health are independent of the level of socio-economic development. This observation has an interesting parallel in the recent experience of many developing countries in which rapid improvements in mortality and public health have been achieved through the importation of low-cost medical technology from the more advanced nations, independent of the indigenous level of socio-economic development.

In the second factor, (F_2), the variables with high factor loadings are the birth rate, the decennial rate of population growth, and the child-woman ratio. This factor reflects the demographic characteristics of the population and is, in particular, both a measure of the rate of growth of population and an indicator of the youthfulness of the age structure.

We are now in a position to use the factor loadings in Table 6 to test our first hypothesis. Notice that the work participation rate for males is directly related to F_1 (the factor loading, 0.36, is positive). The socio-economic variables, on the other hand, are negatively correlated with F_v Hence, we conclude that work participation rates are inversely related to other variables representing the stage of socio-economic development. Similarly, in the case

56. See I. Adelman and C. T. Morris, "Factor Analysis of the Interrelationship Between Social and Political Variables and Per Capita Gross National Product," *The Quarterly Journal of Economics, Vol.* 79, No. 4, November, 1965, pp. 555-578.

of the third factor, work participation is negatively related with the measures of health and nutrition. These results are consistent with the first part of the first hypothesis which states that work participation rates are inversely related to the level of socio-economic development. In connection with F_2, work participation is negatively associated with all three demographic variables, and this inverse relation is equivalent to a direct relation between work participation rates and the proportion of the population in the adult ages. This result confirms the second half of the first hypothesis. The data in the remaining tables should be approached in the same way, and we will not repeat all the steps of explanation as was done in the above case.

TABLE 7—ROTATED FACTOR MATRIX FOR WORK PARTICIPATION RATE (FEMALES) TOGETHER WITH THIRTEEN OTHER VARIABLES FOR STATES IN INDIA

*Rotated Factor Loadings**				
	Variables	F_1	F_2	F_3
1.	Work Participation Rate (Females)	—.21	(-.30)	.24
2.	Crude Birth Rate	—.29	(.91)	.09
3.	Decennial Rate of Growth of Population	.16	(.95)	—.07
4.	Child-woman Ratio	—.05	(.94)	.02
5.	Crude Death Rate	(-.70)	.02	.35
6.	Per Capita Government Expenditure on Public Health and Medical Care	(.64)	.20	—.35
7.	Number of Persons Per 1000 Population Engaged in Public Health and Medical Care	(.70)	.14	—.59
8.	Calorie Equivalent of Daily Diet	(.90)	—.09	.26
9.	Per cent of Population Literate (Females)	(.92)	—.05	-.10
10.	Per cent of Population with Primary Education (Females)	.38	.12	(-.68)
11.	Per cent of Population with Higher Education—Matriculation and Above (Females)	(.84)	—.09	—.46
12.	Per cent of Population Urban	.00	—.21	(-.92)
13.	Per cent of Population belonging to Scheduled Castes and Scheduled Tribes	—.41	.19	(.60)
14.	Per Capita Income	.06	.34	(-.86)

*Figures within the parentheses show the factor to which each variable has been assigned.

Data relevant to females are shown in Table 7. Factor I *(Fj)* is associated with health and nutrition variables, the death rate, and with education (literacy and higher education). Coefficients for the variables on education, health and nutrition are positive and for the death rate it is negative. The factor loading for the work participation rate is also negative which suggests that, in general, health and educational levels are negatively associated with female work participation. Factor III *(F_s)* has high factor loadings with primary education-, urbanization, income, and the cultural variable. The negative association between work participation and these socio-economic variables suggests that female labor force participation rates are inversely related to levels of social and economic development. These results confirm the previous findings of Sinha, namely, that "urbanization, growth of literacy, the increase in organized non-agricultural employment and the rise in the levels of living, all point to the prospect of an initial decline in female labor participation rates. A reversal of the trend might follow a rapid increase in higher education and expansion of service industries—the most promising employees of women, but this may come only at a fairly advanced stage in economic development."[87] The negative association between the demographic variables in Factor II and the female work participation rate suggests that higher fertility and higher rates of growth of population are inversely related to female work participation. Thus, we discover similar results for both males and females, result? which lend credibility to our first hypothesis. One difference, however, between males and females is in the percentage of the total variance in work participation rates explained by FI, F_2, and F_3. For males this percentage was 73, while for females it was just 19 percent.[58] These differences lead to the inference that while the forces that influence male labor force participation rates also operate in the case of females, their importance in the latter case is reduced and, secondly, that there are other factors which this study has not identified which may be more salient for females.

Table 8 contains the necessary data to explore the behavior of unemployment rates. Factor I represents the dimension of socio-economic development or modernization, Factor III represents health, and Factor II represents demo-

57. J. N. Sinha, "Dynamics of Female Labor Participation in a Developing Economy," *Proceedings of the World Population Conference,* Vol. IV, Belgrade, 1965, pp. 336-337.

58. These percentages can be deduced from the sum of squared factor loadings ; for example, for males, $0.73 = (.36)^2 + (.54)^2 + (-.55)^2$.

TABLE 8—ROTATED FACTOR MATRIX FOR UNEMPLOYMENT RATE (MALES) TOGETHER WITH THIRTEEN OTHER VARIABLES FOR STATES IN INDIA

		*Rotated Factor Loadings**		
	Variables	F_1	F_2	F_3
1.	Unemployment Rate (Males)	.52	.10	(-.69)
2.	Crude Birth Rate	—.09	(.93)	.30
3.	Decennial Rate of Growth of Population	.08	(.95)	-.22
4.	Child- Woman Ratio	.01	(.94)	.06
5.	Crude Death Rate	-.42	.05	(.66)
6.	Per Capita Government Expenditure on Public Health and Medical Care	.37	.19	(-.72)
7.	Number of Persons Per 1000 Population Engaged in Public Health and Medical Care	(.68)	.11	—.66
8.	Calorie Equivalent of Daily Diet	—.14	—.09	(-.83)
9.	Per cent of Population Literate (Males)	—.25	-.31	(-.76)
10.	Per cent of Population with Primary Education (Males)	(.80)	.18	.08
11.	Per cent of Population with Higher Education—Matriculation and Above (Males)	(.81)	—.08	—.39
12.	Per cent of Population Urban	(.88)	—.21	.05
13.	Per cent of Population belonging to Scheduled Castes and Scheduled Tribes	(-.64)	.20	.25
14.	Per Capita Income	(.87)	.32	—.02

*Figures within the parentheses show the factor to which each variable has been assigned.

graphic characteristics. All three of these factors are positively associated with the male unemployment rate, a finding which provides strong support for the second hypothesis that rates of unemployment will vary directly with both the level of socio-economic development as well as with the rate of population growth. It is interesting to note, however, that Factors I and III (modernization and health, respectively) account for most of the variation in

male unemployment rates (75 percent out of a total of 76 percent) and that hardly any explanatory power can be assigned to demographic considerations.

TABLE 9—ROTATED FACTOR MATRIX FOR PER CENT OF WORKERS IN PRIMARY (MALES) TOGETHER WITH THIRTEEN OTHER VARIABLES FOR STATES IN INDIA

		*Rotated Factor Loadings**		
	Variables	F_1	F_2	F_3
1.	Per cent of Workers in Primary (Males)	.64	.10	(.70)
2.	Crude Birth Rate	.10	(.92)	.31
3.	Decennial Rate of Growth of Population	—.08	(.95)	-.18
4.	Child-woman Ratio	-.00	(.95)	.07
5.	Crude Death Rate	.44	.03	(.65)
6.	Per Capita Government Expenditure on Public Health and Medical Care	—.39	.21	(-.70)
7.	Number of Persons per 1000 Population Engaged in Public Health and Medical Care	(-.70)	.13	-.64
8.	Calorie Equivalent of Daily Diet	.11	—.07	(-.86)
9.	Per cent of Population Literate (Males)	.23	—.30	(-.76)
10.	Per cent of Population with Primary Education (Males)	(-.80)	.17	.10
11.	Per cent of Population with Higher Education — Matriculation and Above (Males)	(-.81)	-.07	—.36
12.	Per cent of Population Urban	(-.88)	—.20	.07
13.	Per cent of Population belonging to Scheduled Castes and Scheduled Tribes	(-65)	.19	.27
14.	Per Capita Income	(-.86)	.32	.03

*Figures within the parentheses show the factor to which each variable has been assigned.

The final hypothesis concerns the structure of the labor force and is taken up in Tables 9 and 10. When the percent of male workers in the primary sector is considered with thirteen other variables (Table 9), the results are completely in agreement with the third hypothesis. Socio-economic development

and health factors (F_3) are inversely related to the percent of workers engaged in primary activities, whereas the factor loadings for the demographic variables (F_2) suggest a positive relation between rates of population growth and the proportion of male workers in the primary sector. Judging again from the relative magnitudes of the factor loadings, the importance of socio-economic Victors seems to outweigh that of the demographic factors.

TABLE 10—ROTATED FACTOR MATRIX FOR PER CENT OF WORKERS IN PRIMARY (FEMALES) TOGETHER WITH THIRTEEN OTHER VARIABLES FOR STATES IN INDIA

	Variables	*Rotated Factor Loadings**		
		F_1	F_2	F_3
1.	Per cent of Workers in Primary (Females)	(.85)	—.02	—.06
2.	Crude Birth Rate	.26	(.93)	—.10
3.	Decennial Rate of Growth of Population	—.20	(.95)	.09
4.	Child-woman Ratio	.06	(.94)	.01
5.	Crude Death Rate	(.60)	.07	—.44
6.	Per capita Government Expenditure on Public Health and Medical Care	(-.63)	.20	.42
7.	Number of Persons per 1000 Population Engaged in Public Health and Medical Care	—.65	.11	(.66)
8.	Calorie Equivalent of Daily Diet	(-.87)	-.12	-.15
9.	Per cent of Population Literate (Females)	(-.94)	—.09	.16
10.	Per cent of Population with Primary Education (Females)	-.34	.10	(.70)
11.	Per cent of Population with Higher Education—Matriculation and Above (Females)	(-.77)	-.13	.54
12.	Per cent of Population Urban	.10	-.21	(.93)
13.	Percent of Population belonging to Scheduled Castes and Scheduled Tribes	.32	.20	(-.65)
14.	Per Capita Income	.00	.32	(.85)

*Figures within the parentheses show the factor to which each variable has been assigned.

Regarding females (Table 10), with the exception of Factor II, the results are the same as in the case of males in the primary sector. The low correlation between the percent of female workers in the primary sector and the rate of growth of population suggest the absence of any statistically significant relation. Factor I, which represents health, nutrition, and higher education, accounts for most of the variance. Factor analytic results for the secondary and tertiary sectors, not presented here, point to a direct relation between the proportion of workers in non-agriculture and the level of socio-economic development and an inverse relation between this proportion and the rate of population growth.

Concluding Observations

Previous inquiries in this field for developing areas have, generally emphasized the importance of demographic factors, principally the age structure of the population. However, the literature indicates that demographic forces alone cannot explain changes in the size and structure of the labor force and in unemployment rates. Socio-economic, cultural, and institutional factors also have a pronounced influence on labor supply. We were, thus, led to attempt an analysis of labor force data of the 1961 census of India which took into account both the demographic and non-demographic factors.

Our results show clearly that both demographic and non-demographic forces are important. High rates of population growth (1) adversely affect crude activity rates by creating age structures with low proportions of the population in the working ages, (2) create a rapidly growing number of new job-seekers and thus contribute to high unemployment rates, and (3) retard the modernization of the employment structure by creating excessively large numbers of workers who must be absorbed into secondary and tertiary sectors. Ameliorations in socio-economic conditions also tend to affect adversely crude activity rates and to inflate unemployment rates but they do aid the structural transformation of the labor force. Of special interest is the finding that, in general, non-demographic factors are usually at least as important in quantitative terms as demographic forces in explaining the behavior of our three labor force variables. Frequently, in the cases of unemployment rates and labor force structure, for example, they have been found to be more important. It is worth reiterating that these relationships between labor force, demographic, and non-demographic variables may hold true only in the early

stages of social and economic development and are not meant to be generalized to industrialized societies.

Recent years have witnessed a resurgent emphasis on the importance of human resources in formulating policies for national development.[59] Our findings on the relationship between labor supply and demographic, socio-economic and cultural factors are relevant to the purposes of policy-making in developing areas.

From the demographic standpoint, our results reflect the paramount need to reduce fertility in the developing areas. High rates of population growth create age structures which are unfavorable to high crude labor force participation rates. Excessive rates of population growth are also inimical to the structural transformation of the labor force and, moreover, result in exaggerated rates of unemployment and underemployment.

Secondly, we have noticed that such initial efforts to develop an economy, as expanding school enrolments, improved health and welfare services, increased urbanization, and gains in income per capita may be accompanied by declines in crude activity rates and increases in unemployment. One implication of this study is that these concomitants should, perhaps, be anticipated as a country moves from a very low level of economic development to a somewhat higher one. It should be stressed, however, that declines in activity rates, if they occur, are not necessarily disadvantageous to the society. The sharpest declines may take place among marginal workers, the very young and the very old, whose productivity may be low to start with. Furthermore, if the young who are lost to the labor force are retained by the school system, it may pave the way for higher productivity in the future. Similarly, improved health levels among workers may increase their productivity by increasing both their efficiency at work and their time at work. The greater mobility of workers might alter the occupational and industrial distribution of labor force participants and could, in the process, lead to net transfers of workers from agricultural to non-agricultural pursuits. In all of this, however, there is one particularly distressing and persistent theme. High unemployment rates, especially among the better educated, result in a gross wastage of human resources during the process of development.

59. See Frederick H, Harbison, *Human Resources as the Wealih of Nations,* New York: Oxford University Press, 1973.

We have also observed that various cultural and institutional factors in India militate against labor force participation. Perhaps the most salient of these is the tendency to regard manual labor as demeaning. Unless these entrenched attitudes can be transformed, both economic and social development will be slower in coming.

In short, both demographic and non-demographic factors appear to be important in any analysis of labor force changes in developing countries. Contrary to conventional wisdom, non-demographic factors have generally been shown to be at least as important as demographic concerns. This study has attempted to identify some of the relevant non-demographic variables in India and to assess their quantitative importance vis-a-vis the importance of demographic considerations. Much still needs to explore the interrelationships between demographic, socio-economic, and cultural variables.