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From Editor's Pen

The editors are pleased to put the volume I no.1 of the Indian Journal of Economy and Policy in the hands of the readers and the peers. The two distinctive features of the journal are the inclusion of Research Note: (i) it is designed to cover developments in methods of data analysis, theory and the new policies and (ii)   Research news Analysis which covers news about research activities. Each paper included in the issue has undergone blind review by two reputed refrees associated with the journal.

The topics covered by the research papers range (i) from the differential impact of alternative methods of teaching and learning of Economics to income and educational inequalities among the parents and the children of the same households; (ii) the determination of the differences between the performance of younger and older generation in banking industry of India ; (iii) rural household indebtedness to financial health of the companies of electronics goods industry. One paper deals with the procedure of compilation of input output table of the state alongwith the decomposable input output model and Leontief inverse.

The methods of data analysis used by the authors range (i) from descriptive statistics to non-parametric tests like Sign, Singed rank test, Chi square and Coefficient of Contingency ; (ii) from the determination of convergence / divergence from normal distribution, evolving parameters of financial health of the companies to multiple regression modeling of panel data and (iii) Lorenze curve and Ginni Coefficient of inequality in the distribution of the values of the variables.

The research note focuses on the results furnished by newly evolved use of t-test for the determination of nature of distribution, and the result of t test is compared with results furnished by Chi square test and Jarque Berra test of normal distribution.

The editors and members of editorial team are extremely thankful to the authors, refrees, research news analysts and above all the office bearers of IEA. Especially prof Ghanshyam Singh, Prof AP Pandey, Prof DK Asthana and Prof AK Tomar for their spontaneous cooperation and guidance. Special thanks are due to Prof. Pooja Jain for providing facility for page making and designing of the first issue of the journal. We are also thankful to Mr Rajkamal for his contribution in the preparation of the soft copy. Editors are also extremely thankful to the registrar RNI, Mr Ojha, inspector Ravi, police station Janakpuri. Special thanks are due to inspector C.R. Meena, ASI, Delhi Police, who spared several hours of his busy schedule to held and guide the editors in finalizing the documents to be submitted to RNI through licensing unit of Delhi Police. Thanks are also due to Mr Sanjay Sharma, owner of Balaji Offset for bringing out the manuscript in print on short notice.

The editors invite suggestions for improvement from the readers as well as the researchers so that the level, standard and quality of the contents may be improved in future. Editors will also be happy to receive comments and observations from the scholars on the contents of the issue.

- Shri Prakash

Relation Between Parental and Children's Education and Inter- Generational Inequalities in District Gautam Buddha Nagar (U.P.)

Nitin Mohan [1]

Abstract

The research paper examines the interrelationship between parental and children's education. It focuses on the inequality in the distribution of completed years of education among the parents in 472 households with a view to compare it with the inequality in the distribution of completed years of education among the children. The paper uses the following methods of data analysis: (i) summary statistics, (ii) Lorenz curve and (iii) Ginni coefficient. The degree and direction of relationship between the parental and children's education is examined by sign test and coefficient of contingency. The main findings are that higher degree of inequality exists in the distribution of education among the parents which substantially declines from parents to their children. There is a fairly strong inter-relation between the education of parents and their children. In other words, children are more educated than their parents.

Keywords: Inter-Generational, Inequality, Parental Education, Household.

Introduction

The paper investigates inter- generation transfer of inequalities of education in the sampled households of the district Gautam Buddha Nagar, Uttar Pradesh. The topic of investigation of this research paper focuses on the investigation of how do educational inequalities of one generation lead to the educational inequalities in succeeding generations. The lack of ability/ knowledge of reading, writing, and counting among the households of one generation, defined as illiteracy, constitutes the bottom of the education pyramid and it is envisaged to be the cause of transfer of ignorance, while possession of education by households belonging to one generation tend to become the causative factor of transfer of education to the next generation. But education is affected by income.

However, income and education are bi-directionally related. If the parents of a family are educated, then it is expected that they have a certain level of income and it is the consequence of the investment in their education by their parents. Now, these educated and high income group parents are interested and want to educate their children up to a certain level and also have the ability to invest a good amount in the education of their children. The education of the next generation helps to enhance their income. So education and income have a direct influence to enhance each other.

As against this, the less or uneducated and low income group parents are not able to invest in the education of their children despite their willingness to educate their children. So, their illiteracy and inability to invest in the education of their children hinder their children to get high education and stop them to enter in the next higher income group. Thus, income and educational inequality generally coincides. (Marshall, Alfred, 1892, Prakash, Shri, 1978).

It is a generally observed fact that each generation is more and better educated than the preceding generation. (Schultz, T. W. 1962, Prakash, Shri, 1977, 1978 & 1994).

Consequently, inequality in distribution of education among the income and social groups on the one hand and among the religious groups on the other hand tends to decline. (Prakash, Shri, and Mahapatra, A. C., 1981), Third world planning review, Liverpool university).

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However, the relation between income and education is characterized by lead and lag structure. Current income promotes education among current generation while past investment in education leads to formation in human capital which promotes growth of income (Prakash, Shri and Choudhary Sumitra, 1996). Investment in human capital emerges as an important factor of economic growth and transition from the ruling to the welfare state resulting in ever increasing public expenditure on education. Consequently, each generation is better educated than the preceding generation. This is the context of this research paper.

Education: A Factor of Economic Growth

On the eve of Independence, only 5% of the total population had access to school education and hardly 0.01% of the total population had access to higher education in India. Though during the British period, every district had a government boys inter college and government girls inter college and these were supplemented by private schools and colleges. Despite this fact, access to education was confined to only 5% in school education and 0.01 % in higher education (Prakash, Shri, 1978). This can be explained by extremely low level of income during that period. Though the fee of public schools and colleges was comparatively very reasonable during that period, the opportunity cost of education was not availed by a large majority of the society due to low level of income. But during the post-independence period education has grown rapidly. Education has grown ahead to income and enrolments in schools and colleges have grown ahead of number of schools and colleges and number of teachers also. This resulted in overcrowding and even schools without/ inadequate number of teachers and reading material (Prakash, Shri, 1978).

The auxiliary theorem is that **"investment in education promotes growth of income but current income promotes investment in current education and past investment in education promotes growth of current income."** This theorem was formulated by Prakash, Shri (1978) to resolve the controversy by Bowman in 1969. She said that educational economists used correlation coefficient to conclude that education promotes growth. But correlation coefficient does not show causal relation; it may also be concluded that income promotes growth.

Affluent segments of the society are capable of taking care of investment in health and education but the labouring classes and other poor segment of the society may need help from the government to impart education to their children. (Smith, Adam, 1774). This is because of the inadequacy of family income to afford the cost of education in general and opportunity cost in particular.

The sons of the rich wait for the opportunity to come which they seize, whereas the sons of the poor have to create opportunities for themselves (Tawney, R. H. 1952). This directly refers to the income and education inequalities between rich and poor. This creates educational inequalities even in welfare states. For mitigating the malady, UN sponsored the program of Education and Health for all.

In industrial economy, access to high income jobs and prestigious occupations are linked to education, training and skills; acquisition of all these requires investment. It is in view of this that the current government of India has initiated a spatially widely spread program of skill development for equipping young men and women with the ability to get jobs. In the industrial developed societies based on market economies, inequalities of income and wealth are highly marked (Myrdal, Gunnar, 1955).

The currently poor people are engaged in low income jobs and less prestigious occupations due to no or inadequate education, training and skills. Marshall (1892) explained this as follows:**"Current poor people are poor because their parents were poor and engaged in low income jobs; their inadequate income prevented them from investing in the education of their children."**

If we use the terminology of Myrdal (1955, 1969), illiteracy, low education and low income constitute a vicious cycle. Shri Prakash explained it as the process of transfer of inequalities of education and income from one generation to another in the developed capitalist economics in pre-welfare age due to an absence of public investment in education. Education of the children was treated as the responsibility of the parents due to which illiteracy, no or low education and income were transferred from one generation to the next generation (Prakash, Shri, 1994). Schultz (1962) also emphasised the fact that growth of income enables each succeeding generation to be better educated than the earlier generation.

It may not be out of place to point out **Pareto's law of income distribution which is also relevant in this context. According to Pareto - "Probability of people belonging to relatively high income groups to move to the next higher income group is much greater than the probability of the poor to move into an income group above the poverty level".** As income is the facilitator of investment in the education, income inequality tends to be transformed into educational inequalities at the given point of time as well as through time (Prakash, Shri, 1994).

Transformation of administrative estate into welfare estate brought about radical changes. Estate was responsible for defence against external aggression, maintenance of internal law and order and administration of justice; collection of revenue and public expenditure and miscellaneous items were also the responsibility of the estate. However, the transition into welfare estate and maximization of social welfare emerged as the paradigm of public responsibility.

The Twin concept of public and merit goods became a part of conceptual and public policy thrust. Public goods are defined as products where for any given output consumption by additional consumers does not reduce the quantity consumed by existing consumers. There are very few public goods, common examples include law, parks, street-lighting, defence etc. As there is no marginal cost in producing the public goods, it is generally argued that they must be provided free of charge, otherwise the people who benefit less than the cost of using the public goods, will not use it. This will lead to a loss of welfare. Also the goods are mostly non-excludable, which means that if once provided, everybody can use them. When charged it will lead to "free-riding". So these goods will not be provided by free markets as there is no way to charge for the usage. The solution is that the state must provide these goods and finance them from taxes collected from everybody.

Merit goods on the other hand are generally the products not distributed by means of the price system but based on merit or need, because people although having perfect knowledge would buy the wrong quantity of the goods. These goods can be supplied by free market but not of the right quantity. Merit goods are, for example, education and to some extent health-care. They are provided by state as "good for you".

As health and education have become largely a public responsibility and partly a parental responsibility, it may be inferred that inequalities in the distribution of education among the current generation will enhance income which tends to decline from proceeding to current generation.

Research Questions

The following are the research questions of the study which have been empirically investigated:

• Does parental education influence education of the children?
• Do the children receive same level and type of education as their parents received?
• Do the children receive more education than their parents?

In this age of knowledge, education tends to grow more rapidly than income, while population tends to grow less rapidly in the process of development. The job opportunities especially in the public sector in globalized, emerging market economies like India, remain either stagnant or declines. Consequently, excess of supply over demand at each level of education especially at the school stage education, is substituted for jobs. Hence at every layer and level of job up gradation of qualification emerges as an indisputable fact (Woodhal, Maureen et.al. 1969 and Prakash Sri, 1977 & 1996, Sharma, Amit, 2013).

The economies of the third world, which opt for globalization, grow more rapidly than education, specially technical and professional education which leads to the shrinking of income and educational inequalities from the proceeding generation to the current generation (Sharma, Amit and Prakash, Shri, 2018).

Methods and Models

The basic objective of the study is to examine whether the educational inequalities in the distribution of education among the parents is greater or equal to or less than the inequality in the distribution of education among the children.

The following methods of data analysis have been used:
1.   Descriptive statistics;
2.   Lorenz curve;
3.   Ginni coefficient;
4.   Sign test; and
5.   Coefficient of contingency

Descriptive statistics is the simplest statistical methodology of data analysis. But it differs from inferential statistics which is basically based on probability theory and diagnostic tests. Results of descriptive statistics have been subjected to diagnostic test for evaluating significance of the difference between mean and median by t-statistics. The underlying assumptions of the test are that the distributions of (i) parental education (ii) children's education and (iii) parental income are normal. The mean and median of normal distribution coincide in the middle of the curve and hence are equal in magnitude.

Therefore, the significant or non-significant difference between the mean and median will reveal whether the distribution converges or diverges from normal distribution (see Prakash, Shri et al, 2022).

Descriptive statistics comprises the following:
1. Mean;
2. Median;
3. Standard Deviation;
4. Variance;
5. Coefficient of kurtosis and skewness and;
6. Range

Besides, coefficient of variation (CV) has also been used to examine the degree of variation in terms of per unit of mean. In this research paper Lorenz curve has been used to represent the education inequality in parents and children as well as the inequality of parental income in the sampled households.

Lorenz Curve

To show graphically the distribution of income and/or wealth of a country, economists use the Lorenz curve. It was formulated by Max. O. Lorenz in 1906 for representing the proportion of income earned by given percentages of population.

The curve has a line of equality, commonly drawn at 45 degree, which shows equal distribution of income perfectly. The curve under the line of equality is Lorenz curve which shows the actual distribution of income. Comparison of curve with the line of equal distribution highlights the extent of inequality in distribution. Farther the curve from the line of equality, more unequal distribution of income tends to be.

The horizontal axis of the curve represents the cumulative proportion of people from lowest to highest income, while vertical axis shows the cumulative proportion of income earned by different persons. The paper has innovatively used the Lorenze curve for examining inequality in the distribution of education.

Ginni Coefficient

Ginni coefficient represents the degree of income inequality among the population. Ginni coefficient varies from zero to one. Basically, it is the ratio of the area between the Lorenze curve and the line of equality (numerator) and the area under the line of equality (denominator). This concept was developed by Corrado Ginni (an Italian statistician). Often, Ginni coefficient or Ginni index is used to measure inequality of income. If the value of Ginni coefficient is zero (G= 0), it means that everyone in the country has same or equal income, while the value of Ginni coefficient equal to 1(G= 01) indicates only one person has all the income of the nation, all other people have zero income (a case of perfect inequality).

Analysis of Results of Descriptive Statistics

Results of descriptive statistics of parental education, children's education and household's income are analysed separately.

Analysis of Descriptive Statistics of Parental Education

Empirical results are sequentially arranged for discussion. The table of descriptive statistics of parental education is given hereunder.

TABLE: 1.1. SUMMARY STATISTICS OF AVERAGE SCHOOL YEARS OF PARENTS

Average School Years of Parents	
Mean	9.096398305
Standard Error	0.278102754
Median	9.17
Mode	0
Standard Deviation	6.041938335
Sample Variance	36.50501885
Kurtosis	-1.320044284
Skewness	0.013759359
Range	20
Minimum	0
Maximum	20
Sum	4293.5
Count	472

Source: Author's own calculations

The following important inferences may be drawn from the results reported in table 1.1.

1. The calculated value of mean of the completed years of parental education is 9.09, whereas the median has a value of 9.17. As the median is nominally greater than the mean years of completed education by parents, the distribution is expected to be tilting towards negative (left) side. It implies that the illiterate and less educated parents dominated the distribution. However, the difference between mean and median is 0.08, which may appear to be negligible. The difference should be statistically significant despite apparently low value. A difference of 0.08 year in education may represent gap between two levels of education, say primary (class 5th) and middle (class 8th). If a person leaves the school after class 9th, it does not lead him/ her anywhere; but if she/he leaves school after passing class 10th, she/he may pursue next stage of higher education or can even get some job. Even though an academic year is of 08-10 months only, this one year in education makes a big difference in an individual's practical life.

2. The calculated value of (t) between the difference of mean and median of parental education is 6.24, which is much greater than the theoretical value of 1.96 at 0.05 probability level. Hence, it is inferred that the distribution of parental education diverges from normal distribution. It suggests that the distribution may be concentrated and skewed.

3. The above inference is supported by the coefficient of kurtosis, it has a value of -1.3; which is algebraically less than -1.0 and even much lower than +1.0. (-1.0 > -1.3 < +1.0). Thus the coefficient of kurtosis lies outside the range of non- significance. Hence, the distribution of parental education is mildly concentrated.

4. The concentrated distribution is also generally skewed but this does not hold true in this case. The coefficient of skewness has a value of 0.013 which is greater than -1.0 but less than +1.0. Considering the above results, distribution may display some skewness on the left side.
Above results suggest that the distribution of parental education may not vary much away from the mean.

5. The calculated value of the (coefficient of variation) CV is 66.44. Hence the completed years of parental education vary by 66% per unit of mean which is high.

6. The value of range is 20; the parental education varies between 0 to 20 completed years of education which suggests existence of high degree of inequality in the distribution of parental education.
This inference is more rigorously examined directly by Lorenz curve and Ginni coefficient.

Lorenz Curve of Distribution of Education among The Parents of Households of Different Education Groups
The distribution of cumulative percentages of education of parents of 472 households of different groups is shown in the below given table.

TABLE: 1.2. DISTRIBUTION OF PARENTAL EDUCATION AMONG THE HOUSEHOLDS OF DIFFERENT EDUCATION GROUPS

Parents Education Groups	Mid-Point	HH (Frequencies)	No of HH Mid-Point	% School Yrs. of Parents	% HH	Cum % Edu. of Parents	Cum % HH
						0	0
0—3	1.5	76	114	1.35	16.10	1.35	16.10
3—6	4.5	20	90	1.07	4.24	2.42	20.34
6—9	7.5	44	330	3.92	9.32	6.34	29.66
9—12	10.5	60	630	7.48	12.71	13.82	42.37
12—15	13.5	18	243	2.88	3.81	16.70	46.19
15—18	16.5	19	313.5	3.72	4.03	20.42	50.21
18—21	19.5	18	351	4.17	3.81	24.59	54.03
21—24	22.5	39	877.5	10.42	8.26	35.01	62.29
24—27	25.5	43	1096.5	13.02	9.11	48.02	71.40
27—30	28.5	46	1311	15.56	9.75	63.59	81.14
30—33	31.5	38	1197	14.21	8.05	77.80	89.19
33—36	34.5	28	966	11.47	5.93	89.26	95.13
36—39	37.5	9	337.5	4.01	1.91	93.27	97.03
39—42	40.5	14	567	6.73	2.97	100.00	100.00
	SUM =	472	8424				

Source: Author's own calculations

First the entire 472 sampled households have been categorized into 14 parental educational groups. To calculate the completed school years of parents in each educational group, mid-points of education of each group is multiplied by the frequency of households. We then calculate the percentage share of education of the educational groups and finally come to the cumulative percentages of education of the parents. Similarly we calculate the percentage share of households of each parental educational group of 472 households and then come to the cumulative percentages of households.

The Lorenz curve has been plotted to represent the parental educational inequality among the sampled households. X-axis represents cumulative percentage of household while Y- axis represents the cumulative percentage of parental education.

The following in the Lorenz curve of parental education.

FIGURE NO.: 1.1. LORENZ CURVE: INEQUALITY IN THE DISTRIBUTION OF PARENTAL EDUCATION
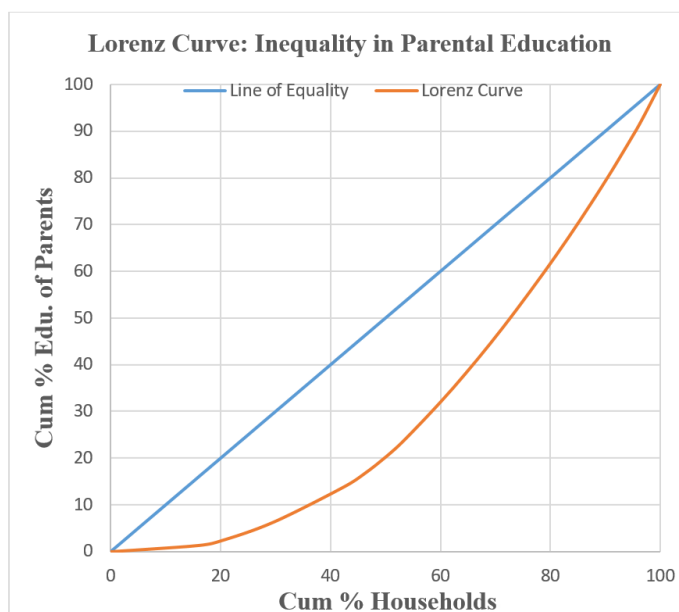
Source: Author's own calculations

As expected, illiterate and low education parents seem to lie nearer the x- axis and away from the diagonal line. As against this, parents of high education groups lie nearer to the diagonal line. It signals existence of substantial inequality.

Ginni Coefficient of Inequality in Parental Education

For the quantification of inequality, Ginni coefficient is estimated. The value to Ginni coefficient of parental education of sampled households is as high as 0.92. This lends support to the inference drawn from visual perusal of the Lorenz curve.

There exists a high degree of educational inequality among the parents of sampled households. It is obvious from the fact that the bottom two groups of parents, out of 14 parental groups are illiterate or have primary level of education while top three groups of parents have graduation level of education or higher than that.

Analysis of Descriptive Statistics of The Children's Education

The following is the table of descriptive statistics of the children's education:

TABLE: 1.3. SUMMERY STATISTICS OF AVERAGE SCHOOL YEARS OF CHILDREN

Average School Years of Children	
Mean	11.25776836
Standard Error	0.200243664
Median	12
Mode	15
Standard Deviation	4.350405931
Sample Variance	18.92603176
Kurtosis	-0.17597002
Skewness	-0.756473929
Range	19.33333333
Minimum	1
Maximum	20.33333333
Sum	5313.666667
Count	472

Source: Author's own calculations

The following important inferences are drawn from the table 6.3.:

Mean years of completed years of children's education is 11.26, which is 1.24 times more than the mean years of completed parental education. Thus the average children's education is 24% more than their parental education.

The calculated value of t of the difference of mean years of education of children and their parents is 8.93 which is highly significant at 0.01 probability level. Hence, the years of children's education is significantly greater than mean years of parental education. Besides median value of children's education is also 1.33 times the median years of parental education. This suggests that the inequality in the children's education may not be as high as inequality of education among parents. It is examined further by Lorenze curve and Ginni coefficient.

Above results lend credence to the thesis that each succeeding generation is more and better educated than the preceding generation (Schultz, T. W., 1962 and Prakash, Shri, 1977, 1978 & 1994).

The median years of children's education are 12.0. Median is thus 1.06 times the value of the mean which means that the value of median is 6.7% greater than the mean value. This suggests that the distribution may be negatively skewed.

t- Statistics of the difference of mean and median of children's education is 80.14 which is statistically extremely high. It suggests that the distribution of children's education greatly diverges from normal distribution. Therefore the distribution may be both concentrated and skewed.

The coefficient of kurtosis has a value of -0.71 which is algebraically greater than -1.0 and lies within the range of acceptance. It suggests that the completed years of children's education are not highly concentrated.

As expected the coefficient of skewness is negative and has a value of -0.76 which is algebraically greater than -1.0. But the degree of skewness on left side is not high.

Coefficient of variation has a value of 38.67 which is much lower than the corresponding value of CV of parental education. It means that the spread of children's education is much lower than that of the parental education. This reflects a lower degree of concentration of children's education than parental education. The results are in consonance with the coefficient of kurtosis.

The value of range is 19; the children's education varies between 1 to 20 completed years of education which suggests existence of high degree of inequality in the distribution of children's education.

However the results suggest existence of inequality in the distribution of education among the children, though the degree of inequality may be much lower than the inequality in the distribution of parental education.

These inferences are more rigorously examined directly by Lorenze curve and Ginni coefficient.

Lorenze Curve of Distribution of Education Among Children of Households of Different Educational Groups

To draw Lorenze curve of inequality of education among the children in the sampled households, first we calculate the total completed school years of children of each parental educational group. Then we calculate the percentage share of education of children in each group followed by calculation of the cumulative percentages of education of children. We also have the total number of children in each parental education group and calculate the percentage share of the children in each parental education group and then come to the cumulative percentages of children. The Lorenze curve has been shown between the two dimensions.

TABLE: 1.4. DISTRIBUTION OF CHILDREN'S EDUCATION AMONG THE HOUSEHOLDS OF DIFFERENT EDUCATION GROUPS

Parents Education Groups	HH (Frequencies)	No of Children	Total School Yrs of Children	% of Children	% of Children Edu	Cum % Edu of Children	Cum % Children
0—3	76	244	2464	20.08	15.43	15.43	20.08
3—6	20	52	552	4.28	3.46	18.89	24.36
6—9	44	136	1220	11.19	7.64	26.52	35.56
9—12	60	168	1384	13.83	8.67	35.19	49.38

12--15	18	52	630	4.28	3.94	39.14	53.66
15--18	19	53	645	4.36	4.04	43.17	58.02
18--21	18	47	550	3.87	3.44	46.62	61.89
21--24	39	95	1338	7.82	8.38	55.00	69.71
24--27	43	98	1179	8.07	7.38	62.38	77.78
27--30	46	97	1242	7.98	7.78	70.16	85.76
30--33	38	74	928	6.09	5.81	75.97	91.85
33--36	28	55	1524	4.53	9.54	85.51	96.38
36--39	9	17	1082	1.40	6.78	92.29	97.78
39--42	14	27	1232	2.22	7.71	100.00	100.00
	472	1215	15970				

Source: Author's own calculations

The Lorenz curve of inequality among the children's education in the sampled households is given below:

FIGURE NO.: 1.2. LORENZ CURVE: INEQUALITY IN THE DISTRIBUTION OF CHILDREN'S EDUCATION
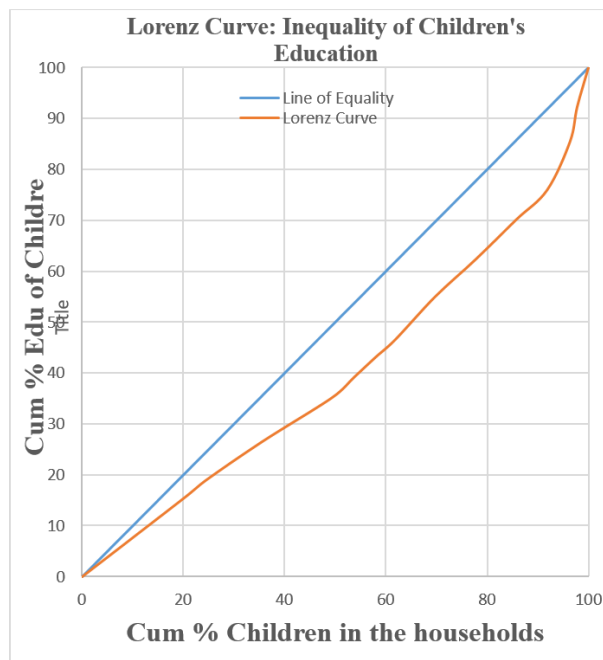
Source: Author's own calculations

Interestingly the curve is very close to the line of equal distribution for the bottom 20 percent. It reflects the success of the Education for all and Sarva Shiksha Abhiyan (SSA). But if we move up the curve, its divergence from 45 degree line increased. Inequality seems to be greater among the last three education groups.

Ginni Coefficient of Inequality in Children's Education

Precise degree of inequality is captured by Ginni coefficient. The value of Ginni coefficient of children's education of sampled households is 0.21 It implies that there exists a low degree of educational inequality among the children's education in the sampled households.

We can infer from the above results that illiterate and less educated parents do not want their children to face the same or similar handicaps, bottlenecks and deprivations which they themselves face in life due to lack of education. So they are motivated to invest in the education of their sons and daughters irrespective of income and/ or education limitations. Policy seems to have also played its role at the level of basic education.

As against this, the educated parents recognize the value of education because of the benefits they received in life in general and in careers in particular. So they attach a great deal of importance to the investment in the education of their children. However there is an upper limit of education beyond which children cannot be provided education. A Ph.D. degree holder father or mother may not necessarily have their children to possess a Ph.D. degree. It is because Ph.D. has now been made a pre-requisite qualification for appointment and promotion in higher education. But it does not have any such relevance in non-teaching jobs. After the implementation of NEP in 1991 employment opportunities in private sector have been expanding more rapidly than the opportunities in the public sector. So, the younger generation seem to prefer private than public jobs. The above result is in consonance with this scenario.

In several cases, children having academic parents may be engaged in private companies where Ph.D. is not required as a qualification. So their education may end at graduation or post-graduation level, though their parents have more education.

Thus, the empirical evidence lends support that inequality in the distribution of education among the children tends to decline in the distribution of education among the parents. On the whole, the probability of the children of the illiterate or less educated parents is greater than the probability of the children of more educated parents to move into next higher education group.

Analysis of Descriptive Statistics of Households' Income

The following is the table of descriptive statistics of households' income:

TABLE: 1.5. SUMMERY STATISTICS OF MONTHLY HOUSEHOLDS' INCOME

Income of The Household (monthly)	
Mean	39.77330508
Standard Error	1.81488227
Median	30
Mode	25
Standard Deviation	39.42933542
Sample Variance	1554.672492
Kurtosis	19.84498694

Skewness	3.687710015
Range	352
Minimum	3
Maximum	355
Sum	18773
Count	472

Source: Author's own calculations

The following important inferences may be drawn from the table 6.5.:

The mean income of the households is Rs. 39.77 thousands per month while median income is 30 thousand per month. As mean income is 1.32 times the median income, income distribution may be positively skewed.

The calculated value of t of the difference of mean and median income of households is 5.39 which is greater than 1.96 at 0.05 probability level; hence, it is statistically significant. Thus, it can be inferred that the distribution of household's income diverges from normal distribution.

The calculated value of coefficient of kurtosis is 19.84, which is higher than even +3.0 and lies outside the range of acceptance. It implies that high values of households' income are likely to be concentrated in and around the mode.

The coefficient of skewness has a high value of 3.68. Thus the coefficient of skewness shows that households' income is highly positively skewed. This is in consonance with the values of coefficient of kurtosis.

The calculated value of CV of households' income is as high as 99.11. Thus, households' income varies by 99% per unit of mean which is extremely high.

The minimum income of households is Rs. 3 thousand pm while maximum value is Rs. 355 thousand pm. Thus the range of Rs 352 thousand is extremely high within which the income of households varies. It implies high degree of inequality in income distribution.

The inference is further examined by Lorenze curve and Ginni coefficient.

Lorenze Curve of Distribution of Income Among Households of Different Education Groups

To draw income inequality curve of distribution among the households, first we calculate the total income of each parental education group and then calculate the percentage share of income in each group and finally come to the cumulative percentage of parental income. Income inequality curve has been drawn between the number of households and the cumulative percentage of parental income.

TABLE: 1.6. INCOME OF HOUSEHOLDS OF DIFFERENT EDUCATION GROUPS

Parents Education Groups	HH (Fre-quencies)	Total Income	% Income HH	% HH	Cum % of Income HH	Cum % HH
0—3	76	1476	7.91	16.10	7.91	16.10
3—6	20	296	1.59	4.24	9.49	20.34

6—9	44	996	5.34	9.32	14.83	29.66
9—12	60	1772	9.49	12.71	24.32	42.37
12—15	18	645	3.46	3.81	27.77	46.19
15—18	19	564	3.02	4.03	30.80	50.21
18—21	18	464	2.49	3.81	33.28	54.03
21—24	39	1512	8.10	8.26	41.38	62.29
24—27	43	1711	9.17	9.11	50.55	71.40
27—30	46	2068	11.08	9.75	61.62	81.14
30—33	38	3050	16.34	8.05	77.96	89.19
33—36	28	2185	11.70	5.93	89.67	95.13
36—39	9	668	3.58	1.91	93.25	97.03
39—42	14	1261	6.75	2.97	100.00	100.00
	472	18668				

Source: Author's own calculations

The Lorenz curve based on above table is shown hereunder.

FIGURE NO: 1.3. LORENZ CURVE: INEQUALITY IN THE DISTRIBUTION OF INCOME AMONG HOUSEHOLDS
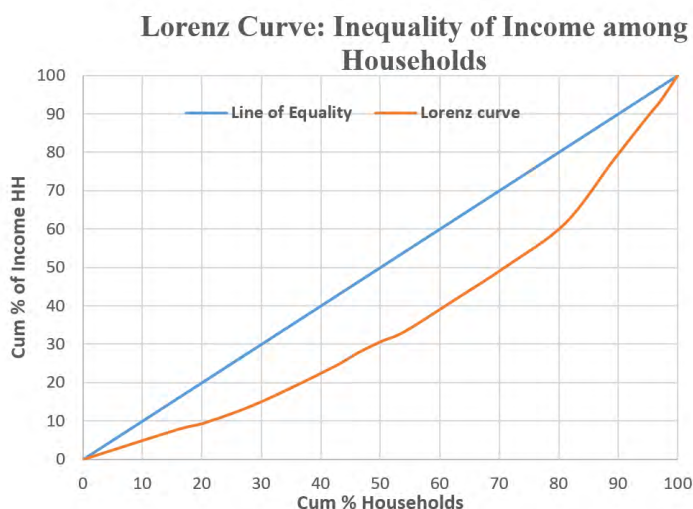
Source: Author's own calculations

The curve shows that the gap between the line of equality and Lorenze curve increases from the bottom placed groups. But it declines among the top groups. The distance/ inequality is high upwards from the bottom to eighth decile where after it declines. Interestingly, income inequality is the highest among the middle income groups and it is relatively low among the low and high income groups. A tendency of convergence seems to operate at the bottom and the top of income pyramid.

Ginni Coefficient of Inequality in the Income of Households

The Ginni coefficient of households' income has a value of 0.28, which is comparatively lower than the value of Ginni coefficient of parental education but it is greater than the coefficient of children's education. It implies that income level among the parents of households has not been so unequally distributed as compared to education of the parents. It may be due to the fact that there are two groups of the families in the sample. One whose children are school going and those whose children are educated and working. These working children are in fact contributing in the income of the family. So income level of the families is less unevenly distributed.

This inference is also tested by sign test to examine relationship.

Sign Test of Relation between Parental and Children's Education

Sign, sign ranked and rank correlation tests have been developed to examine relation of two attributes. In case of paired observations in samples, sign test is, therefore used to evaluate relation between education of parents and their children. The traditional theory of education predicts that every parent wishes to provide at least as much education as they themselves have had. Besides, illiterate and very less educated parents do not want their children to face the same difficulties and problems that they themselves face in their own lives due to their illiteracy and/ or little education. So far as India is concerned, education is viewed as a ladder to employment, especially public sector employment ever since western education was introduced by Macaulay (Prakash, Shri, 1996). From this viewpoint parents may be classified into following groups:

1.   Illiterate;
2.   Primary graduates;
3.   Middle graduates;
4.   Secondary graduates;
5.   Higher Secondary graduates; and
6.   College graduates and above and professionals.

The illiterate parents do not want their child to remain illiterate so that they receive the benefit of at least school education. Strumilin, a Russian economist, discovered that investment in literacy for one year raised agricultural productivity by 36%. Education above literacy naturally confers more benefits. D. P. Chaudhary also found that productivity of primary and middle graduates in Punjab was greater than that of illiterate farmers (cited from Prakash, Shri, 1977). Such parents who have school education want their children to receive college education while parents having college education wish their children to have college and/ or professional education. It implies that the parental education is likely to be directly related with children's education. So, children are expected to receive equal or more education than their parents.

The proposition has been empirically evaluated by sign test. Sign test is one of the simplest non-parametric test. The test is distribution free so far as it does not assume the distribution to be normal. It is assumed that the positive and negative signs are randomly distributed equally. So that null hypothesis predicts 50% signs to be negative and 50% to be positive.

The probability (P1) of positive signs equals probability (P2) of negative signs. If x1 and x2 are the number of positive and negative signs then:

Ex = P1 x1 = P2 x2 = ½*n

If the difference between parental and children's education is zero such pairs are overlooked and the sample size is correspondingly reduced. The smaller number of observed signs in the distribution are picked up and compared with the expected numbers. In this case n = 472. Therefore P1 x1 = P2 x2 = 236 and p1 = p1 ½ (see Siegel).

The observed positive signs are less than 236 as these signs equal 172. Thus the probability of positive signs = 0.364 < 0.50. This difference is statistically significant at 0.05 probability level. As against this, the negative signs are 300 which is much greater than 236. Hence, probability of getting negative sign is 300/ 472 = 0.636. This is also greater than 0.05. Thus the possibility of fewer positive signs is much lower than the critical value of probability of 0.05. Similarly, the probability of greater negative signs is also much greater than the critical probability value of 0.05. As parental education has been taken as the norm for differentiating, negative signs are far greater than positive signs. The above results lead to the following inferences:
Parental education is significantly related to the education of their children;
On an average, children are more educated than their parents.

Sign test, Chi square and coefficient of contingency are non-parametric statistical tools which are relatively weak in power. Sign test is the weakest amongst the three. One question to be answered is that will these inferences stand evaluation by more powerful test. Another question arises, why we have used these weak tests when regression modelling is also used. Answers are straight forward to the above questions;

 Each statistical test has its own assumptions, strengths, weaknesses and power which make each test suitable for some specific objective and particular type of data. Education per say is qualitative in nature and orientation and non-parametric statistical tools are appropriate for such data. For example, illiteracy cannot be measured numerically and similarly the number of completed school years cannot exceed a specific number so, non-parametric tests of statistics have been preferred to regression modelling. Relationship between education of parents and their children is qualitative. Besides parents-children relationship makes sample observations paired. These attributes qualify sample data for use to non- parametric tests;

 Sometimes one gets otiose results which are inbuilt in methods of data analysis. So we chose to analyse data with multiple methods and models.
 If a hypothesis is rejected on the basis of results of a weak non- parametric test, it cannot be expected to yield acceptable results by regression modelling. We tried to eliminate this possibility. This inference is further tested more rigorously by coefficient of contingency. But chi- square test is used to test the hypothesis of direct relation.

Coefficient of Contingency

The coefficient of contingency is used to examine the degree of relationship between parental education and children's education. We have examined preposition by sign test also. The power of which is weak and it does not show the magnitude of relationship. The weakness of sign test is overcome by the coefficient of contingency, though it is problematic to discern the direction of relationship by the coefficient of contingency. Coefficient of contingency is the square root of the ratio of Chi square and sum of the observations and Chi square. The calculated value of coefficient of contingency is = 0.538. A value of 0.54 indicates moderately high value of relationship between the parents' education and the children's education. This inference is supported by the fact that the calculated value of C is 59% of the maximum value of C which is 0.912 for (6 X 6) contingency table.

$$C = \sqrt{\quad / (\quad + n)} \text{ ------------------------------------- (6.16.1.)}$$
$$C \max = \sqrt{r-1}/ r \text{ ------------------------------------- (6.16.2.)}$$

Where r is equal to number of rows/ columns. This is the formula to calculate maximum value of C foe square table.

Conclusions and Findings

The following are the important conclusion of the study:
1. The distribution of completed years of parental education diverges from normal distribution.
2. The distribution of parental education is mildly concentrated and skewed on the left side.
3. The calculated value of (coefficient of variation) CV is 66.44. Hence the completed years of parental education vary by 66% per unit of mean which is high.
4. The range suggests the existence of substantial inequality in the distribution of parental education. This is supported by a high value of Ginni coefficient of 0.92.
5. The distribution of children's education also diverges from normal distribution.
6. The completed years of children's education are not highly concentrated and the degree of skewness is not very high.
7. Coefficient of variation of children's education has a value of 38.67 which is much lower than the corresponding value of CV of parental education. It means that the spread of children's education is much lower than that of the parental education.
8. The inequality in children's education is comparatively low and lower than that of parental education. This is also supported by a low value of Ginni coefficient as 0.21.
9. The distribution of household's income is also not normally distribution as we find a statistically significant t value between the difference of mean and median income of households.
10. High value of coefficient of kurtosis shows that the household's income is concentrated in and around the mode and it also shows a highly positive skewness.
11. The range is extremely high with in which the income of households varies and that shows a high degree of inequality in income distribution.
12. The value of Ginni coefficient of households' income is 0.28 which is relatively less than the value of Ginni coefficient of parental education.
13. The probability of the children of the illiterate or less educated parents is greater than the probability of the children of more educated parents to move into next higher education group.

Comparatively less inequality in households' income is due to the fact that there are two groups of the families in the sample. One whose children are school going and those whose children are educated and working. These working children are in fact contributing in the income of the family.

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Method of Compilation of Input Output Table of the State of Uttar Pradesh, 2017[@1,2]

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Abstract

Initiation of regional planning resulted in the constitution of the state planning boards which necessitated construction of state wise Input Output tables (I-O-T). I-O-T is the base of I-O modeling for planned development, estimation of the impact of Policy, changes in consumption, Investment, exports and imports.

The paper focuses on the method of construction of Input-Output Table, 2017 of Uttar Pradesh. The paper also outlines the decomposable model for empirical applications of the table. First the paper discusses the various uses of Input-Output Modeling. It elaborately explains the database, process of compilation of matrices of the transactions and inputs coefficients. The transaction table has 37 exogenous sectors and 107 endogenous sectors, yielding 144*144 sectors table. To facilitate use of I-O-T a decomposable model has been developed. 107 * 107 matrices of Input Coefficients and its Leontief Inverse have also been estimated.

Keywords: I-O table, Inverse, Leontief, Decomposable Model, Square Matrix.

Introduction

Input – Output (I-O) Model is a part of linear economics. I-O model comprises Primal and Dual Models. Primal Model deals with the determination of output in terms of Leontief Inverse and final demand. Final demand is assumed to be exogenously fixed at the given point in time. It is also assumes the technology of production is given exogenously; the matrix of input coefficients encompasses the technology of production. The change in technology requires a separate input coefficient matrix at a different point in time. The input coefficients of different sectors constitute the structure of the economy for the given technology.

The dual of quantity model is defined as Price Model. The prices derive from price model may also be define as shadow or accounting prices (P.N. Mathur, 1966). The prices derived from I-O model are determine in terms of value added vector and Leontief Inverse.

Static Leontief Model is converted into dynamic model by incorporating Matrix, B of capital coefficients along with input coefficient matrix, A in the structural equations;

Following is the static model:
$$X = A * X + f$$
$$= (I-A)^{(-1)} * f \ldots\ldots\ldots\ldots\ldots (1)$$

Following is the dynamic model:
$$X = A * X + rB * X + F$$
$$= (I-A-rB)^{(-1)} * f \ldots\ldots\ldots (2)$$
$A = (aij)$ is the matrix of input coefficients; $aij = Xij / Xj$ subscript, $aij * X = Xij$

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Where Xij is the amount of ith good used as an input to produce Xj output of good j; aij is the amount of ith good used to produce 1 Rupee worth of output of good j.

B = (bij) is the matrix of capital coefficients, and bij is equal to Kij / Xj or bij * Xj = Kij, where Kij is the amount of capital/ stock of ith good used to produce Xj output of good j, bij is the amount of stock of ith good used to produce one rupee worth of output of good j.

X is vector of gross output, r is the rate of interest and f/F is vector of final demand.

Replacement of r by B, uniform rate of growth in equation 2 will convert it into balanced growth model.

It is obvious that the matrices A and B are essential element of static and dynamic Input – Output Model.

Final demand vector of Static model comprises private consumption, public consumption, private investment, public investment, exports and imports. Dynamic model excludes investment from final demand and investment is treated as endogenously. I - O model classified demand into two parts:

1. Intermediate Demand - comprises sector wise material inputs, shown by matrix A, used in production process and

2. Final Demand which has already been define d above.

Leontief concept of demand differs from its traditional concept; traditionally, demand is treated as a function of price and/or income. Intermediate demand is technologically determined, while each component of final demand depends on different economic variables.

Leontief model is demand based while model of Ambica Ghosh (1959) is supply based. Allocation of output in different sectors is based on allocation parameters determined by planned objectives.

Uses of I - O models

Input Output model has been used for a wide variety of objectives. I - O models have been manly used for planning the development of Second and Third World countries. Leontief paradox inspired numerous researchers such as R.B.Bharadwaj (1954), R.B.Bharadwaj & Jagdish Bhagwati (1969) and K.N. Prasad (1973) in India and across the globe to empirically test the validity of Hekchsher –Ohlin theory of trade. Import substitution policy, rapid development of basic and heavy goods industries and consistent accumulation of capital changed both the structure of Indian economy and its trade, rendering Hekchsher –Ohlin theory of trade redundant. (Shri Prakash & Sonia Dhir, 2013) I - O model has also been used for estimating factor intensity and labor productivity. Factor intensity and labor productivity have also been estimated from I-O models (This Tan Ra, Shri Prakash and Brinda Balakrishnan). P.N. Mathur (1962) distinguished two concepts of capital as well as growth and welfare gains of trade on the basis of I - O Models. Mathur (1986) developed gravity model to determine benefits of regional groupings from trade.

Richard Stone (1966) developed special matrices to determine inter and intra educational processes. Shri Prakash, (1971, 76) developed three special matrices to determine age and gender wise population, internal dynamics of educational activities and their interface the Indian economy. These matrices were finally endogenous as part of Input Output Matrix of 1959.

Rass Musen developed formulae to determine backward and forward linkages for analyzing the precepts of unbalanced growth theory in static I-O model. Shri Prakash (1992) developed the method to determine backward and forward linkages associated with the dynamic I –O model for analyzing the process of unbalanced growth and showed that unbalanced ultimately converges towards balanced growth. Rohit Desai and J.C. Mehta (1974) developed Input Output model for studying degree of success of industrial estates of Gujarat belonging to those which cater to local, regional, National, International markets. Ambika Ghosh developed an input output model for determination of inter sector distribution of income. Shri Prakash and Amit Sharma (2022) developed an Input Output model for determining growth gains of Hungary from its trade with India, China and EU; they also applied the model to determine the growth gains of Hungary from FDI received from INDIA, China and EU. In recent years attempts are made to develop IO tables of districts, cities and industries are also been made and used for regional development in input output framework.

Above all the major use of Input Output model is use for estimation of national income accounting across the globe (U.N Committees, 1946, 1998).

Shri Prakash and Amit Sharma (1997) developed Input Output Model for demographic accountant. Shri Prakash and J.S. Nain, transformed balanced growth model of Gautam Mathur, (1991) which comprises population, education and employment.

However there are several other uses of IO models. It is not possible to cover all uses of IO models.

Need for Constructing of I-O tables of U.P.

In 1970 regional planning emerged as an important objective of the planned development of the Indian economy due to its big size and diversity. So several I-O tables were constructed during this period, the Punjab, Rajasthan, Gujarat, Karnataka, Maharashtra, Madhya Pradesh and Uttar Pradesh were major states of India for which state of IO tables were constructed by various Scholars. But P. Venkat Rammaiya (1966) constructed 65*65 Input Output tables for all the major states of India. As the IO table of Uttar Pradesh has already become highly dated, Directorate of Economics and Statistics, Govt of UP, Lucknow sponsored and financed the project for the construction of the IO table for the year 2017 UP. The project was outsourced to Giri Institute of Development Studies, Lucknow. This paper is based on the outcomes of that project.

The updated table is needed for analyzing the economy of the state on the basis of the changes that have taken place in the state in 1970s.

Objectives of the Paper

Following are the objectives of the paper:

(i)   description and explanation of the procedure followed in the construction of I-O table,
(ii)   Explanation of distinguishing features of the I-O tables
(iii)   Derivation of the sector wise input coefficients from the transaction table;
(iv)   Estimation of Leontief Inverse;
(v)   Development of decomposable model for the empirical applications of this I-O table.

Parameters of consistency of I-O Model

The distinguishing feature of I – O model is that it is consistency rather than optimization model:
1. Consistency of I-O table requires sector wise output to be completely exhausted by the sum of intermediate and final demands.
2. The sum of sector wise value added and the sum of sector wise differences of gross output and intermediate demand should equal to each other. Generally it involves sector wise equality between final demand and value added because satisfaction of demand involves use of income/value added. As some sample data have also been used in the construction of the table, representativeness of the sample is required. If the difference between sample and population mean is statistically zero, sample is treated as representative. This test has been applied to sample data used in the table. The size of the representative sample is ipso facto adequate.

The data pertaining to unorganized sectors have been taken from the Directorate of Economics & Statistics, representativeness of the sample is assumed to have already been tested by the Directorate. The discussion of different components of final demand shows that (i) I-O table is representative of the economy of U.P. and it is expected to have replicated the structure of the economy it represents, so far as final demand part of the table is concerned. (ii) Gross output, intermediate demand and final demand are Core variables of the of I-O model, each of these variables have distinct components. All these three variables both in aggregate and disaggregate forms have been found to satisfy the criteria of consistency. It is hoped that the access to data relating to imports and exports from other states into U.P., carpet weaving, Khadi-Gram Udyog, Eggs and Poultry will enhance the precision of the estimates. Due to lack of such data the table has to make use of logical assumptions and processes of the estimation of the reported values.

Representativeness of I-O table is an important feature of input-output modeling, since the table is the miniaturized replica of the economy, the table represents the (i) system of production; (ii) structure of production in the economy, that is economic structure, (iii) embodies technology of production, and (iv) captures degree and direction of inter-dependence among the sectors, (v) table/matrix has to satisfy the twin conditions of a technological feasibility and economic viability. Technological feasibility is embodied in the input coefficients which are defined as technological parameters: 1- aii > 0. If this condition is not satisfied, production of ith good will neither be technologically feasible nor may it be economically viable. For example if aii = 1, its mean that for producing one ton of steel may be required to be used as an input; nothing will be left for satisfying intermediate demand for steel of other sectors and no money/quantity will be left for the payments for the other inputs required for the production of steel.

Besides, the determinant of the matrix of input coefficients, A must not be zero. Above are known as Hawkins – Simon conditions of technological feasibility. A perusal of the diagonal elements of the matrix A (107 *107) will show that no element has a value greater than one. Similarly a perusal of the Leontief Inverse will show that none of its elements is negative i.e. less than zero. Therefore, the matrices A and $(I – A)^{-1}$ satisfied both the conditions of technological feasibility and economic viability. $Pj > \Sigma Pi * aij$ or $Vj > 0$ satisfy the condition of economic viability. This is also evident from the fact that the Gross Value Added of each sector and the final demand vectors of all sectors have positive values.

The following are the essential conditions for acceptance and approval of I -O model
(a) Existence of the solution - if the non-trivial and non-negative solution alone is acceptable if total

output is zero it cannot be considered as solution besides output can never be negative, therefore the IO table will be valid if and only if non trivial and non-negative solution exist. Besides, the solution should also be technological feasible. Non trivial and positive solution of the model exists only if the conditions of technical feasibility and economic viability are satisfied, which have been explained above.

(b) Uniqueness of the solution, and

(c) Stability of solution revolves around above features of I-O table.

Assumptions and Limitations

12% of output of different crops used to be assumed as feed & seed requirement of agriculture and related sectors. Development of High Yield Variety (HYD) of seeds has reduced the requirement of inputs of seeds for several crops. Consequently the seeds requirements range from 3% to 6 % of output of different crops. Above input requirement of seed are based on observed data.

Mechanization of agriculture and transport has eliminated the requirement of drought cattles like bullocks, horses and he buffaloes. In addition to the above traditional animal feed has been replaced by scientifically developed feed for balanced diet for niche cattle, poultry, pigree and fisheries etc. So, feed requirement for such sectors as animal husbandry, poultry and pig farming has been radically changed. The table uses actually available data of these inputs of the transaction table of U.P.

The limitation which is generally encountered in the compilation of I-O table is that Gaps, Limitations and expanse of Data differ across sectors and parameters. The data relating to the output of Khadi Gram Udyog for U.P. was available; but the data of inputs used in the sector are not available. As the technology of production of Khadi in U.P. in India is similar, input coefficients of Indian table of 2014 are used. Values/amounts of inputs used to produce gross output of khadi gram udyog of U.P. are derived as follows:

$a_{ip} = X_{ip} / X_p$, or $X_{ip} = a_{ip} * X_p$ ………. (3)

X_{ip} is the amount of ith good use to produce an output of X_p of khadi gram udyog; X_{ip} is an element of ith column and pth row of khadi gram udyog sector of U.P. table. a_{ip} is the amount of ith good, say cotton, to produce one rupee worth of output of khadi gram udyog in India.

No data were available for the output and inputs used in the production process in the handloom sector of the economy of U.P. A Stratified, systematic random sample in 2019 of slightly more than 400 weavers of Varanasi was taken. Varanasi has slightly more than 80 thousands handloom weavers. The sample contains data of quantities of various products, inputs used in production, their prices and employment. Some weavers owned several rooms and employed corresponding number of weavers for operations.

Hence labour productivity and the technology in handloom sector of U.P. and Karnataka were found to be convergent in the two states.(Shri Prakash & Sudhi Sharma (2016) So average productivity of labour multiplied by total number of weavers in Uttar Pradesh yielded an estimate of total output of handloom sector in U.P. This estimated output and input coefficients determine from sample data of Varanasi district were used to generate estimate for this column in transaction table of U.P. Similarly, information relating to inputs used in production process of some manufacturing and service sectors were also not accessible. Use of similar technology in corresponding sectors in Indian I - O table 2014 facilitated the borrowing of input coefficients from Indian table for U.P. table. Railways, Road transportation, civil aviation, communication and some servicing sectors like banking and insurance, maintenance of motor vehicle, computers etc are example of such sectors.

BASIC PARAMETERS/VARIABLES OF INPUT OUTPUT TABLE

Following are the basic parameters/ variables of Input output tables:
Gross output, Intermediate Demand and Total Final Demand.
Each of the above variables has its own components;

Gross Output - Gross output of each sector comprises supply of inputs to various sectors and final demand. Aggregate of gross outputs of various sectors of the economy yields an estimate of the aggregates gross output of the economy as a whole. More often than not aggregate gross output derive from table may exceed state SDP due to
1. Differences in the method of estimation; and
2. Some elements excluded in the estimation of SDP but which are included in the gross output/ supply in I – O table. In case of a totally closed economy, total output and total supply don't differ from each other. But in an open economy, output may exceed or fall short of total supply, depending on balance of trade. In case of negative balance of trade, supply shall exceed output, while in case of positive balance of trade; output will exceed supply, since exports will be larger than imports. This is further complicated in a doubly open economy like the economy of Uttar Pradesh. It has trade with rest of India as well as rest of the world.

So both the exports and imports of the state are of two types; Exports/Imports to/from other states of India and other countries. No data are available imports from other states into UP and exports from UP to other states of India; but data relating to exports from UP to other countries and imports into UP from other countries are available. These data have been used in the table or estimating final demand.

Intermediate Demand –

Intermediate demand pertaining to each sector has two components: Supply of the output of given sectors to other sectors for satisfying their requirement of intermediate inputs; this is shown in the row corresponding to the given sector and also defined as the forward linkage of this sector with the production sectors of the economy; second part relates to the supplies received from various sectors of the economy to meet the requirements of the intermediate inputs for the production of output by the given sector, which is defined as backward linkage of the given sector with the rest of the economy.

For example – first row of the transaction matrix depicts the supplies of intermediate inputs by the first sector to the rest of the economy. Thus this row shows the dependence of first sector on other sectors of the economy for the disposal of one part of its output, while this row also shows the dependence of other sectors on first sector of the economy for intermediate inputs. As against this, first column of the transaction table shows the supplies of intermediate inputs received by first sector form other sectors of the economy. Thus the backward linkages of the first sectors depicts the dependence on first on other sectors of the economy as well as the dependence of other sectors on first sector for the disposal of a part of their output. In business management terminology, rows and columns of the transaction matrix of I - O model display B2B business.

A decomposable 144x144 Transaction matrix has been prepared. No data are available for intermediate inputs received from 107 endogenous sectors for the production of output of 37 exogenous sectors.. While 107 have production operations located in the state. So it is assumed that production facilities for 37 sectors do not exist in U.P. So these 37 sectors are assumed to be exogenous to U.P. But supply of output of these 37 sectors of UP is used for three purposes. A part of supply is used as intermediate input in these 37 sectors themselves; another part is used as intermediate inputs in production of 98 of 107 sectors of U.P. the residual part of their output may be used to satisfy final demand in U.P., but no information is available about this

It maybe implied that foreign imports are used only for satisfying final demand and imports from other states are used only for meeting intermediate demand. This assumption is dictated by the lack of information. It is probable that imports from other countries may also be used in the production process in UP. In such cases, imports are used as intermediate inputs get merged in domestic intermediate inputs rather than reported separately. The imposition of these strong assumptions is necessitated by data limitations and absence of adequate information in some cases.

Data relating to Primary Sectors

Sector wise data of Inputs, Outputs, employment and capital of 33 primary sectors have been collected from 900 tehsils of U.P. following are the sectors; 7 cereal crops, 6 crops of fruits, 4 crops of edible oils, 3 crops of vegetables, 4 crops of pulses, cotton, sugarcane and one sector of minor miscellaneous crops, forestry, fishery, animal husbandry, poultry and pigree, dairy sector. First item wise values have been aggregated, identified and classified as outputs and inputs of appropriate sectors. But data for employment and investment/ capital are available only for some sectors.
The following rows have been added to the 144*144 transaction table as exogenous rows; column wise sum of intermediate inputs (Row 145), gross value added (146), Value Added per unit of output (147), employment, for whichever sector data are available (148) and investment, for which ever sector data are available (149).

Accounting Approach Based on Residuals

Final demand of an Input Output model may be obtained from exogenous sources; private consumption expenditure may be taken from the periodic sample surveys conducted by NSSO`s. Expenditure on public consumption may be taken from budgetary proposals/ budgetary expenditure and data relating to public expenditure on different items including subsidies. Data relating to private savings and investment may be accessed from Economic Survey, GOI/ State Governments. Similarly data pertaining to exports and imports are also available from such sources as RBI, Ministry of Commerce and Economic Survey. If, however, data pertaining to final demand or one or more of its components are not available, accounting approach may be used, since the final demand is the difference between the gross output and the sum of intermediate inputs supplied by the sector to the economy:
$X_j - \Sigma X_{ij} = f_j$ yields aggregate final demand of good j. Any missing component of final demand may be determined by similar identity.

Compilation of Transactions Table/ Matrix

The transaction matrix has been compiled column wise for each sector. First, each input is identifies as the output of one specific sector and also identified as an input used in the production process of the some sectors to which column corresponds. For example chemical fertilizer is identified as the output of chemical fertilizer industry and then it is also the value/quantity often used in the production of the wheat sector. For example wheat is 2nd sector and chemical fertilizer is 35th sector, so the value. Quantity of chemical fertilizer will be shown in 2nd column of 35th row in the table. The sector wise distribution of Inputs within the columns represents backward linkages. The entries in the column have their counterpart in the corresponding row which shows forward linkages of the sectors; e.g. First column, first row are counterparts of each other. Whereas sum of the column furnishes an estimate of total intermediate inputs used in the production process of the sector. From which Value Added is calculated:

$$Xj - \Sigma Xkj = Vj,$$

thus Vj is gross value added of the sector j, Xj is gross output of sector j while Xkj stands for output of sector k used as intermediate input in sector j and k = 1,2……,107, j= 1,2….,107

Similarly, sum of the supplies of inputs from the given sector to the sectors of the economy shown in the row, shows total forward linkages and the difference between the output of the given sector and its supplies of inputs to other sectors shows the final demand. However the sum of intermediate input in a column, say ith column need not necessarily be equal to sum of intermediate inputs shown in the ith row. But the output of the sector is completely exhausted by its intermediate and final uses (final demand);

$$Xj = \Sigma Xjk + fj,$$

Part of these input supplies may be accounted by supplies from 37 sectors located outside UP, just as a column total of intermediate inputs may also be partly accounted by inputs imported from other states. This approach has been used to estimate the final demand wherever necessary in this paper. Only investment, component of final demand has been treated as the residual part;

$$X j - \Sigma Xjk - Cj – Ej + Mj = Ij \dots\dots 4$$

Where Cj is total consumption of good j, Ej is total exports of good j and Mj are the imports from other countries of good j and Ij is total investment of good j.

Disaggregation of Aggregate Sectoral Final Demand

Aggregate final demand of a sector comprises the following;

Public consumption + Private Consumption + Investment + Exports (+/-) Imports

Public Consumption

Public consumption depends on the number of departments and number of employees, larger the number of departments and employees greater is the expenditure of public consumption. Public expenditure on public consumption generally relates to electricity, transport, communication, tea and snacks, stationary etc.

The proportionate shares of all sectors in total public expenditure on consumption in 2014 table of India are determined; these proportionate shares are multiplied by the total consumption expenditure to generate estimates of sector wise public expenditure on consumption in U.P.

Private Consumption

The data of private consumption expenditure have been classified into 84 sectors of a U.P. table. Thus 78% of the total sectors of the economy produce consumer goods and service incidentally Bihar, M.P. and Odisha received the greatest proportion of public investment for the creation of heavy and basic goods industries, while states like Haryana and U.P. remained deprive from such investment; Punjab received heavy public investment in Bhakra Nangal. So the economies of these three states revolve round light consumer goods industries. The sector producing given items of private consumption have been identified and amount of expenditure on consumption of specific items has been posted in the cell of final demand which corresponds to the row of the production sector. For example, expenditure on consumption of wheat flour, all-purpose flour (Maida), daliya, suji, sattu etc. are posted in the cell of final demand corresponding to the wheat milling sector. Similarly, bread, biscuits, rusk, fan, cake and pastry, etc. are shown in the final demand cell of the row corresponding to bakery sector.

The latest data of item wise private consumption expenditure in U.P. from NSSO accessible to authors have been used. Proportionate shares of consumption expenditure on different items in total consumption expenditure are determined, which are multiplied by total private consumption expenditure in 2016-17 for generating estimates of sector wise of private consumption expenditure in I-O table of U.P.
It implies that the marginal/average propensity to consume different items in UP in 2016 has not changed from the earlier years for which data are available.

Total Investment

Public and private investments are not distinguished for paucity of data. Total investment has been distributed among 107 endogenous sectors of UP. Total investment equals the product of Average Propensity to Invest (API) and Gross State Domestic Product GSDP of UP. As sum of average propensity to invest and consume is equal to 1, the propensity to invest is taken as the difference between 1 and Average Propensity to Consume (APC) for 2016-17. This estimated total investment is distributed among 107 sectors of U.P. on the basis of distribution of investment of different sectors in Indian table. As the dimension of Indian table is 130*130 some minor adjustments by sectoral aggregation have been made in the distribution of total investment in 107 sectors.

Exports

The data relating to item wise export has been accessed from the Directorate of Economics and Statistics of U.P., section CSO dealing with Input Output table and Ministry of Commerce. The data pertaining to more than 100 items of exports from U.P. have been classified into 87 sectors which correspond to the production sectors of these items. Thus 81 % of the total sectors of the economy of U.P. are involved in export production. So these sectors depend partly on export demand.
The difference between final demand and the sum of consumption and investment are used as control factors to test the consistency of allocation of exports among different sectors. Besides, gross output has also been kept in view.

Identification and Classification of Imports into Appropriate Sectors of I-O Table

74000 items have been imported in UP for 2017 from other countries; such big number is accounted by import of numerous small items of consumption and intermediate inputs. Several items are imported for re-exporting the same. There exists SEZ in Greater Noida which specializes in export of imported goods after value addition. For example Micro Chip, used in the production of automobiles and numerous electrical and electronic products have to be imported from abroad. Similarly various components of computers are imported in knock down condition which is then assembled as final product. Identification of production sectors of each item of imports has facilitated aggregation of values for inclusion in different rows of the imports column in final demand.

The table 3 incorporates imports from the world as total supply (imports +domestic output), whereas exports result in decrease in the domestic supplies of the exported goods. The table furnishes the following interesting information: (i) Global imports in U.P. are far in excess of exports from U.P to the world. (ii) Only 5% of gross output is exported, global imports account for 17% of gross output of UP. Thus, U.P. like India has adverse balance of trade with the rest of the world; (iii) Imports account for 15% of total supplies of goods and services in U.P.; and (iv) Change in stocks explain 1.1% of gross output and 0.96% of supply.

Derivation of Proportionate Shares of Selected Variables from Base Table

The 144x144/ (107x107) transaction matrices have been used to prepare following tables of aggregate figures and their proportions/percentages in total output and total supplies. It may, however, be noted that aggregate intermediate inputs also includes goods imported from other states and aggregate final demand may also include a proportion of goods imported from other states which are used for consumption and/or investment. Consequently, gross value of aggregate output reported in I-O table may differ from the estimated GSDP of U.P. for the year 2016-17. Aggregate Supply equals sum of domestic output and imports from other states and countries – exports. However, no data relating to imports from other states of India are available; therefore, growth accounting residual factor approach may be used to generate estimates of sector-wise imports/exports. Consequently, imports are the residuals derived from the following identity:

IMPORTS=SUPPLY-Output net of Exports.
BROAD VIEW OF TABLE.

Table 1: Aggregate Table

Finally Adjusted Aggregate Table	Values	Proportion of Output	Proportion of Supply
Supply of Total Inputs	6,731,716,409,062	41%	35%
Total Final Demand	9,719,464,066,061	59%	51%
Total Output	16,346,740,159,029	100%	86%
Total Supply	19,172,272,834,127	117%	100%

Table 2: Disaggregated Final Demand

Disaggregated Final Demand	Values	Proportion of Output	Proportion of Supply
Supply of Total Inputs	6,731,716,409,062	41%	35%
Total Consumption	6,825,893,164,532	42%	36%
Total Investment	2,054,293,540,418	13%	11%
Exports	839,999,231,799	5%	4%
Total Output	16,346,740,159,029	100%	85%
Total Supply	19,172,272,834,127	117%	100%
Total Final Demand	9,719,464,066,061	59%	51%
CIS	184,156,189,500	1%	0.96%

Table 3: Disaggregated Final Demand including Imports

Disaggregated Final Demand incl Imports	Values	Proportion of Output	Proportion of Supply
Supply of Total Inputs	6,731,716,409,062	41%	35%
Total Consumption	6,825,893,164,532	42%	36%
Total Investment	2,054,293,540,418	13%	11%
Exports	839,999,231,799	5%	4%
Imports	2,822,851,208,402	17%	15%
Total Output	16,346,740,159,029	100%	85%
Total Supply	19,172,272,834,127	117%	100%
Total Final Demand	9,719,464,066,061	59%	51%
CIS	184,156,189,500	1.1%	0.96%

Explanation of gap between the state estimate of GSDP and Estimate of the Same in I –O table

The GSDP of U.P for 2016-17 at current prices has been estimated to be Rs 1488934 crores whereas the value of gross output of 107 sectors, entailed in the I-O table of U.P. is Rs 16,349,424,425,145/ crores. Thus the aggregate of gross outputs of 107 production sectors entailed in the I-O table is 109, 8%. of 9.8% of GSDP. Excess of 9.8% of gross output over estimated GSDP of the economy of U.P. may be imputed to the inter-state imports into U.P. for meeting technical requirements of intermediate demand and final demand. Imported intermediate inputs are used up in production sectors are known to be worth Rs 80,000/ crore. Though value of inter-state imports absorbed by consumption and investment is not precisely known, it may not be unreasonable to assume their magnitude to in the range of Rs, 100,000/ crore. The part of the gap between GSDP and Gross Output of I-O table may also be explained by the errors of estimation, approximation and rounding off. It is, therefore, reasonable to infer that the I-O table is representative of the entire production system of the economy of the state of Uttar Pradesh.

Aggregates of the Core Variables and the Representaive Characters of the Table 1

Mutual compatibility of broad magnitudes of the core parameters/variables has been tested to evaluate the internal consistency of estimates of Intermediate Demand, Final Demand with Gross Output and Supply at broad aggregate level.

Values reported in table 1 show that (1) 41% of output is accounted by intermediate demand; (2) final demand accounts for 60% of gross output, and (3) sum of intermediate and final demand accounts for gross output which has 1% error; in view of 107x107 transaction matrix comprising 11449 cell values along with estimates of values of public consumption, private consumption, investment and exports shown in 428 cells, 1% error of estimation may be treated as negligible. But the sum of intermediate and final demand accounts for 86% of total supply which is attributable to residual values of global imports. Thus, the detected discrepancies at aggregate level are well within the limits of tolerance. Therefore, the I-O table may be treated as the proper representation of economic structure of Uttar Pradesh.

Consistency at Disaggregated Level

Then, the consistency of the table at dis-aggregated level of final demand is considered; final demand is dis-aggregated into its consumption, investment and exports components; total /aggregate final demand, gross output and supply are now the variables of concern.
Table 2 shows that sum of private and public consumption, investment and exports account for 42%, 13% and 5% of gross output respectively. Thus, the sum of three individual components of final demand exactly equals to 60% of gross output which is in perfect consonance with the share of final demand in output at aggregate level. The table 3 shows that sum of output and imports is equal to aggregate supply. Thus there is no discrepancy between the sum of the components of supply and the value of supply is reported

Use of the Input Output Table of U.P. for Research

In view of the inclusion of 37 exogenous sectors in 144*144 transaction table and the two matrices of Input Coefficients and Leontief Inverse of 107*107 dimensions each, a decomposable model is required for use of this table of research. The decomposable model is outlined here under:
Gross supply, S Vectors comprises Gross Domestic Output, X – Global Exports, E + Imports from other states of India M1 and Global Imports, M, So the following is the supply equation of jth sector:

$$S_j = X_j + M1_j + M_j - E_j \ldots\ldots\ldots\ldots\ldots\ldots \qquad (5)$$

$j = 1,2,\ldots..144$. S_j shows total supply of good j, X_j shows Gross output of good j, $M1_j$ refers to the import of goods from other states of India into U.P. and E stands for Global Exports from U.P. $M1_j$ is different from M which refers to imports into U.P. from other countries and which are part of final demand.

Import of Good J, $M1_j$ from other states of India is used partly to satisfy intermediate demand for good j in endogenous sectors of economy and a part of it may be used to satisfy final demand.
As no information is available about the use of global imports for production and consumption and global imports and exports are strictly exogenously specified to be the part of final demand, a truncated supply vector $S1_j$ is specified as follows:

S1j = Xj + M1j, and ……………… (6)

A = Ad + Am1 ……………………. (7)

The two components of supply vector S1 are determined as follows

X = Ad * X + f

   = (I – Ad)-1 * f …………. (8)

and M1 = Am1 * X

Substitution of value of X from the equation 8 gives M1 = Am1 (I – Ad)-1 * f

The matrix A of input coefficients of 107 endogenous sectors is decomposed into two parts:

(i) AM1 is the matrix of intermediate inputs imported from rest of India into U.P. and used by 98 endogenous sectors of U.P to satisfy their intermediate demand for these imported inputs;

(ii) Ad is the matrix of coefficients of inputs which are produced by 107 endogenous of the state.

A = (aij), aij = Xij / Xj, or Xij = aij * Xj …………….(9)

Where aij is the amount of ith good use to produce one rupee worth of output of Good j. aijs are the technical coefficients of production.

Am1 = (akpm1), akpm1 = Xkpm1 / Xp or Xkpm1 = akpm1 * Xp ……….(10)

k= 1, 2,….., 37, p= 1 to 37. As no information is available for use of 37 goods imported from other states of India as sector specific inputs used in 107 sectors, it is assumed that akpm1 will be calculated on the basis of output of the endogenous sector in the row of which these imports are listed.

Conclusions

The following conclusion and inferences may be drawn from the above discussion

1. Transactions matrix of 144*144 and two matrices of input coefficients and Leontief Inverse of 107 * 107 have been constructed, for the year 2017.

2. 37 of the 144 sectors are exogenous and 107 are endogenous sectors of the U.P. economy.

3. A decomposable model to determine total supplies, Gross Output of 107 domestic sectors and imports from rest of the world has been developed.

4. Procedures of classification and classification of inputs and outputs and compilation of the table have been elaborately explained.

5. Distinct features of the structure of the economy of U.P. have also been explained.

6. Consistency and the representative character of the I – O tables have been evaluated by the application of various parameters. 1% error of estimation, approximation and rounding off the figures is treated as negligible

7. An important of the paper is that the U.P. economy is dominated by primary sectors and the consumer goods sectors; 78% of the total output is accounted by the production of consumers' goods and services.

8. As many as 81% of 107 sectors of U.P. economy are export oriented.

9. Finally but more importantly various uses of input output models have also been discussed.

10. The paper fulfills need felt for long and updated and up to date I -O table of Uttar Pradesh.

Note 2

The tables of input coefficients and Leontief inverse will be supply on request to the Chief Editor.

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Impact of Age on Performance on Banking Industry in India with Special Reference to Delhi Capital Region *

Shiwani srivastava [1]

Abstract

This paper aims to find the impact of age on performance and the association of performance between different age groups in banking sector of India. Banking sector is considered the nerve centre of all modern economies and is one of the core sectors of service sector. Productivity or output is considered the most effective indicator of performance. This study identifies the number and nature of work done, which contains the output of services.

The survey was conducted in the capital region of Delhi, covering Faridabad, Gurgaon, Greater Noida, Ghaziabad and Delhi. The primary data have, however, been collected with the help of pre drafted and tested in field conditions questionnaire. The sample of the study comprises ten banks in all, five each from public sector and private sector. The public sector banks include State bank of India, Punjab National bank, Allahabad Bank, Syndicate bank, Indian Overseas Bank and the private sector banks include ICICI Bank, Axis Bank, IndusInd Bank, HDFC and Karnataka bank. All these banks are key players in the public sector and private sector of India. These banks are the major players in the Indian banking Sector and command the highest market share of the Indian banking sector. The study is based on primary data. The study of banking sector in changing economic scenario in modern Indian economy has gained tremendous importance since banking is now an important employment and income generating industry. The focus of the study on younger generation is also important in the context of India's demographic profile, which contributes India with demographic dividend and transition. Statistical methods have been used to lend credence to inferences. Findings are confirmed with the help of more than one statistical tool. The data collected has been analysed with the help of non-parametric and parametric tools like Chi-square, t test, co-efficient of contingency, Yule co-efficient of association.

The data analysis revealed that there is a positive association between the performances of four age groups and there is a significant difference in the performance of age groups.

Keywords: Performance, Productivity, Demographic dividend, Demographic transitions.

Introduction

As we are rushing towards demographic dividend, the average age of workforce in India is decreasing. The banking sector of India is also flooded with youngsters especially in the private sector. Measuring the performance of young bankers can give a deep insight about banking system and its potential contribution to economic development of a country. Rapid development of information technology, adoption of new economic

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policy and induction of information technology technique in various sectors of economy especially banking has made it necessary for bank to go for rendering IT enabled services. The urgency of the need has been heightened by the presence of private banks rendering quicker and better service with the help of IT based services. Above factors have prompted all banks including public sector banks to induct software based computerised services to reduce time, cost and increased efficiency. Previously, employed workforce has also been trained in the use of such software. But the fact remains that younger are more computer savvy than the older generation. As the younger generation is more technology savvy, especially in information technology, the emphasis has also been on the recruitment of young people. Incidentally, T.W. Schultz found that each younger generation is more and better educated than the preceding one which leads to better efficiency and more productivity than before. V.N Kothari found indirect empirical support for Schultz's by highlighting shifting of unemployment from senior secondary graduates to college graduates. Shri Prakash (1978), Nitin Mohan (2017) showed that inter-temporal educational development of education over the years has led to the substitution of illiterates by literates and less by more and better educated persons across industries and occupations. Amit Sharma (2012) further extended and modified the paradigms by emphasizing that up-gradation of qualifications and substitution of general by professionally educated persons resulted in increased productivity in the Indian economy. Consequently, the focus of all these studies has implicitly been the younger generation.

Private sector banks are inundated mostly with young new entrants into banking, as private sector banks have been allowed to operate only in the later half of 90's, with the opening up of service sector to private players. This policy has not only enabled a few foreign banks to enter into Indian market but it has also facilitated the emergence of several indigenous private sector banks. However, some old age bankers have also moved to private banks to take advantage of greater pay package but less job security. Thus, both private sector bank and their workforce are relatively young.

We are used to defining banking as a process primarily of deposits and advances – where deposits are collected from the public in the form of savings account, current account, fixed deposit (FD), recurring deposit (RD), etc. and advances/ loans are provided to individuals, corporates, to other banks and financial institutions. Although this definition has considerably been altered for large global banks like CITIBANK, HSBC, JP Morgan, Deutsche Bank, etc. due to their massive trading in securities. For ex, banks like HSBC and JP Morgan do not refer to themselves as retail banks. HSBC has hardly any retail banking activity outside Hong Kong and UK. They do not refer to themselves as a retail bank. They have exponentially grown at places where there is high amount of trading activities, for ex – Singapore, Dubai, Hong Kong, etc. But the deposits vs. advances definition holds good for all Indian banks – SBI, ICICI Bank, Allahabad Bank, HDFC, Axis Bank, PNB, etc. as their market exposure is not comparable to their global peers. Indian banks are still primarily into retail banking activities with increasing markets and securities exposures.

The "primary activities" selected for this research are:

(1) Account opening
(2) Clearing
(3) Transactions
(4) Mailing services
(5) CRM
(6) Credit and Advances

These banking activities are based on retail banking activities of banks in which most of the Indian banks have largest exposure. There is growing commercial banking activities but those activities are also sometimes part of retail banking (i.e. consumer banking) only. For ex – ICICI Bank has a separate unit called Business Banking Group (BBG) which caters to corporate customers. They open Current Accounts; provide FD facilities, etc. to corporate customers. All the activities BBG perform comes under the purview of retail banking umbrella (Retail Banking Group – RBG). Therefore, taking into account the overall banking functions in India – which is heavily tilted in favour of retail banking- data, have been collected.

These are primary segments of Indian banks:

(1)   Retail banking
(2)   Wholesale/ Consumer banking
(3)   Treasury operations
(4)   Private banking

Also, the author has taken into account the revenue model of Indian banks. Unlike their western peers which are more exposed to the securities markets for trading purposes, most of the revenue in Indian banks is generated in the retail banking space and this is also the space having the maximum margins. The reason is that the Indian Public Sector banks are mass banker while private sector banks are class bankers.

Classification of Banking Operations and System and Weighting

The banking activities have been classified into seven and the respondent have to give numeric value for each activity they perform each day. Numeric value is assigned to the outcome of the activity of bank. For example, how many new accounts have been opened and how many closed, how many deposit and withdrawal cases have been dealt with per day. The data converted into annual outturn. This is an illustration of one banking activity. We have calculated the performance of every respondent with the help of weightage provided to every activity.

The banking activity has been classified into seven and the operations include (i) **New Account opening activity;** (ii) **Clearing** – Inward Clearance, NEFT, ECS, other clearing activities like govt. business module for challan clearing, clearing cheques of credit card etc.,(iii) **Transactions** – internal bank cheque clearing, (iv) **Mailing services** – dispatch of ATM cards/PIN, credit cards, account opening kits, account statement etc, (v) **CRM Unit** – handling customer queries/tickets (Normal & Critical), (vi) **Credit advances** – demand loans, term loans, overdraft/cash credits, letter of credits, guarantees etc. and (vii) **Any other activity** like team management, audit reports, branch head, reporting etc. They were given weight in 1 to 7 scales on the basis of complexity and risk involved in the activity. Risk involved is both for the operator and the bank. For example, if a person manning the teller commits an error of giving more money than actually withdrawn, than s/he runs the risk of the excess amount been deducted from salary. In such cases risk is born by the employee. If however loan has been sanctioned to undeserving entity, risk of NPA falls on the bank. Though, the operator may be punished for committing an error. Account opening has been awarded the weight of 5, clearing has been awarded the weight of 3, transaction has been awarded the weight

of 4, CRM Unit has been awarded the weight of 2 , credit advances has been awarded the weight of 6 and other activity has been awarded the weight of 7. The respondent has to give numeric value for each activity they perform each day.

The total sum of all scores allotted to all the activities of bank is 7+6+5+4+3+2+1 = 28. The weight assigned to each activity is derived by dividing the score by 28.

The system of finding the performance of every respondent is as follow:

$\sum W_i$= 7/28+6/28+5/28+4/28+3/28+2/28+1/28 = 1
W1 = 7/28 = 0.25
W2 = 6/28 = 0.214
W3 = 5/28 = 0.178
W4 = 4/28 = 0.142
P5 = 3/28 = 0.107
W6 = 2/28 = 0.072
W7 = 1/28 = 0.036

The actual calculation of performance of each respondent is as follows:

Performance= 7*W1*N1+6*W2*N2+5*W3*N3+4*W4*N4+3*W5*N5+2*W6*N6+1*W7*N7

W1, W2, W3, W4, W5, W6, W7 are the weight of other activities, credit advances, account opening, mailing services, clearing, CRM Unit and transactions respectively.
N1, N2, N3, N4, N5, N6 and N7 are the numeric value given by the respondents to other activities, credit advances, account opening, mailing services, CRM Unit and transactions respectively.
However, the degree and direction of influence of several other factors, besides the age, on workforce performance in both the sectors of banks public and private in capital region of Delhi has remained scarcely investigated. The focus of study on younger generation is also important in the context of India's demographic profile, which has endowed India with demographic dividend. Demographic transition is also occurring slowly but imperceptibly. The hypotheses, formulated in the paper, are tested by t test, Yule's coefficient of association, $\varkappa2$ and the Coefficient of Contingency.

Statistical Analysis

Following methods of data analyses have been used in the paper t-test for paired means, Yule's Coefficient of Association, Chi square and Coefficient of contingency.
 t – test has been designed to evaluate the significance between the sample and population means, and two sample means.

The following is the formula:
t = {$(\overline{X}1-\overline{X}2)/\sigma$} *$\sqrt{n} - 2$
where n = n1 + n2
Pooled Standard deviation: $\sigma = \sqrt{}$ (n1-1) s12 + (n2- 1) s22/n1+n2-2
$\overline{X}1$ is mean of sample 1 and $\overline{X}2$ is mean of sample 2,
s1 and s2 are sample standard deviation.

Impact of age on performance

Mean of each group has been calculated separately and differences of mean of five pairs of four age groups are evaluated. One tailed t- test is used to determine the significance of differences of mean performances at 0.05 probability level of the following age four group: (i) 20- 25 yrs, (ii) 26 – 35 yrs, (iii) 36 – 45 yrs, (iv) 46 yrs & above. Average performance of four age groups are arranged in pair as 1 & 2, 1 & 3, 1 & 4, 2 & 3 and 2 & 4.The value of t corresponding to differences of mean of the pairs are shown as t1, t2, t3, t4 and t5. The hypotheses relating to the application of above methods are stated hereunder.

The following hypothesis are subjected for statistical significance-

H1- Average performance of two age groups young (20-25 yrs.) and not so young (26 – 35 yrs) are similar.
H2- Average performance of young age groups (20- 25 yrs) is more than the average performance of not so young (26-35 yrs).
H3- Average performances of two age groups i.e., 20- 25 yrs and 36-45 yrs are similar.
H4- Average performance of 20 - 25 yrs age group is more than the average performance of 36-45 yrs age group.
H5- Average performances of two age groups i.e., 20- 25 yrs and 46 yrs & above are similar.
H6- Average performance of 20- 25 yrs is more than the average performance of 46 yrs and above age group.
H7- Average performance of two age groups i.e., 26- 35 yrs and 36-45 yrs are similar.
H8- Average performance of 26-35 yrs age group is more than the average performance of 36-45 yrs age group.
H9- Average performances of two age groups i.e., 26-35 yrs and 46 yrs & above are similar.
H10- Average performance of 26-35 yrs age group is more than the average performance of 46 yrs and above age group.

Results of t- test of the difference of the paired means are reported hereunder
Table A

Age group	1 & 2	1 & 3	1 & 4	2 & 3	2 &4
t-test	1.604135	3.216113	1.22763	2.649248	-0.10984
1 = below 25 yrs, 2= 26 to 35 yrs, 3 = 36 to 45 yrs, 4 = 46 yrs & above					

Source: Authors own calculation

When the two age categories – (i) 20- 25yrs and (ii) 26 to 35 yrs. were taken into consideration the value of t is 1.604135. The calculated value of t is less than the critical value of t (degree of freedom = 77, t critical = 1.671). The result shows that the average performance two age groups are similar. The difference between the performances of two age groups of young employees is as good as zero. It is because neither the age differs nor experience and nor the knowledge of technical operations differ significantly between these age groups. But this difference is accentuated if 1 and 3 age group are compared. It may be because the employees of third age group might not be very enthusiastic in performing the routine job which is being performed by the first two age groups.

Some of them may still not be satisfied with the promotion that might have been delayed. But the employees of fourth age group are interested with the more risky job which involves less of technology and more of knowledge and experience which help them to match the performance of younger age group. However, the original hypothesis does not differentiate between the young employees and not so young employees which have been done in this study. This result may probably attributed to the fact that the bank operations have been digitalised in modern India but the large scale computerisation was started in early 70's and 80's. Consequently, those who entered banking sector as an employee in 60's to mid-90's, are not proficient in computer operation. Though all employees had been imparted training to use computer software. Yet, the elderly employees may not be as comfortable with the use of computer as the young employees.

When the two categories of age – (i) 20- 25yrs and (ii) 36 yrs and 45 yrs were taken into consideration, the value of t is 3.216113. The calculated value of t is more than the critical value of t (degree of freedom = 43, t critical = 1.684) .The result shows that the average performance of employees, 20-25 yrs is greater than that of employees whose age is between 36 yrs and 45 yrs.

When the two categories of age (i) 20- 25 yrs and (ii) 46 yrs & above were taken into consideration, the value of t is 1.22763. The calculated value of t is less than the critical value of t (degree of freedom = 42, t critical = 1.684) .This result shows that the average performance of employees 20-25 years is less than the average performance of employees of 46 yrs. & above. The banking activity has been classified into seven and the operations include (i) account opening,(ii) clearing,(iii) transactions, (iv) mailing services, (v) CRM Unit, (vi) credit advances, and (vii) other activity. They were given weight in 1 to 7 scales on the basis of complexity and risk involved in the activity. Account opening has been awarded the weight of 5, clearing has been awarded the weight of 3, transaction has been awarded the weight of 1, mailing services has been awarded the weight of 4, CRM Unit has been awarded the weight of 2 , credit advances has been awarded the weight of 6 and other activity has been awarded 7. In baking sector the more experienced employees are appointed for doing more complex and risk involved job. Increase in experience is associated with age. As the age increases, experience also increases. Hence, the average performance of older employees is more than that of the younger employees.

When the two categories of employees of age (i) 26 to 35 yrs and (ii) 36 to 45 yrs. were taken into consideration, the value of t is 2.649248. The calculated value of t is more than the critical value of t (degree of freedom = 74, t critical = 1.671) .This result shows that the average performance of young employees is more than older employees i.e., the performance of 26 to 35 yrs of age group is more than the performance of 36 to 45 yrs of age group. This lends support to the inference that younger employees are more proficient than the older employees. Older employees are slower in acquiring new skill and knowledge but the Youngers are technologically savvy. With the finding of U. S. Department of Labour (1957); it investigated comparative job performance by age at large plants in the men's footwear and household furniture industries and find that work performance increases up to the age of 35 and steadily declines thereafter.

When the two categories of age (i) 26 to 35 yrs., and (ii) 46 yrs. and above, were taken into consideration, the value of t is -0.10984. The calculated value of t is very less than the critical value of t (degree of freedom = 73, t critical = 1.671) .This result shows that the average performance of older employees is more than that of the younger employees.. The weightage of banking activity that is more complex is greater. Hence the performance of older employees is more than the younger employees. According to Avolio (1990), work performance is directly proportional to the work experience of employees. There are certain attributes on which older employees are not proficient like physical ability, adaptibity but in many others they are more effective than the younger.

To strengthen the analysis of above data and to make it more precise, Yules coefficient of association has also been used –

Results of Application of Yules Coefficient of Association

The Yule`s coefficient of association is a nominal measure of association and is used to measure the relationship or association between variables (Baddie and Fred, 1995; Kolawole, 2001). If we have a 2X2 table, Yule's Coefficient of Association may be applied. Yule's coefficient of association is calculated as follows:

$$Y = (a \times d - b \times c)/(a \times d + b \times c)$$

This is calculated from the following table:

CLASSES	A	A
B	A	B
B	C	D

Where Y is the Coefficient of Association and a,b,c,d are the joint frequencies of A's and α = not As, Bs and β = not Bs, that is, a,b,c and d are joint occurrences of AB,αB,Aβ and $\alpha\beta$ in the above table.

Association between Age Groups for performance

As performance is dependent variable and there are several factors which influence it. Performance, however, does not relate solely either to educational qualifications or experience alone. There are various studies which diagnosed the impact of age on performance. Age is the proxy of on the job learning, experience and learning from observations, etc.

We have tried to evaluate the association between four age groups for performance. The average performance of each age group is used as the basis for Yule's Coefficient of Association. The employees of different ages are classified into four age groups, that is (i) 20- 25 yrs, (ii) 26 -35 yrs, (iii) 36 – 45 yrs and (iv) 46 yrs and above. Above mean and below mean categories of performance are arranged in pairs as 1 &2, 1 & 3, 1 & 4, 2&3, and 2 &4. Subscript 1 used for below 25 year, subscript 2 is used for 26-35 years , subscript 3 is used for 36- 45 year and subscript 4 is used for 46 year & above.

The frequencies of below and above mean performance of two age groups are used to prepare the contingency table. Contingency table for two age groups ((i) below 25 yrs and (ii) 26 – 35 yrs and their performances in the form of above mean and below mean

	Above Mean	Below Mean	Total	Y=(aXd-bXc)/(aXd+bXc)
Below 25 yrs	[a]19	[b]5	24	
26 - 35 yrs	[c]23	[d]32	55	
Total	42	37	79	0.68

Source: Authors own calculation

Contingency table for two age groups ((i) below 25 yrs and (ii) 36 – 45 yrs and their performances in the form of above mean and below mean –

	Above Mean	Below Mean	Total	Y=(aXd-bXc)/ (aXd+bXc)
Below 25 yrs	[a]20	[b]4	24	
36-45 yrs	[c]8	[d]13	21	
Total	28	17	45	0.78

Source: Authors own calculation

Contingency table for two age group ((i) below 25 yrs and (ii) 46 yrs & above and their performances in the form of above mean and below mean –

	Above Mean	Below Mean	Total	Y=(aXd-bXc)/ (aXd+bXc)
Below 25 yrs	[a]18	[b]6	24	
46 yrs & above	[c]11	[d]9	20	
Total	29	15	44	0.42

Source: Authors own calculation

Contingency table for two age groups (i) 25 yrs- 35 yrs and (ii) 36 yrs – 45 yrs and their performances in the form of above mean and below mean –

	Above Mean	Below Mean	Total	Y=(aXd-bXc)/ (aXd+bXc)
25 yrs-35 yrs	[a]40	[b]15	55	
36 yrs-45 yrs	[c]8	[d]13	21	
Total	48	28	76	0.63

Source: Authors own calculation

Contingency table for two age groups (i) 25 yrs- 35 yrs and (ii) 46 yrs & above and their performances in the form of above mean and below mean –

	Above Mean	Below Mean	Total	Y=(aXd-bXc)/ (aXd+bXc)
25 yrs-35 yrs	[a]43	[b]12	55	
46 yrs & above	[c]10	[d]10	20	
Total	53	22	75	0.57

Source: Authors own calculation

Calculated value of Yule's Coefficient of Association:

Table B

Age group	1 & 2	1 & 3	1 & 4	2 & 3	2 &4
Y	0.68	0.78	0.42	0.63	0.58
1 = 20- 25 yrs, 2= 26 to 35 yrs, 3 = 36 to 45 yrs, 4 = 46 yrs & above					

Source: Authors own calculation

The Yules Coefficient has the value of 0.68 for the age groups – (i) below 25 and (ii) 26 to 35 yrs. The high value of the coefficient indicates positive association between the performance and the age.

The Yules coefficient has the high positive value of 0.78 for the age groups (i) below 25 yrs. and (ii) 36 to 45 yrs which shows high association between age and performance.

The value of Y is 0.42 for age groups (i) below 25 yrs and (ii) 46 yrs and above which shows moderate degree of association between the performance and these two age groups.

 The value of Y is 0.63 for the age groups (i) 26 to 35 yrs and (ii) 36 to 45 yrs which shows high degree of association between the performance and these two age groups.

For the fifth pair of age groups the calculated value of Yule coefficient depicts a strong and high positive association.

The value of Y is 0.57 for the age groups (i) 26 to 35 yrs and (ii) 46 yrs. which shows moderate association between age and performance.

The above results show that as the age increases, performance tends to rise. But the performances of all member of the age group are interdependent.

Application of Chi square and Coefficient of Contingency

Chi square has been applied to find the difference in performance of four age groups. Weight is given to every operation depending on the risk and complexity involved in each. Respondent has to give numeric value for each activity they perform each day. The following tables show the result of application of Chi square.

Contingency Table of Four Age Groups and Performance,
Table-C

Age	1	2	3	4	5	6	7	Total
20-25yrs	53.214	62.571	22.535	27.428	12.928	32.571	6.75	217.997
26-35 yrs.	163.035	59.464	24.142	52.485	38.5	47.785	5.75	391.161
36-45 yrs.	26.0714	20.785	5.035	4.285	9.214	15.642	7.25	88.282
46 yrs.	29.821	24.107	3.214	23.571	11.57	43.71	8.25	144.243
Total	272.141	166.927	54.926	107.769	72.212	139.708	28	841.683

Source: Author's Own calculation

The value of Chi square is 87.368, DF=18, critical value of chi square at 0.05 level of significance= 28.869.

Coefficient of Contingency -- 0.757298, Cmax= 0.8953

The critical value of chi square at 0.05 level of significance= 28.869 for DF = 18 is but the calculated value of $x2$ is 87.368 which is much greater than the critical value. Thus there is significant relationship between the age and performance between above age groups and their performance. The Coefficient of Contingency is 0.757298 which is quiet high and supports the inference of Chi Square. Incidentally, maximum value of C is 0.8953 which is naturally greater than the calculated value but the difference is not high.

Contingency Table of Two Age Groups (Younger Generation) and Performance

Table-D

Age	1	2	3	4	5	6	7	Total
upto25yrs	53.214	62.571	22.535	27.428	12.928	32.571	6.75	217.997
26-35 yrs.	163.035	59.464	24.142	52.485	38.5	47.785	5.75	391.161
Total	216.249	122.035	46.677	79.913	51.428	80.356	12.5	609.158

Source: Author's Own calculation

The value of Chi square is 32.87, DF=6, critical value of chi square at 0.05 level of significance= 12.592.

Coefficient of Contingency -- 0.701301, Cmax= 0.809

The table shows that the calculated value of $x2$ is much greater than the critical value for 6 DF. The calculated value of Coefficient of Contingency is 86% of the maximum values. Thus both Chi square and the Coefficient of Contingency display high degree of relationship between the specified age groups and their performance.

Contingency Table of Two Age Groups (Older Generation) and Performance
Table-E

Age	1	2	3	4	5	6	7	Total
36-45 yrs.	26.0714	20.785	5.035	4.285	9.214	15.642	7.25	88.282
46 yrs.	29.821	24.107	3.214	23.571	11.57	43.71	8.25	144.243
Total	55.8924	44.892	8.249	27.856	20.784	59.352	15.5	232.525

Source: Author's Own calculation

The value of Chi square is 15.27, DF=6, critical value of chi square at 0.05 level of significance= 12.592.

Coefficient of Contingency -- 0.521695, Cmax= 0.809
The calculated value of $x2$ is greater than the critical value for 6 degrees of freedom. Thus Chi square shows significance relation between these age groups and their performance.

But Coefficient of Contingency is 0.521695 which is about 65% of the maximum value of the coefficient. Thus Coefficient of Contingency also supports the inference drawn from application of Chi Square test.

Contingency Table of Two Age Groups (Younger & Older) and Performance
Table-F

Age	1	2	3	4	5	6	7	Total
upto 35 yrs	216.249	122.035	46.677	79.913	51.428	80.356	12.5	609.158
36 yrs & above	55.8924	44.892	8.249	27.856	20.784	59.352	15.5	232.525
Total	272.141	166.927	54.926	107.769	72.212	139.71	28	841.683

Source: Authors own calculation

The value of Chi square is 37.66, DF=6, critical value of chi square at 0.05 level of significance= 12.592.

Coefficient of Contingency -- 0.728997, Cmax= 0.809

The calculated value of x^2 for last two age older age groups which is much greater than the critical value for 6 degrees of freedom while the Coefficient of Contingency has a high value which is 90% of its maximum value. Thus both these test statistics show a high degree of relationship between the age groups and their performance.
The analysis of the result of Chi Square and the Coefficient of Contingency reinforce each other; the results show that the relationship between age and performance becomes stronger with the increase in age. Thus these result are also in consonance with the inferences drawn from the application of Yule`s Coefficient.

Conclusion

Result of the empirical analysis show that (i) Average performance of 20 to 35 years old employees is greater than average performance of 36 to 45 years old employees. (ii) Average performance of 46 years and above is greater than the average performance of 20 to 35 year old employees. (iii) the results of application of t Test show that there is a significant difference in the performance of four age groups. (iv) Yule`s Coefficient of Association reveals that there is a positive association between the performances of four age groups. But the association between age and performance is stronger for older age groups.

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Structure of Capital and Financial Health of Indian Electronic Goods Companies with Reference to Debt [1]

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Abstract

The paper analyses structure of capital and financial health of electronic goods companies. Ratios of i) debt to fixed capital, ii) debt to equity iii) debt to total capital and iv) interest liability to total revenue are treated as indicators of structure of capital and financial health. The study covers the periods of 30 years from 1991 to 2020. The main objective of the study is i) determination of structure of capital and empirically test the Modigliani hypothesis. Modigliani hypothesized that higher the amount of loan capital in total capital stock better is the financial health of the company (1950). Modigliani has not specified any specific amount of loan capital.

Data have been taken from PROWESS IQ CMIE New Delhi. t- Statistic has been used to determine i) whether the distribution of above 4 ratios is normal, ii) whether the differences of the paired means of chosen ratios are statistically significant. Following are the main findings; i) the ratio of debt to total capital of 9 companies significantly diverge from normal distribution while the distribution of the ratio for 5 companies is normal. ii) Ratio of debt to fixed capital for 10 companies is not normal and this ratio for 4 companies is normally distributed, iii) distribution of the ratio of debt to equity is not normal for any Companies, iv) distribution of the ratio of interest liability to total revenue is normal for 1 company and not normal for 13 Companies, vi) 71, 65, 61 and 39 paired differences of the means of the ratios of loan to fixed capital, loan to equity capital, loan to total capital and interest payment liability to total revenue are found to be statistically significant. These findings imply that the sampled companies should alter the proportion of borrowing their capital stock.

None of the sampled companies is revealed in ill financial health if indivisible company wise analysis of the data is taken into account. Findings of the study diverge from Modigliani hypothesis.

Keywords: Financial Health, Indicators, Electronics Goods Companies, Descriptive statistic

Introduction

Modigliani hypothesized that greater the amount of loan capital in the total stock of capital, better is the financial health of the company (1950). This observation is important in the modern business models. Most of the business houses, especially family owned business entities, used very little own capital and they mostly raise the capital from the stock markets and loans from banks and other financial institutions. However the dishonest business practices and the intent of the cheating also flourishes in this eco system for example, Vijya Malaya , Nirav Modi and few others had run away to UK and other country from India to escape to repayment of loans or going to jail. Similarly, chairman of gaur sons, owner of Real Estate Company has been jailed for three years for defrauding bank of Baroda from which his company took loan of Rs85 cr.

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However Modigilani`s thesis needs to be examine, tested and verified empirically, especially with data relating to Indian companies. The reason is that, to the best of the knowledge of the authors, the thesis has not been extensively empirically tested globally, including India. In authors view, each company has specific capital requirement for smooth functioning, growth and /or diversification. Besides, each company has the limited absorption capacity of loan capital so there exist the threshold beyond which no company should borrow and use loan capital. Therefor the authors have reviewed such studies on this topic as are accessibility to authors. Besides some studies related indirectly to the topic are also reviewed.

Brief Review of Selected Studies

Such companies as are declared bankrupt have been in an unsound state of financial health; such companies do not have adequate revenue to finance the normal operation. In other words, operational cost is greater than the normal revenue earned by these companies. Several real-estate companies like J.P. Gour has gone bankrupt and Tata INDICOM has also been closed. This facet of business companies necessatites determination of threshold for borrowing and determination of the absorption capacity of the borrowing of the borrowers; this task may be performed by the potential creditors. Besides, several companies in financial poor health seek merger with or takeover by other successful companies in the industry. Some recent examples of mergers and take over are furnished by Vikas Publication House by S. Chand. Shuchita shukla has conducted a comparative study of 10 pharmaceutical companies; she examined the impact of take over and mergers on the financial health of the sampled companies by comparing pre and post-merger financial status. She used multiple regression models as the basic tools of data analysis. She found that the financial health of most of the companies has improved during the post-merger period.   Mayank Goel in his study titled, Rational of bad bank for Needo- banking in Indian economy examines the problems of bad needo banking in Indian economy. Large proportions of NPAs in Indian economy have adversely affecting financial health of banking industry. This empirically invalidates Modigliani hypothesis in India.

Yuga Raj Bhattarai (2016) examined the impact of capital structure on the performance of manufacturing companies which are listed in Nepal`s stock exchange. He used firm's performance as a dependent variable and leverage, firm size, tangibility and growth rate as independent variables in the multiple regression models. The equation shows that capital Structure has a significant negative relationship with the performance of Nepalese manufacturing companies however the authors has not tested multicollinearity and the satisfaction or violation of the assumption of homoscedastidasty. Presence of multicollinearity among independent variables makes the regression coefficient not significant or a positive coefficient may also turn negative.

 The results may also be explained by the disproportionately high loan capital in total capital stock of company; liabilities of interest repayment of loan will exercise negative influence on financial health, empirical evidence furnished by this study refutes the Modigliani hypothesis.

Raluca Georgiana (2014), studies the relationship between capital structure and profitability of the companies, 53 companies registered on the Bucharest Stock Exchange. He measures the performance of the companies in terms of ratios of ROA (ration on assets), ROE (ratio on equity), RCA (net sales margin rate) and MBR (market to book ratio) to total capital; these significantly depend upon the capital structure. The ratios used in this paper are by and large similar to the ratios used in our paper.

Salawu Rufiu Oyesola (2008) found that the capital structure depends on non – financial parameters, he used panel data of 33 Nigerian companies He evolved fixed variables regression model based

on panel data. This finding suggest that the relative weights of different components in capital structure pay an important role in final outcome of production and marketing operation of the companies rather than financial health and operational outcomes being determinant by loan capital alone thus this study may also be taken to refute Modigliani hypothesis.

Shubita Mohammud Fauri (2012) analyzed the impact of capital structure on the Jordanian industrial companies. She took the sample of 39 companies and used multiple regression model. She found the correlation coefficient between debt and profitability significant thus the finding may be taken to lend some empirical support to the hypothesis of Modigliani though the financial health of these companies remain implicit.

Suhendra Euphrasis Susy (2014) uses data of 17 Indonesian firms, period covered rages 2010-2012 thus period cover is only 3 years yet each variables comprises 51 observations. He uses multiple regression model which has profitability, firm size and assets growth which has capital structure as the dependent variable and profitability, firm size and assets growth are treated independent variable. The study has found that the independent variables exercise significant influence on the capital structure of the sampled companies. Interestingly, the direction of the causality is inverses to the direction used in other studies however; the study does not mention debt capital. So it is not directly related to the Modigliani hypothesis.

Joze P. Damijan (2017) evaluates leverage of the corporates and range of debt of Slovenians firms during the financial crisis. He examines the effect of financial distress on the performance of the firms. The performance is related to productivity, employment, exports, and investment. Results shows that the micro and small firms are found to suffer relatively more than larger firms. This study is not related to Modigliani hypothesis.

Ijaz Hussain Bokhari et al. (2019) this paper examines the impact of corporate governance, capital structure, and dividend policy on returns of assets, whereas political instability has been introduced as moderating variable. The authors used 56 listed companies of textile sector of Pakistan and has been selected over the period of 2012-2016 and data collected from the audited annual reports. The result of study concludes that CG, CS, and DP have significant impact on ROA. The results also affirms that political instability moderate the relationship between CG, CS, DP and ROA. This study is not related to Modigliani hypothesis.

Sandra Jooste et al (2016) the main objective of this study is to examine empirically relationship between debt levels and total returns to shareholders of platinum JES listed companies. The study field comprises annual analyses for 12 companies listed under the Platinum and Precious Metals sector on the JSE Ltd for the 14-year period 2000 to 2013. The result of the study shows that the level of debt and rate of returns to equity capital are significantly related. The finding of the study implies that the return to equity capital is an important indicator of the financial health of the companies which, in turn, enables to the companies to raise loan capital to the desired extent. Thus this finding is contrary to Modigliani hypothesis.

Hong Zhang et al (2014) in this paper have investigated the impact of the credit crunch on target capital structures and the sample consists of 1,128 listed companies in China during the period 2000–2011. Thus the base of the study is panel data. They used econometric model and tested the validity of the model by evaluating the significance of the multicollinearity. Which is the usual malady of multiple regression model. However the problem of autocorrelation in the errors and the problem of heteroscedasticity have not been evaluated which militates against the acceptance of the study. The main finding shows that the credit crunch was associated with a decrease in the target debt ratios for all listed companies.

Profit is main driver of the business access of revenue/income over expenditure/cost is the accounting concept of the profit while revenue stands for income from all sources and cost refers to expenditure on all items in accounting parlance. However these concepts are different in economics. Profit refers to the revenue and undertakes risk. Economic value added is another way looking of profit. Total output/ income minus expenditure on all material inputs used in process of production is define as value added which comprises salaries and wages of workers and employees and interest of capital any access over value added may be define as economic value added (shri prakash & shalini sharma 2008). Economic cost refers to expenditure incurred in process the production of goods and services. Thus the cost comprises expenditure on material inputs, labor and capital. In view of this a company which earns profit will obviously financially healthy.

The revenue of the company earns from the output is just sufficient to cover the production cost. The company will somehow survive and will continue to have foothold in the market. However if the company is able to recovers its variables cost comparing labor and material cost it will continue to produce in the short run with a hope, that it will be able to recover the loss of fixed cost in the long run. If the average revenue falls short of average cost in the long, the company will shut down. This parameter may be used to determine financial health of the companies. If it does not succeed to overcome this bottleneck for long, the company will either bankruptcy or it may be taken over by some successfully companies. In such situation company will not be financially healthy and it may fails to pay the loan capital. This is the context which Modigliani hypothesis has been empirically evaluated in this paper.

Sources of data

The basic source of data is Prowess, centre for monitoring Indian Economy New Delhi. The paper focuses on the data relating to 14 Indian companies of electronic good industry. These companies produce following electronics and other products: automatic parts & hardware, electrical, electronic materials & components, MMCBs, fuse gear, switch disconnections & medium voltage products, conductors, manual motor starters, soft starters, safety product, devices, drive spares & PM kits, general purpose drives, micro machinery drives, PLC & HIM, defence products, IE2 motors, IE3 motors, room conditioners, water purifiers, air cooler, cassette, air conditioners, mega split air conditioners, variety of coolers, commercial refrigeration, printers/ MFPs, multifunctional printers, digital duplication, projectors, interactive whiteboard, camera, binoculars etc.

The number of electronic goods companies data of which are reported is quite large. Therefore stratified simple random sample has been taken from the list. The stratification of the companies has been done according to the size. The following parameters have been used as the control factor for stratification:

1) Age of the companies, measured in years from the date of establishment and the date up to which data are available.

2) Size of companies measured by the total stock of capital

3) Output/ sales revenue and

4) Size of employment

On the basis of age of companies

1) For 8 companies data are available from 1991 to 2020.

2) For 6 companies data are available from 1993 to 2021.

On the basis of the total capital stock

The companies have been classified into three groups according to size; small, medium and large
1) Small companies have less than rupees 25,000 million stock of total capital; medium size companies possess capital stock ranging between rupees 25000 to 75000 million while the companies having the capital stock of more than 75000 rupees million are classified as large.
2) 5 companies are small on this criterion; number of medium companies is 4 and the remaining 5 companies are large. According to all above criterion number of companies in each category is almost similar though not equal.

On the basis of number of total output/ sales revenue

1) Total output/ sales revenue of small companies is rupee less than 10000 million; medium companies produce and output worth between rupee 10000 to 50000 million and large companies produce of output of more than rupee 50000 million.
2) The number of companies in these groups is 6, 3 and 5 respectively.

On the basis of number of employees

Number of employees of small companies is which have less than 1000 number of employees; medium companies employ 1000 to 5000 persons; and large companies have more than 5000 persons on rolls. The number of companies in these groups is 5, 4 and 5 respectively.
Thus, the number of companies in each group according to the above three criteria is more or less the same.
The following are the numbers allotted to the company 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13 and 14. Systematic random sampling has been done for collecting data. The sampled companies constitute 60% of the total industry.

Methods of data analysis

The objective of the paper is to assess the financial health of the sampled companies and determine the share of loan capital in the total capital stock. For this purpose the following methods are used for data analysis;
1) Calculation of the ratio and proportion of the core variables constitute the preliminary method of data analysis. As reviewed studies have used ratios and proportions to estimate capital structure, this paper also relies on the analysis of ratios of the co- variables.
2) Descriptive statistic is used; it comprises Mean, Standard Error of the mean, median, variance, and standard deviation, coefficient of skewness, Kurtosis and the Range. Results of descriptive statistitics are used to highlight the values of the basic parameters such as Skewness, Kurtosis C.V.
3) Innovative t- statistic has been employed to determine whether the distribution of the core ratios diverges from normal distribution. The assumption that mean and median of normal distribution are equal is used as null hypothesis. Normally, chi square and Jark Bera test are used for this purpose. Recently Shri Prakash et al. (2022) have shown that the t test furnishes same results as may be derived by the application of chi square and Jark Bera test.
4) T test has also been used for evaluating the significance of the difference between the means of the ratios of the core variables of different companies. Thus 91 pairs of means of ratios have been subjective to this test for specific variables.

Analysis of empirical results

There exists the threshold of the borrowed capital for each company, amount of loan more than the threshold of economic viability will jeopardises the financial health. If the repayment liability of the loan and interest thereof exceeded the revenue of the company and / or non-loan capital stock, the company will fail to discharge its repayment liability; consequently the company will be sick. This point may be represented by the following Diagram

Diagram – 1
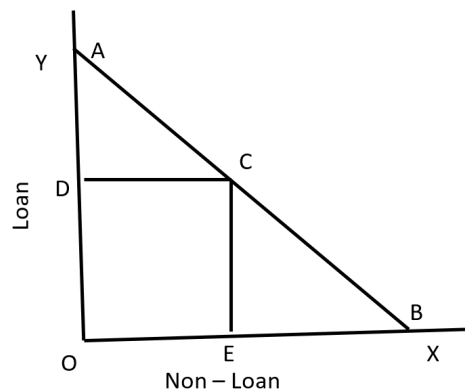
In the Diagram 1 line AB shows the % shares of the loan and non-loan capital stock of the company. At the point A, total stock of capital of the company is loan capital while the point B shows that the entire capital stock of the company is non- loan capital stock; point C on the line is the middle point and at this point the company has equal shares of loan and non-loan capital stock. Any point above C will represent the share of loan capital to be in excess of 50% of the total. All such points may signal ill financial health of the company. As in such cases company will be owned by the creditors.
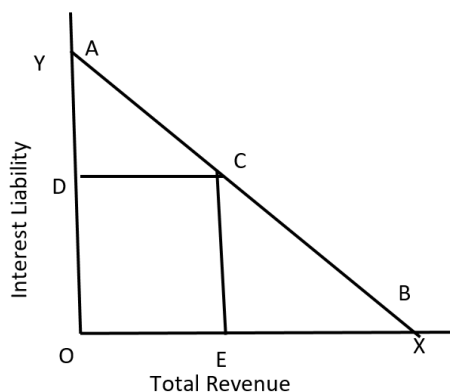
In Diagram 2 line AB shows the ratio of interest liability to the revenue of the company. Vertical axis shows the interest payment on loans as a proportion of total revenue At the point A entire revenue of the company may be exhausted by the payment liability while at the point B, repayment liability will be zero. So at point B entire capital stock is of non-debt capital and the entire revenue of the company will be available for discharging repayment liability. At the point C 50% of the revenue will be required for interest payment. Any point above C will signal the unwelcome payment liability.

The above criteria are used in the study as indicators of the financial health of the sampled companies. These diagrams enhance parameters identified for indicating financial health of the companies is an innovative aspect of the studies.

Discussion of summary statistics of debt to fixed capital ratio
Table 1; Ratio of Debt to Fixed Capital

	Companies' name													
	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Mean	0.061	0.076	0.146	0.692	1.005	0.133	0.261	0.344	0.128	0.531	0.56	0.456	1.43	0.27
Standard Error	0.015	0.022	0.014	0.251	0.102	0.023	0.04	0.053	0.036	0.089	0.029	0.063	0.963	0.169
Median	0.04	0.005	0.15	0.315	0.735	0.07	0.27	0.335	0.03	0.6	0.58	0.44	0.54	0.025
Mode	0	0	0.05	0.33	0.55	0.06	0	0.05	0	0	0.58	0.26	0	0
Standard Deviation	0.082	0.123	0.077	1.374	0.556	0.126	0.217	0.29	0.189	0.462	0.15	0.321	4.816	0.829
Sample Variance	0.007	0.015	0.006	1.888	0.309	0.016	0.047	0.084	0.036	0.213	0.022	0.103	23.196	0.687
Kurtosis	4.974	3.122	-1.051	15.331	0.811	-0.716	-1.558	-0.328	7.801	0.968	-0.03	-0.64	24.779	21.666
Skewness	2.129	1.863	0.121	3.802	0.917	0.903	0.007	0.605	2.5	0.757	-0.174	0.41	4.968	4.57
Range	0.33	0.48	0.26	6.89	2.6	0.37	0.6	1.05	0.86	1.86	0.6	1.17	24.5	4.08
Minimum	0	0	0.03	0	0	0.01	0	0	0	0	0.28	0	0	0
Maximum	0.33	0.48	0.29	6.89	2.6	0.38	0.6	1.05	0.86	1.86	0.88	1.17	24.5	4.08
Sum	1.84	2.27	4.39	20.77	30.14	3.99	7.83	10.32	3.57	14.34	14.55	11.86	35.69	6.59
Count	30	30	30	30	30	30	30	30	28	27	26	26	25	24
Coefficient of variation	0.5	0.93	1.12	95.12	55.86	1.68	5.67	9.98	2.41	24.53	8.37	14.65	687.56	22.76
T-value for normality	7.83	17.21	-1.43	8.23	14.53	14.93	-1.24	0.93	14.47	-4.02	-3.54	1.31	4.61	7.21

Source: Author's own calculation

The calculated values of t statistic of difference between the means and the medians of the ratio of debt to fixed capital are greater than 1.96 for 10 companies, so the distribution of the ratio debt to fixed capital for 10 companies significantly diverges from normal distribution, while t statistic of the difference between means and medians of ratio debt to fixed capital of the 4 companies are less than the critical value, so the distribution may be taken to be normal. So the null hypothesis that the means and medians of 10 companies are equal is rejected but this null hypothesis for other 4 companies is accepted on empirical evidence. These results implied that the distribution of the debt to gross working fixed capital ratio may be skewed and concentrated; concentration of high values around the narrow space of mode signifies unequal distribution of the values around the means. It may be inferred that proportionately greater amounts of loan relative to fixed capital have been taken in some years and relatively less amounts have been borrowing in other years by other companies. Uneven inter-temporal borrowings by the 10 companies may be explained by uneven expansion or diversification of production during the period of study. However the remaining 4 sampled companies have adhered to even pace of growth and diversification of output. These companies appear to have maintained proper financial health during the entire period. However the remaining 4 sampled companies have adhered to even pace of growth and diversification of output. These companies appear to have maintained proper financial health during the entire period.

The coefficients of kurtosis of 6 companies are negative; coefficients of 2 companies are less than 1 whereas the coefficients of other 4 companies are greater than 1. Thus the negative coefficients of kurtosis are statistically significant only for 2 companies. So the diverges of the distribution of the debt to fixed capital ratio may be extremely high, while diverges of normal distribution of the ratio may not be very high for 4 companies. It may be inferred that the relative borrowings of these 6 companies must have been on the lower side.

The coefficients of kurtosis for 8 companies are positive, but the coefficients are significant only for 6 companies which imply heavier borrowings by these companies in some years which make the distribution not only concentrated but also not-normal.

Only 1 coefficient of skewness is negative and significant also. 6 positive coefficients of skeweness are significant. This also account for the significant diverges of the distribution of the debt to fixed capital ratio from normality. Above results imply high degree of variation of the debt to fixed capital ratio between the years. This is evident from the high values of the range and CV. The values of CV vary from the lowest value 0.50. However, the calculative values of the ratio of the debt to fixed capital for the sampled companies do not violate the threshold level.

The summary of statistic of debt to equity ratio

Equity constitutes the major proportion of the total capital stock while debt is another source of raising capital. Owner`s own capital and part of invested profit are also important sources of capital but, these to generally constitute a smaller part of total capital stock therefore, ratio of debt to equity have been considered. The table 2 shows the summary statistic of debt to equity ratio.

Debt to Equity Ratio – Table 2

	Companies' name													
	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Mean	0.440	0.336	0.750	0.501	0.961	0.766	0.518	0.790	0.454	0.781	0.671	0.735	0.569	0.293
Standard Error	0.065	0.061	0.036	0.036	0.005	0.023	0.066	0.041	0.059	0.043	0.073	0.048	0.062	0.068
Median	0.370	0.200	0.800	0.515	0.970	0.790	0.730	0.905	0.505	0.900	0.860	0.785	0.740	0.150
Mode	0.000	0.000	0.950	0.420	0.990	0.850	0.000	0.930	0.000	0.950	0.000	1.000	0.880	0.000
Standard Deviation	0.358	0.333	0.197	0.200	0.029	0.128	0.363	0.223	0.313	0.219	0.364	0.235	0.314	0.332
Sample Variance	0.128	0.111	0.039	0.040	0.001	0.016	0.132	0.050	0.098	0.048	0.132	0.055	0.099	0.110
Kurtosis	-1.571	-1.583	-0.105	0.449	1.805	2.524	-1.436	1.541	-1.199	0.841	-0.392	4.584	-1.213	-1.141
Skewness	0.166	0.410	-0.819	-0.725	-1.407	-1.470	-0.656	-1.603	-0.197	-1.376	-1.143	-1.938	-0.603	0.618
Range	0.940	0.880	0.700	0.880	0.110	0.540	0.920	0.800	0.940	0.750	0.980	1.000	0.910	0.900
Minimum	0.000	0.000	0.270	0.000	0.880	0.370	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000
Maximum	0.940	0.880	0.970	0.880	0.990	0.910	0.920	0.950	0.940	0.960	0.980	1.000	0.910	0.900
Sum	13.200	10.070	22.500	15.020	27.880	22.990	15.550	23.700	12.720	20.310	16.770	17.630	14.790	7.020
Count	30	30	30	30	30	30	30	30	28	26	25	24	26	24
Coefficient of variation	81.28	99.20	26.23	39.90	2.99	16.71	70.13	28.17	69.01	28.09	54.24	31.92	55.19	113.42
T- value for normality	5.86	12.21	-7.62	-2.15	-8.83	-5.54	-17.45	-15.48	-4.53	-14.06	-13.00	-5.15	-14.15	10.29

Source: Author's own calculation

T statistic of the difference between the means and medians of debt to equity ratio for all 14 companies exceed the critical value of t therefore the distribution of debt to equity ratio diverges distributed from the normal distribution for all the companies. The values of the ratio are unevenly spaced between the years as the null hypothesis of equality of means and medians of the ratio is rejected in all cases. The 8 coefficients of kurtosis and 11 of skeweness are negative but only 2 negative coefficient of kurtosis and 5 of skewness are statistically significant and 4 coefficients of kurtosis are significant but none of 3 coefficients of skewness is significant. Thus the diverges of this ratio from normal distribution may be explained by heavy borrowing relative in few years. The coefficient of variance % of per unit of mean as the minimum value of CV, thus the ratio is very high between the years.

Debt to total capital ratio – table 3

Total capital comprises working and fixed capital. Sources wise description refers to capital raised from equity, own capital, capital raised from borrowings. The table 3 shows summary statistic of debt to total capital ratio.

	Companies' name													
	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Mean	0.190	0.073	0.396	0.808	5.256	0.151	0.270	0.477	0.133	1.374	1.576	0.931	0.270	1.523
Standard Error	0.131	0.022	0.255	0.297	4.286	0.027	0.045	0.160	0.034	0.887	1.035	0.553	0.163	0.972
Median	0.045	0.005	0.140	0.300	0.720	0.090	0.260	0.325	0.060	0.460	0.570	0.405	0.025	0.470
Mode	0.000	0.000	0.050	0.540	0.580	0.010	0.000	0.040	0.000	0.000	0.570	0.000	0.000	0.000
Standard Deviation	0.716	0.120	1.399	1.626	23.473	0.148	0.247	0.876	0.180	4.610	5.278	2.818	0.799	4.860
Sample Variance	0.513	0.014	1.956	2.644	550.978	0.022	0.061	0.767	0.032	21.248	27.857	7.940	0.638	23.619
Kurtosis	29.195	3.182	29.799	8.408	29.971	0.777	0.821	24.065	5.637	26.485	25.938	25.529	21.722	23.339
Skewness	5.373	1.874	5.451	3.047	5.473	1.177	0.762	4.695	2.120	5.125	5.090	5.032	4.575	4.781
Range	3.960	0.470	7.770	6.580	128.970	0.570	1.000	4.890	0.790	24.340	27.200	14.690	3.940	24.500
Minimum	0.000	0.000	0.020	0.000	0.540	0.010	0.000	0.000	0.000	0.000	0.240	0.000	0.000	0.000
Maximum	3.960	0.470	7.790	6.580	129.510	0.580	1.000	4.890	0.790	24.340	27.440	14.690	3.940	24.500
Sum	5.710	2.200	11.870	24.240	157.690	4.520	8.110	14.300	3.710	37.100	40.980	24.200	6.470	38.070
Count	30	30	30	30	30	30	30	30	28	27	26	26	24	25
Coefficient of variation	376.37	163.77	353.50	201.26	446.56	97.95	91.34	183.71	135.89	335.46	334.87	302.73	296.38	319.15
T- value for normality	6.08	17.05	5.48	9.36	5.79	12.32	1.25	5.19	11.27	5.35	4.95	4.84	7.33	5.42

Source: Author's own calculation

The t statistic of debt to total capital ratio shows that calculated values of t are the differences between the means and the medians of the ratio are greater than the table value for 0.05 probability level; the distribution of the ratio for 13 companies significantly diverges from the normal distribution. The distribution of the ratio only for 1 company confirms to the normal distribution. The null hypothesis of the equality between the means and medians of the ratio for the 13 companies is rejected.

The positive coefficients of kurtosis are significant for 12 companies and 13 positive coefficients of skewness are also significant thus both these coefficients have furnished the results which are inconsonance with yield by t test. This also suggests the distribution of borrowings between the years has not been evenly spaced. Consequently the values of the ratio have greatly varied between the years; this is evident from high values of range and CV of the ratio.

No company raises capital on daily basis or in the continuum. Companies issue new shares or borrow for expansion or diversification of the operations in selective years only after reaching a specific level of development. So uneven inter- temporal distribution of the above three ratios is not an uncommon feature of the industries. The facet does not support ipso – facto Modigliani hypothesis.

Ratio of interest liability to total income

Total income of company comprises sales revenue, interest received and income from other sources that accrues to the company. The table 4 shows the summary statistic of the ratio interest liability to total income.

	Companies' name													
	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Mean	0.469	0.518	1.182	1.841	2.272	0.625	0.604	0.540	0.280	0.685	1.061	1.081	1.360	0.453
Standard Error	0.132	0.211	0.195	0.274	0.619	0.151	0.119	0.156	0.115	0.147	0.276	0.277	0.243	0.227
Median	0.120	0.010	0.745	1.470	1.125	0.110	0.490	0.030	0.045	0.270	0.645	0.520	1.000	0.025
Mode	0.000	0.000	0.560	N/A	1.260	0.090	0.000	0.010	0.000	0.000	0.030	0.340	1.000	0.010
Standard Deviation	0.724	1.157	1.068	1.503	3.388	0.827	0.653	0.855	0.611	0.763	1.407	1.413	1.214	1.111
Sample Variance	0.524	1.339	1.140	2.260	11.478	0.684	0.426	0.730	0.373	0.582	1.980	1.995	1.473	1.235
Kurtosis	1.777	8.785	2.936	0.319	6.768	0.878	1.443	0.939	15.529	-0.639	3.830	6.799	1.230	12.682
Skewness	1.742	2.995	1.618	0.888	2.619	1.329	1.228	1.448	3.777	0.910	2.023	2.605	1.158	3.414
Range	2.490	4.790	4.630	5.820	14.390	2.930	2.540	2.870	3.000	2.360	5.220	6.050	4.740	4.990
Minimum	0.000	0.000	0.120	0.010	0.080	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Maximum	2.490	4.790	4.750	5.830	14.470	2.950	2.540	2.870	3.000	2.360	5.220	6.050	4.740	4.990
Sum	14.070	15.530	35.460	55.220	68.150	18.760	18.130	16.210	7.850	18.490	27.590	28.100	34.000	10.880
Count	30	30	30	30	30	30	30	30	28	27	26	26	25	24
Coefficient of variation	154.41	223.55	90.33	81.67	149.14	132.23	108.02	158.15	217.96	111.43	132.60	130.70	89.25	245.10
T- value for normality	0.25	0.59	0.47	0.56	3.88	0.43	0.07	0.44	0.14	0.32	0.58	0.79	0.44	0.48

Source: Author's own calculation

The values of t statistics of the differences between the means and medians of this ratio for 13 companies are less than 1.96; it means that the ratio is normally distributed between the years for 13 companies. Besides the very low values of ratio to interest payment to total income of 13 companies' means that the liability of the loans for these companies is within their absorption capacity and therefore the companies may be taken to be in good financial health on this count but the distribution of this ratio diverges from normal distribution for 1 company. The 10 positive coefficient of kurtosis are significant at 1% probability level while rest of the coefficient are not significant.

This results is contradictory to the results of t statistic. All the coefficients of skewness are positive and 12 of these are statistically significant at 1% probability. These coefficients also contradict the results of t statistic. It is because Jark Bera test, based on the coefficients of kurtosis and skewenss, may also be contrary to the results of t statistic relating to the normality of the distribution. The coefficients of CV have, however, low or moderately high values.

Test of significance of the differences of the paired means of 4 ratios

The following are the values of the t- statistic of 91 paired means of ratio debt to fixed capital

Table – 5: values of t- statistic of paired means of debt to fixed capital ratio.

	Companies' name													
	A1,A2	A1,A3	A1,A4	A1,A5	A1,A6	A1,A7	A1,A8	A1,A9	A1,A10	A1,A11	A1,A12	A1,A13	A1,A14
T value	-1.027	-8.034	-4.851	-17.763	-5.041	-9.108	-9.922	-3.386	-10.575	-30.395	-12.543	-3.006	-2.714
	A2,A3	A2,A4	A2,A5	A2,A6	A2,A7	A2,A8	A2,A9	A2,A10	A2,A11	A2,A12	A2,A13	A2,A14	A3,A4
T value	-5.162	-4.734	-17.276	-3.442	-7.863	-9.015	-2.410	-10.049	-25.671	-11.601	-2.974	-2.513	-4.202
	A3,A5	A3,A6	A3,A7	A3,A8	A3,A9	A3,A10	A3,A11	A3,A12	A3,A13	A3,A14	A4,A5	A4,A6	A4,A7
T value	-16.195	0.955	-5.273	-6.974	0.974	-8.686	-25.629	-9.895	-2.820	-1.634	-2.231	4.293	3.284
	A4,A8	A4,A9	A1,A10	A1,A11	A1,A12	A1,A13	A1,A14	A5,A6	A5,A7	A5,A8	A5,A9	A5,A10	A5,11
T value	2.627	4.167	1.123	0.948	1.656	-1.545	2.540	16.189	13.194	11.155	15.328	6.718	7.655
	A5,A12	A5,A13	A5,A14	A6,A7	A6,A8	A6,A9	A6,A10	A6,A11	A6,A12	A6,A13	A6,A14	A7,A8	A7,A9
T value	8.566	-0.923	7.480	-5.395	-7.059	0.254	-8.766	-22.362	-9.814	-2.848	-1.787	-2.425	4.815
	A7,A10	A1,A11	A1,A12	A1,A13	A1,A14	A8,A9	A8,A10	A8,A11	A8,A12	A8,A13	A8,A14	A9,A10	A9,A11
T value	-5.547	-11.412	-5.206	-2.564	-0.167	6.460	-3.575	-6.604	-2.654	-2.380	0.828	-8.230	-17.883
	A9,A12	A9,A13	A9,A14	A10,A11	A10,A12	A10,A13	A10,A14	A11,A12	A11,A13	A10,A14	A12,A13	A12,A14	A13,A14
T value	-8.910	-2.751	-1.759	-0.577	1.316	-1.852	2.665	2.863	-1.765	3.311	-1.972	1.991	2.219

Source: Author's own calculation

As many as 70 out of 91 differences of paired means of the ratio of debt to fixed capital are statistically significant as these values are greater than the critical value 1.96 at 0.05 probability level while the 21 differences (paired companies) are not statistically significant. Thus about 77% of the total paired means of the ratio debt to fixed capital are significantly above the normal differences of these ratios for the group as a whole. It may imply that these differences of paired means of the ratio of debt to fixed capital lie outside the normal domain for the group so average amount of debt for these paired companies may be taken to be above or far below the normal which may be considered undesirable level of borrowings. It is not an unusual result since different companies of the sample are at different stages of growth.

The table 6 shows the values of t statistic of the differences of paired means of the ratios of debt to equity

Table 6: t- t statistic of paired means of ratios of debt to equity ratio

	Companies' name												
	A1,A2	A1,A3	A1,A4	A1,A5	A1,A6	A1,A7	A1,A8	A1,A9	A1,A10	A1,A11	A1,A12	A1,A13	A1,A14
T value	2.261	-8.042	-1.568	-15.388	-9.097	-1.627	-8.799	-0.312	-8.166	-4.576	-6.745	-2.750	3.013
	A2,A3	A2,A4	A2,A5	A2,A6	A2,A7	A2,A8	A2,A9	A2,A10	A2,A11	A2,A12	A2,A13	A2,A14	A3,A4
T value	-8.042	-4.500	-11.259	-11.856	12.867	-0.976	10.357	0.009	-4.485	1.394	0.030	10.217	-1.568
	A3,A5	A3,A6	A3,A7	A3,A8	A3,A9	A3,A10	A3,A11	A3,A12	A3,A13	A3,A14	A4,A5	A4,A6	A4,A7
T value	-19.824	-0.737	-0.451	8.089	9.702	-45.666	0.119	-6.946	5.435	0.402	-15.388	-12.783	5.936
	A4,A8	A4,A9	A4,A10	A4,A11	A4,A12	A4,A13	A4,A14	A5,A6	A5,A7	A5,A8	A5,A9	A5,A10	A5,11
T value	-10.246	17.042	-0.606	-21.814	0.055	-2.584	11.887	-9.097	-3.924	-1.426	1.307	8.613	2.597
	A5,A12	A5,A13	A5,A14	A6,A7	A6,A8	A6,A9	A6,A10	A6,A11	A6,A12	A6,A13	A6,A14	A7,A8	A7,A9
T value	-35.278	0.221	3.483	-1.627	-12.013	8.372	-9.678	8.435	1.227	-7.846	0.498	-8.799	-2.694
	A7,A10	A7,A11	A7,A12	A7,A13	A7,A14	A8,A9	A8,A10	A8,A11	A8,A12	A8,A13	A8,A14	A9,A10	A9,A11
T value	-1.083	-4.248	10.171	6.101	32.949	-0.312	-11.243	1.985	-7.667	13.177	13.919	-8.166	-6.895
	A9,A12	A9,A13	A9,A14	A10,A11	A10,A12	A10,A13	A10,A14	A11,A12	A11,A13	A10,A14	A12,A13	A12,A14	A13,A14
T value	0.509	-1.899	21.301	-4.576	-9.624	5.069	5.525	-6.745	-5.189	12.200	-2.750	0.919	3.013

Source: author's own calculation

The table shows that 65 or 71.42% of the difference of the means of the ratio of debt to equity capital are statistically significant at 0.05 probability level while about 29% of the total paired of the means of the ratio is not statistically significant.

If equity capital is treated as the base for the borrowed capital, 71% of the cases of differences of the paired means lay outside the desired norm for loan capital. The desiredness may refer to the actual borrowings below/ above the potential development and diversification of the companies. All these companies may find beneficial to alter the proportion of debt capital in their capital structure.

Differences of the paired means of debt to total capital ratio – table 7

The following table shows the t statistic of the paired differences of the ratio of debt to total capital stock of 14 sampled companies:

Table – 7: values of t of paired means of ratio of debt to total capital

	Companies' name												
	A1,A2	A1,A3	A1,A4	A1,A5	A1,A6	A1,A7	A1,A8	A1,A9	A1,A10	A1,A11	A1,A12	A1,A13	A1,A14
T value	1.706	-1.384	-3.681	-2.284	0.574	-1.118	-2.680	0.802	-2.682	-2.752	-2.685	-0.744	-2.869
	A2,A3	A2,A4	A2,A5	A2,A5	A2,A7	A2,A8	A2,A9	A2,A10	A2,A11	A2,A12	A2,A13	A2,A14	A3,A4
T value	-0.226	-0.444	-0.217	-0.447	-0.742	-0.451	-0.295	-0.285	-0.290	-0.310	-0.254	-0.307	-2.036
	A3,A5	A3,A6	A3,A7	A3,A8	A3,A9	A3,A10	A3,A11	A3,A12	A3,A13	A3,A14	A4,A5	A4,A6	A4,A7
T value	-2.189	1.845	0.934	-0.520	1.909	-2.140	-2.278	-1.775	0.762	-2.345	-0.186	0.557	0.449
	A4,A8	A4,A9	A4,A10	A4,A11	A4,A12	A4,A13	A4,A14	A5,A6	A5,A7	A5,A8	A5,A9	A5,A10	A5,11
T value	0.225	0.561	-0.120	-0.144	-0.041	0.370	-0.147	2.303	2.249	2.155	2.232	1.633	1.513
	A5,A12	A5,A13	A5,A14	A6,A7	A6,A8	A6,A9	A6,A10	A6,A11	A6,A12	A6,A13	A6,A14	A7,A8	A7,A9
T value	1.806	2.016	1.512	-4.405	-3.887	0.814	-2.808	-2.859	-2.927	-1.547	-2.991	-2.401	4.666
	A7,A10	A7,A11	A7,A12	A7,A13	A7,A14	A8,A9	A8,A10	A8,A11	A8,A12	A8,A13	A8,A14	A9,A10	A9,A11
T value	-2.530	-2.617	-2.471	0.009	-2.728	3.941	-2.021	-2.172	-1.619	1.739	-2.239	-1.925	-1.936
	A9,A12	A9,A13	A9,A14	A10,A11	A10,A12	A10,A13	A10,A14	A11,A12	A11,A13	A11,A14	A12,A13	A12,A14	A13,A14
T value	-2.005	-1.190	-2.004	-0.286	0.809	2.230	-0.218	1.058	2.306	0.072	2.131	-1.028	-2.393

Table 7 shows that 39 or about 43% of the total paired differences of the means of the ratios of debt to total capital stock are statistically significant at 0.05 probability level while 57% of the total paired differences of the ratio are not statistically significant this means that the differences of means of this ratio are in acceptable zone. In view of the authors, total capital stock is the best parameter for normalizing of the extent of the borrowed capital for the company. So it may be concluded that 43% of the paired companies may need to alter the ratio of borrowed to their total capital stock. Thus the financial health of the 57% of the total paired companies may be taken to be in good financial health on this count.

The following table shows that the values of t of the differences of the paired means of the ratio of interest liability to total revenue:

Table 8 values of t of paired differences of ratio of interest payment liability to total revenue

Companies' name													
	A1,A2	A1,A3	A1,A4	A1,A5	A1,A6	A1,A7	A1,A8	A1,A9	A1,A10	A1,A11	A1,A12	A1,A13	A1,A14
T value	-0.378	-5.852	-8.705	-5.510	-1.506	-1.470	-0.674	2.064	-2.116	-3.900	-4.018	-6.513	0.121
	A2,A3	A2,A4	A2,A5	A2,A5	A2,A7	A2,A8	A2,A9	A2,A10	A2,A11	A2,A12	A2,A13	A2,A14	A3,A4
T value	-4.468	-7.385	-5.188	-0.802	-0.691	-0.167	1.868	-1.230	-3.066	-3.169	-5.087	0.400	-3.783
	A3,A5	A3,A6	A3,A7	A3,A8	A3,A9	A3,A10	A3,A11	A3,A12	A3,A13	A3,A14	A4,A5	A4,A6	A4,A7
T value	-3.248	4.365	4.888	4.969	7.556	3.870	0.705	0.589	-1.119	4.743	-1.231	7.501	7.988
	A4,A8	A4,A9	A4,A10	A4,A11	A4,A12	A4,A13	A4,A14	A5,A6	A5,A7	A5,A8	A5,A9	A5,A10	A5,11
T value	7.963	9.877	6.956	3.854	3.751	2.491	7.309	4.999	5.117	5.247	5.920	4.599	3.286
	A5,A12	A5,A13	A5,A14	A6,A7	A6,A8	A6,A9	A6,A10	A6,A11	A6,A12	A6,A13	A6,A14	A7,A8	A7,A9
T value	3.231	2.475	4.889	0.211	0.757	3.472	-0.543	-2.774	-2.891	-5.142	1.263	0.630	3.763
	A7,A10	A7,A11	A7,A12	A7,A13	A7,A14	A8,A9	A8,A10	A8,A11	A8,A12	A8,A13	A8,A14	A9,A10	A9,A11
T value	-0.829	-3.077	-3.199	-5.686	1.206	2.559	-1.295	-3.283	-3.397	-5.668	0.630	-4.190	-5.159
	A9,A12	A9,A13	A9,A14	A10,A11	A10,A12	A10,A13	A10,A14	A11,A12	A11,A13	A11,A14	A12,A13	A12,A14	A13,A14
T value	-5.272	-8.007	-1.366	-2.341	-2.456	-4.657	1.684	1.438	1.342	1.300	-1.453	3.336	5.227

The table 8 shows that 61 or 67% of the total paired differences of the ratio of interest payment liability to total revenue are statistically significant while 33% of the paired differences of the means of the ratio are not significant. Thus the payment liability of interest may be taken to be outside the acceptable range for the group as a whole. So some companies of the group may be required to increases/decrease the share of loan capital in their capital stock.

The individual company wise analysis of the data shows that none of the 14 sampled companies has borrowed amount of capital that is in excess of 50% of the total capital stock while interest payment liability for any company appeared to be excessive relative to the total revenue therefore it may be concluded that none of the sampled companies stands in violation of the threshold norm describe in the study. So, none of the companies suffers from ill financial health due to excessive borrowings. Findings of the study may be taken to diverge from Modigliani hypothesis which advocates larger proportion of the borrowing in the total capital stock to be an indicator of good financial health.

Conclusion and findings of the study
The fowling are the main findings of the study;
i) The ratio of debt to total capital of 9 companies significantly diverges from normal distribution

while the distribution of the ratio for 5 companies is normal.

ii) Ratio of debt to fixed capital for 10 companies is not normally distributed and this ratio for 4 companies is normally distributed,

iii) Distribution of the ratio of debt to equity is not normal for any Companies,

iv) Distribution of the ratio of interest liability to total revenue is normal for 1 company and not normal for 13 Companies,

v) 71, 65, 61 and 39 paired differences of the means of the ratios of loan to fixed capital, loan to equity capital, loan to total capital and interest payment liability to total revenue are found to be statistically significant. These findings imply that the sampled companies should alter the proportion of borrowing their capital stock.

None of the sampled companies is revealed in ill financial health, if individual company wise analysis of the data is taken into account. Findings of the study diverge from Modigliani hypothesis.

Contribution of the paper

The empirical validity of the theory depends on the data and expanse but data may differ over space and time that is why validity of theory needs to be checking repeated application of the theory different data sets. The results of this study to Indian data does not support in the paper 99% of the sampled companies are in good financial health despite the share of loan capital very low in this stands in contradiction to the kernel of this study.

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Appendix

Selected or sampled companies have been coded in the below table.

SL.	Company' Name	Company' Code Name
1	A B B India Ltd.	01
2	Bharat Electronics Ltd.	02
3	Blue Star Ltd.	03
4	Sharp India Ltd.	04
5	Videocon Industries Ltd.	05
6	Voltas Ltd.	06
7	Whirlpool Of India Ltd.	07
8	Wipro Ltd.	08
9	3M India Ltd.	09
10	Genus Power Infrastructures Ltd.	10
11	Ricoh India Ltd.	11
12	T V S Electronics Ltd.	12
13	Xerox India Ltd.	13
14	Zicom Electronic Security Systems Ltd.	14

Rural Households' Indebtedness In India and Its Determinants

Tarujyoti Buragohain[1]

Abstract

In this paper, an attempt has been made to assess the trend of incidence of indebtedness, extent of indebtedness, major determinants of incidence of indebtedness and extent of indebtedness of rural and agriculture households across states. The study finds that despite increase of institutional short-term crops loans, non-institutional credit accounts for 33 per cent of total outstanding agricultural loan. About 40 per cent of agricultural households were estimated as indebted and the average amount of outstanding loan per agricultural households was Rs 74000. Among the states- the southern states- Telangana has the highest per cent of indebted households (83.7 %), followed by Andhra Pradesh (75.1%), Karnataka (59.2%) whereas Chhattisgarh has the lowest indebted agricultural households (21.1 per cent). A multiple regression model was developed to assess the major determinants of incidence of indebtedness and extent of indebtedness. The study finds that one unit increase of average land size of agricultural households would reduce incidence of indebtedness to 5 per cent. Secondly, a unit increase in area under commercial crops would reduce about 2 per cent of incidence of indebtedness. Institutional credit per hectare of net area sown as well as the extent of irrigated area to total cropped area have positive influences in reducing the extent of indebtedness.

Key Words: Indebtedness, Households, Rural, Agriculture, Determinants

Introduction

Extreme levels of households' indebtedness are common across developing countries. Rural households' indebtedness, especially cultivator households remains unsolved in India. Due to non-availability of institutional credit, a large number of cultivator households were completely dependent on moneylenders for agricultural input purchase with high interest rate. Since the British rule, Central Government has been trying to extend the institutional credit to agricultural sector. In 1951, RBI commissioned the All India Rural Credit Survey to understand the situation of agricultural households and address concerns regarding financing the agricultural sector (RBI-Bulletin- 1951).The committee recommended the creation of an efficient system for agricultural finance and the development of a sound co-operative credit structure. In 1955, at the time of the creation of State Bank of India, one of the major objectives was to extend banking services to rural and semi-urban areas. In 1969, the All India rural Credit review Committee suggested the adoption of a 'Multi-agency Approach' towards agriculture and rural credit and commercial banks were expected to complement the efforts of co-operative banks to enhance the quantum of credit in the rural economy (RBI-Chronology of Event -1969). In 1972, RBI introduced the priority sector lending and it became mandatory for commercial banks to advance a certain proportion of their funds to these priority sectors. The priority sector includes agriculture and small- scale industries. In 1975, Narasimhan Committee on rural credit recommended the establishment of regional Rural Banks to extend the credit requirement for agricultural purposes (RBI-Report-2004).

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In 1982, National Bank for Agricultural and Rural development (NABARD) was established towards the development of institutional credit for agriculture and rural development. The aim of this institution was to 'promote sustainable and equitable agriculture and rural prosperity through effective credit support related services, and institution development. In 1990, other initiatives like Kisan Credit Cards scheme, self-help group-Bank Linkage programme and Special agriculture credit plan were implemented to increase the credit flow to agricultural sector (RBI-Report -2004). These public efforts signify the importance attached to the need for expansion of credit facilities to the rural households.

Importance of Credit for Agricultural Growth: A Review

Credits are distributed to the farmers for purchasing inputs such as seeds, fertilizer, and other agricultural mechanization. A few references are given below to support the correlation between institutional credit and agricultural productivity.

A study by Veerashekarappa (1997), finds that institutional finance was instrumental in acquiring productive form of assets and development of agriculture facilities, change in cropping pattern, increase in cropping intensity and adoption of HYV seeds. It is an accepted fact that the availability of concessional credit would help the farmers to adopt new technology, encourage investment in machinery and irrigation and augment the use of quality inputs to increase agricultural productivity. Using modern inputs is possible only when the farmers are provided with credit for purchasing modern inputs (Schultz, 1964). Chaudhury (1986) stated that combined effect of irrigation, fertilizers, seeds and pesticides, etc. was positively related with crop productivity.

A study by Jugal (1997), inferred that the term loan for agricultural purpose granted by zonal development banks enable the farmers to improve mechanization by purchasing tractors, tillers and IP sets for minor irrigation. The term loan also helped in increasing irrigation area by 22.40 per cent of land as well as cropping patterns and cropping intensity.

Asamoah, (2008) scrutinized the impact of the financial sector reforms on savings, investment, and growth of gross domestic product in the Ghana economy.

Saez, (2001) studied financial reforms in India and China. These countries were selected due to their similar development patterns. This paper argued that after banking sector reform India was able to overcome the problems of bad debts by allowing new entrant in the market. While China tried to restore its state owned banks by way of assets management institutions.

Yusuf (1984), highlights the urgency of credit to farmers. Credit should be provided for relief of distress and for purchasing seeds, fertilizers, cattle and implements.

Mellor (1966) has synthesised the role of finance for economic development in general and agricultural development in particular. In his perception, institutional finance should accompany or closely follow the programmes of technical change. He is clear, however, that institutional finance will fail if it is not closely associated with innovation, which increases factor productivity in agriculture.

Saeed et al. (1996) found that mean input expenditure per hectare was significantly higher for the farmers who participated in credit. Expenditure on agricultural inputs is presumably associated with higher productivity growth.

Strong correlation exists between the amounts of institutional credit and the real gross domestic product of agricultural sector in a given time period (Carter, 1988).

Dantwala, (1989) estimated demand and supply of credit and its role in poverty alleviation in India. He emphasized on supply of credit for increasing technical assistance to farmers which in turn would increase agricultural productivity.

Nosiru, (2010) proved that micro credit enabled farmers to buy the inputs they need to increase their agricultural productivity. However, the sum of credit obtained by the farmers in the study area did not contribute positively to the level of output. This was a result of non-judicious utilisation or diversion of credits obtained to other uses apart from the intended farm enterprises.

Positive relationships exist between institutional credit and agricultural productivity (Bernstein and Nadiri 1993 and Nickell and Nicholisas 1999). Modern tools, such as tractors for tilling the cultivable land, increase productivity. A study by Waqar et al. (2008) found that 'use of tractors had positive and significant impact on gross domestic product of agriculture.

A study by Bhalla and Singh (2010) finds in their cross sectional analysis using data for 2003-06 that the elasticity of demand for inputs with respect to credit is quite significant. At all India level, credit elasticities for use of fertilizers, tractors and tube wells is 0.85 suggesting that 10 per cent increase in supply of direct institutional credit to the farmers leads to 8-9 per cent increase in use of fertilizers, tractors and tubewells in long run.

Zuberi (1989), estimated that 70 per cent of total formal credit was used for the purchase of seed and fertilizer and concluded that most of the increases in agricultural output could be explained by changes in the quantity and quality of seed and fertilizer.

Trend of Non-Institutional Indebted households

Figure 1 presents the trend of outstanding indebtedness of agricultural households as compared to rural households. In 1951, non-Institutional credit sources accounted for 89.8 per cent of outstanding debt of agricultural households. The share has since then declined from 79 per cent in 1961 to 32.9 per cent in 2018. Similarly, the per cent of outstanding debt from non-institutional credit of rural households has also declined from 92.8 per cent in 1951 to 33.8 per cent in 2018. The sources of non-institutional credit for both rural and agricultural households are land lord, professional moneylenders, relatives and friends, agricultural moneylenders, traders and commission agents. A large number of studies have been focusing on the agricultural credit which includes indebtedness of rural households in general and agricultural households in particular. Some studies have been carried out on the indebtedness of rural and urban households using the decadal data of All India Debt and Investment Surveys(AIDIS)

Fig 1 Trend of non-Institutional Outstanding Debt Rural Households and Cultivator Households (%)
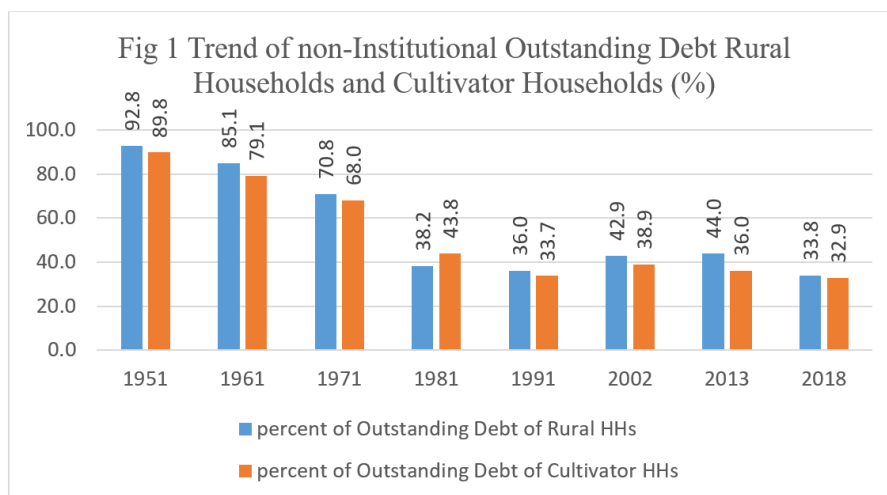
Source: All India Debt & Investment Survey, Various Issues, NSSO.

Quite a few studies have dealt with the per cent of indebtedness of rural households including farmers' households with data pertaining to 2002-03. But the studies focusing on the extent of indebtedness of farmers' households across states using latest round of AIDIS data-that is from 2012-13- are not available. In this view, an attempt is made in this paper to assess the recent trends of the extent of incidence of indebtedness (IOI) and average amount of debt per indebted household (AODL) by using state wise data of latest round of AIDIS (2012-13).
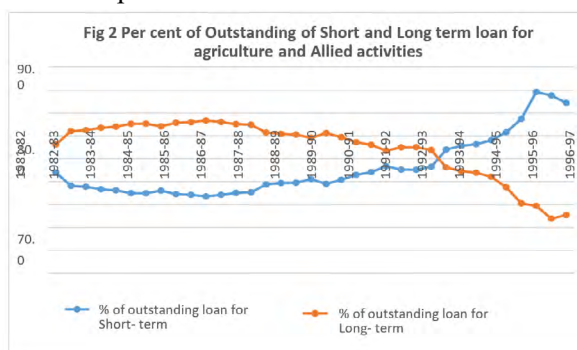
Indebtedness of Agricultural households

Information on the amount of loan outstanding on the date of survey carried out by NSSO was collected from each surveyed agricultural household. Along with this, information on source and nature of the loan was also collected. The information included all kinds of outstanding loans irrespective of the purpose for which loans were taken. Table 2 presents the average amount of outstanding loan per agricultural household by states. About 40 per cent of agricultural households were estimated as indebted and the average amount of outstanding loan per agricultural household was Rs. 74000. Among the states, the southern states, Telangana has the highest per cent of indebted households (83.7), followed by Andhra Pradesh (75.1), Karnataka (59.2) whereas Chattisgarh has the lowest indebted agricultural households (21.1 per cent).

Extent of Institutional Credit

Under the strategy of multi-agency adopted by the government, the credit institutes have provided credit to cultivators and other weak people. The success of agricultural production depends on supply of credit for purchase of inputs such as seeds, fertilisers, irrigation, labour, etc.

The agricultural credit has been classified into three categories (i) Short term (ii) medium term (iii) long term. The short-term loan which is known as crop-loan, is provided for a period of 15 months and is meant for meeting the needs like seed, fertiliser, labour, cattle feed, etc. The cultivator may repay the loan after harvesting of the crop. The medium-term loan is provided for expenses on land improvement, digging of wells, purchase of implements and machinery, farm animals, etc. The period of medium-term loan is from 15 months to five years. The long-term credit is given for activities requiring heavy investment for a period of more than five years. In agriculture, long–term loans are given for sinking well, land levelling, fencing and permanent improvements on land, purchase of machinery, etc. The total loan outstanding has increased from 86.35 billion in 1981-82 to 10998.41 in 2015-16 (Table 5). Figure 2 presents the trend of percentage of outstanding institutional loan of both short term and long term to total outstanding loan. The per cent of long-term outstanding loan to total outstanding loan sharply declined from 56 per cent in 1981- 82 to 25 per cent in 2015-16. Whereas the per cent of short-term outstanding loan has increased from as low as 44 per cent in 1981-82 to 74 per cent in 2015-16.

Sources: RBI Hand Book of Statistics on Indian Economy, 2017-18

Objectives

The objectives of this paper are to assess the following:

(i) incidence of indebtedness (IOI) as well as the extent of indebtedness (EOI) of agricultural households across southern states

(ii) socio-economic characteristics of the states for extent of IOI and EOI across states

(iii) major determinants of incidence and extent of indebtedness of agricultural households.

Methods and Hypotheses

Since the main objective of the study is to assess the trend and determinants of incidence – per cent of households suffering from debt to either institutional or non- institutional agencies, as well as the extent of indebtedness – average amount of debt in rupees per household, data pertaining to incidence as well as extent of indebtedness of agricultural households have been taken from AIDIS-2012-13, NSSO's 70th round. To assess the changes over the decade in respect to incidence of indebtedness and the extent of indebtedness have been taken from the report, Indebtedness of Farmer Households published in NSSO Report No. 498, 59th Round, January-December- 2002-03. It is a well-known fact that the incidence as well as the extent of indebtedness is determined by many socio-economic factors also. These are:

1.2.1 average size of land holding (ASH) X (i)= It is assumed that IOI as well as EOI has negative association with the extent of land owned by the farmers as large farmers will be able to return the loan after harvesting the crops.

1.2.2 per cent of area under non-food crops to gross crop area (NFGA) X(ii) = implies that farmers have to take loan for cultivation of commercial crops in the season. Higher the area under cash crops like cotton, soybean, etc. would mean it is negatively related with IOI and EOI. It is expected that farmers will be able to return the loan after selling the crops.

1.2.3 availability of institutional credit per hectare of net area sown (ICPH) X(iii) = (ICPH-2015-16). It is understood that all farmers are not illegible for institutional loan. Hence, it is expected that the IOI and EOI decreases when the institutional loan disbursement system is stronger in states.

1.2.4 per cent of institutional loan to total outstanding loan (ILTO) X (iv) = It is expected that IOI and EOI have negative association as all farmers are not eligible for institutional credit.

1.2.5 per cent of SC/ST indebted households to total indebted households (SCST) X(v) = This implies that the presence of higher SC/ST population has positive association with IOI as well as EOI, as they have lower ability to return the loan amount.

1.2.6 per cent of rural population below poverty line (RPBPL) X(vi) = per cent of rural population below poverty line has positive association with IOI and EOI due to lower ability to return the loan.

1.2.7 extent of irrigated area to total cropped area (IA) X(vii)= Higher proportion of crop area under irrigation is essential to reduce IOI as well as EOI as the farmers are likely to get better return from cropping intensity and it will help farmers to return the loan amount which they borrowed for purchase of agricultural inputs.

Table 3 presents the measurement unit of these variables.

Determinants of Incidence and Extent of Indebtedness

The factors that determine the incidence of indebtedness and extent of indebtedness are expected to vary across the states because of differences that exist in the development of agriculture and other relevant factors. Based on the above mentioned variables a multiple regression model has been developed to assess the incidence of indebtedness and extent of indebtedness among agricultural

households. The following multiple regression model has been developed to test the hypothesis:

$$IOI/EOI = \alpha + \beta_1 ASH + \beta_2 NFGA + \beta_3 ICPH + \beta_4 ILTO + \beta_5 SCST + \beta_6 RPBPL + \beta_7 IA \text{---------(1)}$$

Major Findings

Two regressions have been estimated separately with two different dependent variables, viz. IOI and EOI. The values of R^2 are 0.74 per cent for IOI and 0.69 per cent for EOI reported in Table 4. The F values are 4.43 and 3.56 for IOI and EOI respectively.

Out of the seven independent variables selected to study the determinants of IOI and EOI, the coefficient of one variable is positive in case IOI. This is exactly as per the hypothesis made. This implies that the presence of higher SCST population has positive association with IOI, as they have lower ability to return the loan amount. This variable positively influences IOI and is significant. All other six variables negatively influence IOI. The coefficient of ASH that is average size of land holding for the year (2015-16) is negatively related to IOI as expected. The negative coefficient of ASH implies that a unit increase in the average size of land holding would reduce IOI to the extent of 5 per cent. This is possible because the production as well as income of the farmers is mostly determined by the size of the land, which ultimately helps farmers to repay the loan. The negative coefficient of NFGA per cent of area under non-food crops implies that higher the area under commercial crops easier it would be for farmers to repay the loan after selling the cash crops. This implies that a unit increase in the area under commercial crops would reduce IOI by about 2 per cent. The negative co-efficient of ICPH and ILTO imply that one per cent increase in institutional loan per hectare of net area sown and per cent of institutional loan to total outstanding loan each would reduce the IOI which is expected. The coefficient of RPBPL- rural population below poverty line has a negative sign which is not expected. This implies that one unit increase in rural population below poverty line will reduce IOI by 1 per cent. This happened because some states like Bihar, Odisha, and Uttar Pradesh have higher rural poverty that influences the co-efficient to turn out to negative. The negative co-efficient of IA implies that increase area under irrigation would reduce IOI which is expected as the farmers are likely to get better return from crops by increasing cropping intensity and it will help farmers to return the loan amount.

The regression equation is separately estimated to find out the determinants of extent of indebtedness by considering same independent variable. The coefficient of the variables like ASH, ICPH and IA are positive and significantly influence extent of Indebtedness. It was expected that the extent of indebtedness would be less as the average size of land holding would be more as the farmers have more income cruised from land. Similarly, institutional credit per hectare of net area sown as well as the extent of irrigated area to total cropped area have positive influences in reducing the extent of indebtedness.

The co-efficient of other variables such as NFGA, ILTO, SCST and RPBPL have negative and significant influence on extent of incidence of indebtedness. However, two negative co-efficients are statistically significant at 0.10 probability level; the greater value of probability is accepted because of the presence of multi collinearity between these variables.

Conclusion

In spite of significant increase in agricultural productivity, production and availability of institutional credit for crops, the problem of incidence of indebtedness has been continuing among agricultura

households. Short-term credit is provided primarily to finance the purchase of agricultural inputs such as seeds, fertilisers and labour. Since 2002-03, the short-term institutional credit has increased many fold. As a consequence the short-term outstanding loan to total outstanding loan increased sharply from 44 per cent in 2002-03 to 74 per cent in 2015-16. This implies that low interest rates charge by institutional sources may have had some influence on the rate of interest charged by non-institutional sources.

The study shows that the incidence of indebtedness ranges from about 21 per cent in Chhattisgarh to 83.7 per cent in Telangana. The incidence of Indebtedness has been found to be higher among agricultural developed states like Punjab, Tamil Nadu, and Karnataka during 2018. About 40 per cent of agricultural households were estimated as indebted and the average amount of outstanding loan per agricultural households was Rs 74000. The average outstanding loan varies across states. The non-institutional credit sources accounted for 89.8 per cent of outstanding debt of agricultural households in 1951, the share has declined to 79%, 68%, 43.8%, 33.7%,

38.9%, 36% and 32.9% respectively in 1961, 1971, 1981, 1991, 2002, 2013 and 2018. The sources of non-institutional credits for both rural and agricultural households are land lord, professional moneylenders, relative and friends, agricultural moneylenders, traders and commission agents.

Table 1 Description of variables used for regression analysis

	Avg . Siz e of lan dho ldin g (20	Area under non- food to net area sow n%"	Avg. credit avail. per ha of net area sown, Rs	% of instit ution al loan to total outstanding	% of SCST agri. househol ds to total agri. househol ds loan outstanding	Rural popul ation below pover ty Rural (2011- 12)	Area under irrigati on of Foodgr ain crop to total crop area
	(2015- 16)	(2015-16)		(2012 -13)	(2012- 13)		(2015- 16)
Andhra Pradesh	0.97	6.4	87584	43.7	28.2	11.0	66.6
Assam	1.09	9.5	57022	72.3	28.0	33.9	10.3
Bihar	0.39	12.6	43218	28.9	13.8	34.1	69.1
Chhattisgarh	1.25	10.6	14332	62.3	44.2	44.6	31.3
Gujarat	1.88	3.1	33212	79.2	17.0	21.5	46.1
Haryana	2.22	12.8	112022	69.4	36.3	11.6	92.0
Jharkhand	1.17	19.1	11460	28.0	26.1	40.8	9.1
Karnataka	1.35	7.2	30364	63.0	16.3	24.5	26.9
Madhya Pradesh	1.57	10.1	27231	60.5	32.5	35.7	58.2
Maharashtra	1.35	5.8	23371	76.5	13.2	24.2	18.6
Odisha	0.95	11.9	35798	37.9	37.7	35.7	29.2
Punjab	3.63	16.0	173291	71.7	23.3	7.7	98.8
Rajasthan	2.73	7.1	31149	43.5	30.7	16.1	32.5
Tamil Nadu	0.75	8.2	180781	63.9	24.4	15.8	56.4
Telangana	1.00	4.4	45517	34.5	30.1	11.0	65.4
Uttar Pradesh	0.73	11.7	19675	61.5	19.4	30.4	78.4
Uttarakhand	0.85	12.6	42739	83.5	25.0	11.6	44.4
West Bengal	0.76	12.2	55867	58.1	31.0	22.5	48.4
All India	1.08	8.7	45272	59.8	25.0	25.7	51.9

Table 2 Incidence of Indebtedness of agricultural households and average outstanding loan per agricultural households

	Incidence of Indebtedness of Agri.households (2018) (%)	Avg. Outstanding loan per Agri. households -2018 (Rs)
Andhra Pradesh	75.1	207000
Assam	22.5	18000
Bihar	33.4	26000
Chhattisgarh	21.1	14000
Gujarat	36.4	66000
Haryana	39.6	159000
Jharkhand	22,4	11000
Karnataka	59.2	110000
Madhya Pradesh	43.7	77000
Maharashtra	45.5	125000
Odisha	46.4	34000
Punjab	51.0	198000
Rajasthan	48.6	125000
Tamil Nadu	49.1	90000
Telangana	83.7	128000
Uttar Pradesh	34.0	48000
Uttarakhand	33.5	71000
West Bengal	26.3	21000
All India	40.3	74000

Table 3 Unit of the selected variables used to understand the determinants of the major reason of IOI and EOI

Variables	Units	"National average"	State average	Standard Deviations
ASH	Hectare	1.08	1.369	0.7840
NFGA	Per cent	8.7	10.08	3.97
ICPH	Rupees	45272	85435	47662
ILTO	Per cent	59.8	57.69	16.97
SCSTH	Per cent	25.0	26.52	8.27
RPBPL	Per cent	24.04	25.7	11.24
GIA	Per cent	51.9	48.98	25.64
EOI	Rupees	47000	53800	40345
IOI	Per cent	51.9	54.1	19.8
GIA	Per cent	51.9	48.98	25.64
EOI	Rupees	47000	53800	40345
IOI	Per cent	51.9	54.1	19.8

**Table 4 Regression Results: Factors Determining Incidence of Indebtedness
and Extent of Indebtedness**

Independents Variables	Dependent Variable (IOI)	Dependent Variable (EOI)
X (i)	-5.059	9655.39
X (ii)	-1.826	-2124.62
X (iii)	-0.00003	0.00087
X (iv)	-0.397	-519.86
X (v)	0.175	-176.29
X (vi)	-1.242	-2301.23
X (vii)	-0.0324	187.86
Constants	131.78	141901.8
R2	0.74	0.69
F-Value	4.43	3.56

Table 5 Direct Institutional Credit for Agriculture and Allied activities (Rs Billion)

	Total Loan out-stand ing (billion)	Short- Term loan outstandin g (billion)	Long-term loan outstandin g (billion)	% of short- term outstandin g to Total	% of long- term outstandin g to Total
1981-82	86.35	37.92	48.43	43.9	56.1
1982-83	96.80	36.85	59.95	38.1	61.9
1983-84	115.24	43.39	71.85	37.7	62.4
1984-85	136.76	50.06	86.70	36.6	63.4
1985-86	162.34	58.58	103.77	36.1	63.9
1986-87	178.81	62.36	116.45	34.9	65.1
1987-88	210.84	73.42	137.42	34.8	65.2
1988-89	238.00	85.61	152.39	36.0	64.0
1989-90	276.87	95.27	181.60	34.4	65.6
1990-91	293.16	100.02	193.13	34.1	65.9
1991-92	311.42	104.19	207.23	33.5	66.5
1992-93	342.63	116.87	225.76	34.1	65.9
1993-94	369.88	129.52	240.37	35.0	65.0
1994-95	407.38	143.61	263.78	35.3	64.7
1995-96	460.20	177.93	282.27	38.7	61.3
1996-97	509.21	200.09	309.11	39.3	60.7
1997-98	545.18	214.69	329.50	39.4	60.4
1998-99	574.08	235.21	338.86	41.0	59.0
1999-00	813.83	316.59	497.24	38.9	61.1
2000-01	916.54	373.02	543.52	40.7	59.3
2001-02	1055.02	452.34	602.68	42.9	57.1
2002-03	1231.29	542.24	689.05	44.0	56.0
2003-04	1512.28	704.54	807.74	46.6	53.4

2004-05	1910.50	862.59	1047.91	45.1	54.9
2005-06	2394.39	1079.88	1314.51	45.1	54.9
2006-07	2859.13	1324.77	1534.36	46.3	53.7
2007-08	3016.78	1625.96	1390.82	53.9	46.1
2008-09	3575.31	1986.23	1589.08	55.6	44.4
2009-10	4215.09	2370.03	1845.06	56.2	43.8
2010-11	4893.25	2835.70	2057.55	58.0	42.0
2011-12	5796.67	3601.27	2195.40	61.4	37.4
2012-13	7048.42	4853.02	2195.40	67.2	30.4
2013-14	7986.41	5826.03	2160.38	79.1	29.3
2014-15	9628.96	7369.39	2259.57	77.5	23.8
2015-16	10998.41	8202.87	2795.54	74.3	25.3

Source: RBI Handbook of Statistics in Indian States, 2017-18.

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Effectiveness of Embedded Strategies on Metacognitive Awareness among Males and Females Students of Higher Secondary Schools in Kerala

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Abstract

The objective of the study is to examine the effectiveness of certain strategies, like cognitive, metacognitive, social, and resource management strategies, that are embedded in the teaching-learning process, on the Metacognitive Awareness of Higher Secondary School Students' of Kerala. The Experimental Method with the Non-Equivalent Two Groups Pre-Test Post-Test Design was found to be appropriate for the study. The primary data was used for the study which comprised 432 Higher Secondary School Students of Kerala of whom 213 were Girls and 219 were Boys. The findings of the study show that Embedded Strategies have a significant effect on both the Gender Groups of the Students. There is no gender difference in the effectiveness of teaching strategy.

Keywords: Metacognitive awareness, Embedded Strategies, Effectiveness, Teaching, Higher Secondary Students

Introduction

Economics as a discipline unravels the correlation between man and society. The objective of teaching and learning is to disseminate the stock of knowledge in the subjects concerned. But the learning imparted through teaching depends on the absorption capacity of the students, pedagogy and the approach used by the teachers. The paper focuses mainly upon the teaching and learning of the subject of Economics in the state of Kerala. Economics is generally treated as the part of social sciences; the subject is quite popular among the students though the learning and teaching of economics is quite different from other subjects of social sciences. The emphasis in teaching is on theory and its applications through diagrams and mathematics wherever necessary. This aspect makes the learning of this subject a bit more difficult than the subjects like language, literature, history, civics and geography etc. the subject also involves heavy doses of deductive logic. The study of Economics must be devised in such a way as to protect the interests of both the learner and the society. Therefore, students of Economics must be assisted to absorb the basic theories of Economics, realize the problems related to the economy, manage them, and contribute to the advancement of society. Effectiveness of learning teaching requires internalization of the theories of economics and the methods of application to the problems of the economy of India. This task becomes difficult because most of the students are not aware of the problems of Indian economy and their intricacies. So it is the responsibility of the teacher to help the metacognitive the learning strategies so that from the higher secondary school level itself the students learn at a deeper level. For this, the study has put forward certain strategies to use as a teaching strategy to make the student learn at a deeper level. The contributions of these strategies to Deep learning have been ascertained by the research of Borkowsk (1987) on Metacognitive and Cognitive Strategy, Johnson et al. (2000) on Social Strategy, Svenson (1977) on Macro Strategy, and Zimmerman (1990) on

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Resource Management Strategy, argues that Deep learners are metacognitive processors, intrinsically motivated, and behaviorally active participants in their own learning, and further suggests that association between motivation, environment, and effort are the most important determinants of deep learning. So in the article researcher tries to use certain strategies such as resource management strategy, cognitive strategy, metacognitive strategy, and social strategy, Macro strategy for making the students learn at a deeper level, so that further they become the makers of the new economy.

Metacognitive Awareness refers to higher-order thinking which involves active control over the cognitive processes involved in learning. These executive processes involve planning, evaluating, monitoring, and problem-solving activities. The Metacognitive Awareness adopted by students greatly influences the quality of their educational outcome which differs from student to student. Teaching methods that integrate Strategies suitable for better Metacognitive Awareness will serve to develop the students' potentialities to the optimum level. Thus, in this study, certain strategies have been embedded to promote the Metacognition of students.

Context of the study

In response to the changes taking place in society today, there is an urgent need for qualitative improvement in education. Students will be able to contribute to society only if they learn at a Metacognitive level. Thus the researcher use those embedded strategies by using certain strategies that enable semantic processing and lead to better retention like the *Cognitive Strategy, the Metacognitive Strategy, the Social Strategy, the Macro Strategy, and the Resource Management Strategy, which were embedded in the instructional process and to show it effectiveness over constructivism which is the theory that says learners construct knowledge rather than just passively take in information.* However, Metacognitive awareness can be promoted if the existing interests or backgrounds of students have a strong disciplinary focus. The higher secondary stage assumes greater significance in view of the fact that after acquiring higher secondary level of education students choose such disciplines for higher education / graduation which are associated with specific occupations. Since Economics in India is the part of social sciences, students can choose occupations / careers in subjects which are the part of social sciences. For example, choices available to students are teaching, management, banking, legal practice and administrative services. Choice of economics at graduate level facilitates students to enter into banking, insurance, finance, management and teaching etc. As such, the students are better placed to exercise a choice, keeping in view their needs, interests, capabilities, and aptitudes, and become reflective whenever possible, which would enable them to cope with the challenges of the world. Experts and researchers in the field of education advocate the employing of psychologically, philosophically and sociologically sound strategies of instruction that promote Metacognitive awareness. In the light of the prevailing conditions in the teaching of Economics in the Higher Secondary Schools of Kerala, the investigator felt the need to conduct such an investigation at the Higher Secondary level. So it was a humble effort on the part of the investigator to use the embedded strategies to promote metacognitive awareness among the higher secondary students

Literature review

Lot of studies have been conducted at NCERT at NIEPA, New Delhi in the field of education technology, pedagogy and use of modern technology in teaching. Main approaches that have been emphasized in the past studies are as follows: prescription of minimum level of learning required for promotion to the next higher class in the schools, learner centric approach to teaching, visual approach based on the assumption that seeing is believing, visits to fairs , exhibitions, farms and

factories etc. The last approach is devised to accentuate and enlarge the capacity of the students to observe, recollect, recount and describe.

Shri Prakash and Ranita Dutta (1996) found that the choice between the place of learning and the place of work by the poor families is guided mainly by the income needs of the family. In another study Shri Prakash (1994) found that most of the out of school children were girls, Muslims, SCs and STs. Similarly, VKRV Rao in a study of 1954 batch of undergraduates of Delhi university found that families belonging to lower and lower middle income groups used their meager resources in imparting graduate education to their sons and withdrew their daughters and sisters from educational system after higher secondary school. Besides, there had been rampant discrimination against the girl child even in the matter of nutrition and food. Despite Kerala being the most literate state of India, certain communities and sections of society are not away from such discrimination against the girl child. In view of this, ability of learning and absorption of knowledge by the girls may be adversely affected. So, the author has examined the gender related aspect of learning by the girls. **Anderson (2004)** in his study finds out that, developing Metacognitive awareness will lead to the development of stronger cognitive skills, and proposed five main components for Metacognition. While **James (2001)** examined the relationship between mastery goals, performance goals, Metacognition, and academic success. Regression analyses revealed a partial mediation effect in the relationship between mastery goals and academic performance. Further, **Lin (2001)** in a study on Metacognition investigates two main approaches, which promote Metacognition: Strategy training, and the creation of a supportive social environment for Metacognition. **Harrison (1991)** investigated three basic types of awareness, related to metacognitive knowledge which affects the students learning. First is knowledge possessed and awareness of ignorance, second is capacity to think and third is awareness of existing strategies which describes an understanding of approaches to directed learning. **Borkowsk,(1991)** in his research on metacognition investigates that Self-regulated Learning plays a major role in understanding classroom learning processes and facilitating the intellectual development of the child. It has been found that the students learn a lot from discussion with each other. Thus from the above literature, the investigator gathered extensive information on metacognition and its role in making the student's learning disciplines.

Hypotheses formulated for the study

It is hypothesized that the Metacognitive Awareness of Higher Secondary School Students will improve significantly if they are taught using certain embedded strategies as compared to those students taught using the strategies based on constructivism based on gender.

Objectives of the study

The objectives of the study are to compare the effectiveness of teaching through embedded strategies of teaching and strategies of teaching based on constructivism in improving the metacognitive awareness of Higher Secondary School Students based on Gender. A related aspect is the evaluation of the differential effect on learning from the different teaching strategies with regard to gender differences. The basic objective of learning teaching is mainly to bring out the latent and potent abilities of the learners to the fore. The comparison between above two strategies is designed to bring out differences in effectiveness, if any with regard to the learning absorbed by the male and female students.

Model and Methodology

• The Experimental Method with the Non-Equivalent Two Groups Pre-Test Post-Test Design was

found to be appropriate for the study.

• The sample comprised of 432 Higher Secondary School Students of Kerala of whom 213 were Girls and 219 were Boys. Schools have been clustered in complexes on the basis of space; a stratified systematic sampling procedure has been used to select the boys and girls in proportion to their respective shares in the total population of the secondary students.

• Independent variables It is under the direct control of the experimenter, who may vary it in any way desired. The independent variables used in the present study are

o   Embedded Strategies of Instruction
o   Constructivist Strategies of Instruction

•   The dependent variables used for the present study is:
o   Metacognitive Awareness

•   The extraneous variables in this study is
o   Gender

• A Metacognitive Awareness Inventory (prepared and standardized by the investigators) was used for gathering data. It was administered initially to the experimental and control groups and the scores obtained were taken as the pre-Test.

• The investigator used the Metacognitive Awareness Inventory, prepared and standardized by Shraw and Dennison (1994) to assess the Metacognitive Awareness of Higher Secondary School Students. The Inventory consists of the 52 items. It is long and comprehensive and assesses various facets of Metacognition, such as monitoring, planning, comprehension, debugging, information management, regulation of cognition, and evaluation

• The Metacognitive Awareness Inventory comprises of statement type items, the responses of which are to be marked on a seven-point scale. The responses and the scores assigned to each response are as follows 1 Not at all true of me 2 Disagree 3 Undecided 4 Sometimes true of me 5 less true of me 6 True of me 7 Very true of me

• Lesson transcripts for teaching with embedded strategies were used for instructional purpose with the experimental group, while lesson transcripts for teaching with strategies based on constructivism were employed for instruction with the control group.

• The inventory on metacognitive awareness was again administered on both experimental and control groups and the scores obtained were taken as the Post-Test.

• The data thus collected were tabulated and analysed using statistical techniques like arithmetic mean, standard deviation, test of significance (t-test), tests of variance, viz. analysis of Variance (ANOVA) and analysis of covariance (ANCOVA).

Data analysis

The effectiveness of Certain Embedded Strategies on the improvement of Metacognitive Awareness among Higher Secondary School Boys in their Pre- and Post-Test scores both in the Experimental and Control groups were compared. A similar comparison was made among Higher Secondary School Girls. The difference between the Mean Gain scores was tested for significance. The Gain Performance and the Genuineness of the difference in Metacognitive Awareness were estimated.

1. The data and the results of the test of significance are consolidated and given in Table 1.

Table 1: Data and the Results of Test of Significance of the Difference between the Mean Gain Scores both of Boys and of Girls in Experimental and Control groups with regard to Metacognitive Awareness

Gender Groups	Groups	N	M	SD	t- value	p
Boys	Experimental	107	13.0	8.9	11.93	p < 0.01
	Control	106	1.0	5. 3		
Girls	Experimental	106	13.1	8.4	13.37	p < 0.01
	Control	113	-0.8	6.9		
Results	t- value for Boys is significant at 0.01 level					
	t- value for Girls is significant at 0.01 level					

Table 1 shows that the obtained values of Critical Ratio for Boys (t = 11.32, p < 0.01) and for Girls (t = 8.44, p < 0.01) are significant at 0.01 level. Therefore, it can be inferred that there is a significant difference between the Mean Gain scores of Boys in the Experimental and Control groups. Similarly, there is a significant difference between the Mean Gain scores of Girls in the Experimental and Control groups. The figures in the above table show that the Mean Gain scores of Boys in the Experimental group (M = 60.6) is greater than that of the Control group (M = 11.7). This means that employing the Embedded Strategies for instruction is Analysis and Interpretation of Data 207 superior to the Strategies based on Constructivism for the Male groups of students. Similarly, the Mean Gain scores of Girls in the Experimental group (M = 63.1) is greater than that of the Control group (M = 17.4), which indicates that employing the Embedded Strategies for instruction is superior to the Strategies based on Constructivism for the Female gender group too.

Table 2: Consolidated Results of Analysis of Covariance (ANOVA) of Pre- and Post- Test scores of Metacognitive Awareness in Experimental and Control groups

	Source of variation	df	SS_x	SS_y	MS_x	MS_y
Boys	Among Means	1	104.5	134879.9	104.5	134879.9
	Within Groups	211	597682.2	720430.8	2832.6	3414.3
	Total	212	597786.8	855310.8		
Girls	Source of variation	df	SS_x	SS_y	MS_x	MS_y
	Among Means	1	4272.8	162437.6	4272.8	162437.6
	Within Groups	217	678075.2	962597.0	3124.7	4435.93
	Total	218	682348.1	1125034.6		

The F ratios for the two sets of scores were tested for significance. The FX value is 0.04, which is less than the table values, viz. 6.75 at 0.01 level and 3.88 at 0.05 level. Hence the obtained value of FX is not significant at 0.05 level. This indicates that there is no significant difference between the Pre-Test scores of Boys in the Experimental and Control groups. The obtained FY value is 39.50, which is greater than the table value for df 1, 211 and it is significant at 0.01 level. The significant FY value indicates that the two groups of Boys differ significantly in their Post-Test scores in Metacognitive Awareness.

From Table F, for df 1, 217, F at 0.05 level = 3.88 and F at 0.01 level = 6.75 The F ratios for the two sets of scores were tested for significance. The FX value is 1.36, which is less than the table values, viz. 6.75 at 0.01 level and 3.88 at 0.05 level. Hence the obtained value of FX is not significant. This indicates that there is no significant difference between the Pre-Test scores of Girls in the Experimental and Control groups. The obtained FY value is 36.65, which is greater than the table value for df 1, 217 and it is significant at 0.01 level. The significant FY value indicates that the two groups of Girls differ significantly in their Post-Test scores in Metacognitive Awareness.

2. The Consolidated results of Analysis of Covariance (ANCOVA) with regard to Metacognitive Awareness of Higher Secondary School Students in the Experimental and Control groups are presented in Table 3.

Table 3: Consolidated Results of Analysis of Covariance (ANCOVA) of Pre- and Post- Test scores of Metacognitive Awareness in Experimental and Control groups

Samples		Source of Variation	SS_X	SS_Y	SS_{XY}	SS_{YX}	MS_{YX}	SD_{YX}	F_{YX}	p
sub sam-ples	**Boys**	Among Means	12.4	7052.6	7547.6	13857.9	13857.9	3.71	269.8	*p < 0.01
		Within Groups	20037.5	24642.8	10784.8	10784.8	51.36			
Gen-der	**Girls**	Among Means	164.8	13478.2	11116.8	15646.0	15646.0	7.44	281.9	*p < 0.01

From the above data it may be inferred that the students who learned using Certain Embedded Strategies have better Metacognitive Awareness than those who studied using the Strategies based on Constructivism. In other words, the Embedded Strategies of teaching are more effective than the Strategies based on Constructivism in improving Metacognitive Awareness among Higher Secondary School Students.

3. The Consolidated results of Adjusted Means with regard to Metacognitive Awareness of Higher Secondary School Students in the Experimental and Control groups are presented in Table 4.

Table 4: Consolidated Results of Analysis of Adjusted Means of Post-Test scores of Metacognitive Awareness in Experimental and Control groups

Groups		Groups	N	M_Y	M_Y	Adjusted Mean	t- value	p
Gender	**Boys**	Experimen-tal	107	53.07	66.09	66.29	23.35	*P < 0.01
		Control	106	53.56	54.58	54.38		
	Girls	Experimen-tal	106	48.74	61.84	61.14	14.22	*P < 0.01
		Control	113	47.00	46.14	46.84		

From the above Table, it can be seen that the F-ratio for the Gender groups of Higher Secondary School Students (viz. Boys as well as Girls) are significant at 0.01 level. This points to the fact that the Embedded Strategies employed for instruction are highly effective in improving Metacognitive Awareness of Higher Secondary School Students as compared to Strategies based on Constructivism.

Conclusion and findings

The selected Embedded Strategies are more effective than the Strategies based on Constructivism in improving the Metacognitive Awareness of Higher Secondary School Students based on Gender. The Metacognitive Awareness of Higher Secondary School Students taught using Certain Embedded Strategies will improve significantly as compared to those students taught using the Strategies based on Constructivism for gender group.

• The results of the study show that the Metacognitive Awareness of Higher Secondary School Students taught using Certain Embedded Strategies has improved significantly as compared to those students taught using the Strategies based on Constructivism for well as the Male and Female sub-samples.

• Student learning has involved both acquiring high-level knowledge and knowing how that knowledge becomes usable in fundamental issues.

• Thereby, there will be an increase in the efficiency and confidence with which the learner approaches a learning task as well as in his ability to develop a product, retain information, or perform a skill.

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Research Note

Use of t – Statistics for Evaluating Whether Distribution of a Variable is Normal

Prof. Shri Prakash[1] , Dr. Sonia Anand Dhir[2] & Dr. Rebecca Donald[3]

Abstract

Inferential Statistics is mostly based on the assumption that the distribution of the variable(s) is normal. There are two important methods of testing whether a distribution of a variable is normal: First Chi square test which requires the transformation of the given set of variables into normal deviates and secondly Chi square test is applied to the pair of the observe distribution of the variable and the normal deviates. The more powerful Jack Bara test of normality which is mostly applied to Econometric modelling of Time Series. This paper evolves an innovative view of t – statistics for evaluating normalcy of the given distribution. This is less expensive, simpler and less costly, especially in case of very large samples, then the other two tests.

Introduction

The science of statistics may broadly be classified into two branches: Descriptive Statistics which comprises measures of central tendency, Variance, Co-Variance and third and fourth movements which are required for estimation of the co efficient of Kurtosis and Skewness besides it also deals with the analysis of Variance and Co-Variance, Extrapolation and Interpolation. All these measures are distribution free.

Inferential Statistics is basically based on theory of probability and diagnostic test of significance of parameters is based on the assumption that the distribution is normal. Naturally inferential statistics comprises mainly the analysis of following distributions also: Normal, Binomial and Poisson distribution. As the sample size increases Binomial and Poisson distributions converts towards normal distribution ala central limit theorem.

Till 1980s, time series data used to be massaged before the application of econometric models. Time series comprises four components: seasonal, cyclical fluctuations, trend and random errors. The technique of moving averages use to be employed for decomposing time series into its components, so that data were readied for application of econometric models to determine trend and residuals of the series comprising only trend and residuals. However rapid developments in 1980s changed the scenario totally. Y.A .Yule (1927) in a research paper published in the journal of royal society of statistics showed that time series may or may not be stationary. In case of non-stationary time series regression and correlation coefficient will be pseudo rather than genuine. So random work model was developed for testing staionarity of the given time series. A stationary time series have constant mean, constant variance and estimation of covariance is not affected by the time at which it is calculated besides it is assumed that each observation of the time series is an average of all the probable values that the variable can assumes at the given point of time and this average is invariant over time. This may be explained as follows:

Let X^i_t be the ith value of the variable X which may occur with the probability P^i_t where P is probability. Therefore, this may be explained as follows:

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X^{it}: X^{1t} X^{2t} X^{3t}.. X^{it}.. X^{nt}

P^{it} : P^{1t}, P^{2t} P^{3t}.. P^{it}.. P^{nt}

Thus, the expected value of X^{it}: $= P^{1t} X^{1t} + P^{2t} X^{2t} + \ldots + P^{it} X^{it}.. + .. + P^{nt} X^{nt}$ and besides E, X^{it} does not vary from t = 1, 2..,T

Besides the above joint hypothesis, testing by means of Q and Q* test were also developed. Error correction model, determination of the length of the lag, Jarque Berra test of normalcy and direction of casualty for two variable case were also evolved. E-view is very powerful software for this type of Econometric modelling of time series data. Obviously application of such econometric models is more time consuming and relatively costly.

This Research note is exclusively focused on testing normalcy of the given distribution. The procedure is very simple. It is explained hereunder:

Either we directly calculate the mean, median and variance and the standard error of the mean of the given set of values directly or we can use excel software to calculate comprehensive summary statistics which is quicker to do and less knowledge intensive. Summary statistics comprises following by values: Mean, standard error of the mean, median, mode, standard deviation, variance, coefficients of skewness and kurtosis, range minimum and maximum values and the number of observation. Most of these parameters reflect the nature of the distribution of the given variable.

An important characteristic of the normal distribution is that the mean, median and mode all coincide at the top and the middle of the curve. Besides σ+μ and σ+2μ, σ+3μ, practically exhaust all the values of the distribution. So confidence interval at 1% or 5%, probability levels may easily be calculated. If the significance is tested at 5% probability level, it furnishes 95% confidence interval which means that if 100 repetitive samples are taken from the same or similar population, the results obtained will be similar closely if not identical to the values furnished by the given distributions.

If the coefficient of kurtosis is found to be statistically significant, it implies that large number of values will be concentrated in or around the narrow area of the mode of the distribution. If the coefficient is statistically significant, it implies that the distribution will be highly concentrated on the left side (-ve) or the right side (+ve) of the curve. In above cases the distribution is normally diverged from normalcy. However these are weak test which may be indicated of the direction of the distribution. t - Statistics furnishes more powerful test of the nature of the distribution.

To start with, it is assumed that given distribution is normal. This is treated as null hypothesis. The absolute difference between the values of the mean and median of this distribution on the assumption of normalcy is expected to be zero. This is evaluated as follows:

$$t = \{(\text{mean} - \text{median}/S\} * \sqrt{n}-2$$

If the calculated value of t is greater than 1.95, then the difference of mean and median is statistically significant and the null hypothesis that the distribution is not normal is rejected on available evidence. This inference will generally be supported by the significance values of the coefficient of Kurtosis and skewness. So it may be concluded that the given distribution diverges from normalcy.

Chi Square Test for normality

Null Hypothesis : The distribution is not normal

Step 1: Calculate the normal deviate

Normal Deviate = (Actual Observed value – Mean) / Standard Deviation

Step 2: Subtract actual observed value from the normal deviate

Normal Deviate – Actual Observed Value

Step 3: Sqaure the above obtained value and then divide the result by the normal deviate

(Normal Deviate – Actual Observed Value)2 / Normal Deviate

Step 4 : calculate Chi Square by taking the sum of the above

Chi2 = $\sum$ (Normal Deviate – Actual Observed Value)2 / Normal Deviate

Degrees of freedom = n-2

Compare the calculated value of Chi2 with the table value of Chi2

If the calculated value is greater than the table value, Chi2 is significant hence reject he null hypothesis that is the distribution is not normal.

Alternative method: use of t statistics for determination of normalcy of dataset

Step 1 : calculate the absolute difference of mean and median of the given dataset

I mean - median I

Step 2 : divide the above with standard error of the mean of the dataset

(I mean - median I)/standard error of mean

Step 3 : Multiply the above with √(n-2)

t = (I mean - median I)/ standard error of mean   * √(n-2)

if the calculated t is greater than the table value of t then the difference of mean and median is statistically significant. So the null hypothesis is rejected. Hence the distribution is normal.

Jarque Berra Test

The Jarque-Berra test determines the normalcy of skewness and kurtosis of the sample data. The test statistic of the Jarque-Berra test is always a positive number and if it's far from zero, it indicates that the sample data do not have a normal distribution.

JB statistic = n/6 * (S2 + ¼ (K-3)2

The following practical example will illustrate the above:

Fitting normal distribution to given dataset

Time series of Asia's total inward FDI from year 2000-20 (source : UNCTAD) has been taken for application of Chi Square test, t test for normality and Jarque Berra test.

Summary statistics	FDI Inward
Mean	382527.45
Standard Error	34500.72
Median	437925.81
Standard Deviation	158102.16
Kurtosis	-1.18
Skewness	-0.55

Count	21.00
t value	-4.14
Chi 2	5.6 E+12
Jarque Berra	16.29

Source: own calculations

All three values of the test statistic show that the distribution is normal. On this evidence the null hypothesis is conclusively rejected. More importantly inference drawn from innovative t-test is confirmed by the results of other two tests. Obviously t – test is simpler, less time consuming and less costly than either of the two other tests.

It may therefore be concluded that the research note has contributed significantly to the existing stock of knowledge of research methodology.

The above is an illustrative exercise therefore, it is suggested that the researchers should subject this innovation in research methodology to different datasets so that the validity remains beyond question.

Book Review
India's Export Growth and Sustainability – A Macroeconomic Approach

The book comprises following two chapters : Chapter 1 Export Led Growth Strategy: Retrospect and Prospect – it discusses the alternative development strategies for India with special reference to export led growth. The chapter includes brief review of ten studies. It also examines the technical feasibility for exploring future prospects of this growth strategy for India. The chapter highlights item wise total reserves of mining products which constitute the major propellers of exports from India. It also examines the annual rate of extraction of major export mining products of India. Then it focuses on the accelerated rate of growth of export of such products from India and concludes that export led growth strategy is neither technically feasible nor economically viable unless the export basket is highly diversified by inclusion of industrial and agricultural products alongwith services as major items of export growth.

Chapter 2 - Effect of Opening-Up of Indian Economy on Indo-Southern African Trade, focuses on the past growth and current status of Indo- Southern African trade. The chapter discusses country wide India's trade with Southern Africa. The chapter starts with the evaluation of relative shares of individual members of southern Africa in India's total trade with this group. The following rank orders of relative shares of these member countries in trade with India -1.Mozambique 2. Zimbabwe 3. South Africa 4.Zambia 5. Angola.
The chapter highlights immense potential for future growth with each of these countries of southern Africa. The paper highlights that exports of cars, automobile parts, pharmaceutical products and some simple manufactures may hold the key for future growth of India's trade with these countries. Export of education, health and IT enables services may also play an important role in this process of growth.

The book will be of special interest to researchers, corporate houses especially such industries and entities which are actively engaged in export import trade of India. The book may be useful also for teachers with specialization in international trade. The book may be helpful in focusing on changing commodity composition and changing directions of India's traditional lines of international trade. This aspect constitutes an important part of the syllabi relating to international trade of India.

Dr Chitra Bhatia Arora, Paris

Research News

Prof Sonia Anand Dhir[1]

PGDM _ IB Department of JIMS Rohini successfully organized National Conclave on Resilient Trade Policy – A Path to Sustainable Growth on Saturday, 2nd April'22 in an online mode. The event was held in association with Indian Economic Association.

The event comprised of the Inaugural session followed by Panel Discussion 01 and 02. Dr Yukti Ahuja , dean PGDM – IB program inaugurated the session by welcoming the guests and audience for the conclave. Her address was followed by the address of Prof (Dr) Pooja Jain, director JIMS Rohini.

Prof (Dr) JK Goyal, Advisor JIMS Rohini gave the opening note for the session focusing on the theme Trade policy vis a vis Atmanirbhar Bharat, thus kickstarting the day.   The key note speaker for the inaugural session was Prof (Dr) Shri Prakash, member Indian Economic Association, member task force Planning Commission and recipient of Atal Bihari Vajpayee Award, Kautilya Award and JK Mehta Award for his contribution to the field of Economics. He shared his ideas on the path to be adopted by India for sustaining its trade growth in the wake of ongoing Russia Ukraine crisis. The chief guest, Shri Gajendra Pratap Singh, senior member Assocham and sr. VP and Group Head- Corporate and Regulatory Affairs JSW enumerated his viewpoint on the current scenario of India's trade with respect to the free trade agreements it shares with other countries of the world. He also focused upon the steel sector of the economy explaining it's role and prospects in the export basket of the country.

Inaugural session was followed by Panel Discussion 01 on the theme Indian Trade Policy and it's benefits to India Inc. The following speakers deliberated on the theme : Mr Pranav Kumar, Chief International trade Policy CII, Ms Garima Jain, Deputy CEO, Head of Grains - Louis Dreyfus Company India, Mr Nitin Gupta, VP-Olam Agri and Mr Rajeev . The speakers shared their experience giving their viewpoints with respect to the current scenario of their respective sectors and contribution to the export basket of the country and also on how the trade policy is affecting their business and the direction it should take in future so that it becomes more beneficial to the Indian Inc. the session ended with the question answer round from the audience.

Panel discussion 01 was followed by panel Discussion 02 on the theme Indian Trade Policy – Current and Future Perspectives. Prominent members of the Indian Economic Association deliberated on the theme as panelists of the session. These included speakers like Prof (Dr) Man Mohan Krishna, Former Prof and Head Economics Dept, Allahabad University, Prof (Dr) Indu Varshney, Principal SRDA Girls College Hathras and Prof (Dr) Mohmd. Shamim, Aligarh Muslim University. The sessions started with the address of Dr DK Asthana Secretary general IEA who introduced the IEA to the audience enumerating upon the vision, mission and functions of the association. Prof (Dr) AP Pandey, VP Indian Economic Association was the Guest of Honour for the session and gave his viewpoints on the trade policy of India and its future direction. The session was followed by question answer round from the audience.

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Main points of discussion of the conclave :

- India must absorb benefits from Russia's offering as much as possible in lieu of the on-going war between Russia and Ukraine
- Imports are as important as exports for an economy. There should be balanced mix between the two while adopting policy for bilateral trade
- India should focus on export sectors in line with its factor endowment as well as cost advantage
- Trade creation should be the focus of Indian policy makers driving the direction and composition of its trade
- Leading sectors of export production should be multiplied
- Diversification of export basket required.
- Focus on agri sector of the economy required to reduce dependence on traditional partners to fulfil domestic demand and build brand equity of high quality agri products in foreign markets
- Indian policy makers should take initiatives like establishing Rouble Rupee trade route to reduce dependency on dollar and make the best of situation due to Russia Ukraine war
- Focusing on sectors like steel and devising beneficial policies in light of geopolitical situation in the world (Russia Ukraine War) impacting commodity prices, sanctions imposed on exporting countries of such commodities
- New FTA to be devised keeping in mind geo political situation, domestic competitiveness , macroeconomic events and demands of trading partners
- Negotiations and closure of FTA governed by timelines and interest at highest level of political circles
- FTA, PTA and MOUs to be signed with newer partners like Korea, Japan, UAE and Australia to be highly beneficial
- Policy makers need to respond to new emerging issues like climate change and digitalization
- Government to focus on promoting foreign investments for establishing strong global value chains, infrastructure development to improve logistics efficiency and promote high technology exports
- Government to come up with consistent duty structure
- Policies adopted to promote trade should be sustainable in the long run

Research News

Dr. Urjaswita Singh1[1]

Summary of budget 2020-23

Financial year 2023 is the first over budget associated with a 25 years perspective plan to move the Indian economy from its current Rs 232($3 trillion)crore to its expected size $5trillion economy in the medium term. However,the method of projection is used in the budget is based on the assumption that short run trend will be replicated in the current fiscal year. Besides, the budget statement confuse the rate of recovery with the mixture of the rate of recovery and the rate of change. The expected rate of growth in the current year is 8.2%. 10.9 lakh crore investment are expected to materialise, in this regard INR 2.5 lakh can expected to come state/public sector and INR 12.5 lakh crore will address the problem of unemployment, welfare and growth.Further it is said that projected fig.8.2% is over estimated because [1] Considering a 5:1 capital output ratio the expected investment generate only INR 2.5 lakh crores of additional output. [2] On the basis of marginal propensities of investment and consumption INR 0.5 lakh crore of additional investment may materialise from the above additional income while INR 2 lakh crore additional incomes. The budget puts faith in indirect effect of operationalizing backward linkages of the projected investment. However, multiplier work best when the investment expense is deployed in the manufacturing rather then service or agriculture sector and at the same time government expenditure also focused to have positive effect on aggregate demand and GDP albeit with a lag .On the other hand divergence is seen in growth estimates .Afterwards it is said that the survey has used advanced estimate of the central statistics office had not taken into account about the impact of the third wave of pandemic.[3] assuming INR 18000 minimum wages to be paid to labour belongs to construction and 1:1capital labour ratio is involved in the construction of 80 lakh houses .Budgeted amount for these houses is INR 48000 crores and INR 24000 crores will be spend on paying wage of labour. As marginal propensity of consumption of labour is very high,ie 0.9.Thus of the INR 24000 crores approximately INR 22,800 crores will generate demand . Hence, we estimate the output effect of these to be less impactful on output as compared to the budget estimation. . Thus, we expect the economy to grow at 5-6% rather than 8% as per budgetary estimates.

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Guided 40 M.Phil and Ph.D Scholars

Authored 13 books and more than 200 research papers published in India and abroad.

Prof Indu Varshney

Prof Dr Indu Varshney is currently Principal SRDA Girls PG College, Hathras. She has 27 years of Post Graduate teaching and research experience in Economics. She has guided eight Ph.D Scholars, five PDFs and seven Dissertations in Economics She has edited ten books in Economics with ISBN. She has been Managing Editor of SAVASS journal of Social Sciences and also in Editorial Board of upuea Economic Journal. She has successfully organised several National and International Seminars sponsored by UGC, ICSSR , Higher Education,UP Government. She is Treasurer of Indian Economic Association since 2016, Joint Secretary, UP Uttarakhand Economic Association Joint Secretary Bhartiya Arthritik Shodh Sansthan, Prayagraj. She is Executive President of Samajik Arthik Vikas avam Shodh Sansthan. She has been a brilliant scholar in her academic life. She scored more than 70% . She has achieved 9th position in graduation and 1st position in Post- graduation in Agra University

Prof Sonia Anand Dhir

Having work experience of more than a decade, Dr Dhir has a blend of corporate and academic exposure to her credit. Prior to serving academics, she worked in the capacity of Product Owner with a multi-national healthcare concern handling the business operations in the healthcare sector. She was also involved in taking training programs on a wide array of issues for the field staff on a regular basis while she worked with the corporate sector. Being in the field of academics for more than a decade now, she has contributed to the establishment of a rich academic environment in the institutions she has served by way of facilitating learning through modern techniques of teaching, conducting research, organizing and conducting master classes, specialized lectures and workshops. She has been taking managerial development sessions on an array of topics affecting corporate employees working in various capacities. Dr Dhir also holds a rich experience in administration, teaching as well as research. Her area of keen interest in research includes Macroeconomics with a special interest

in International Trade and Econometrics. Some of her prominent research publications include: 'Heckscher Ohlin Theorem and India's Trade' (presented at conference organized by BITS Pilani, 2023), 'Impact of 2007-08 Economic Crisis on SAARC Economies' (presented at OBIS conference, Budapest, 2017), 'Productivity as Base of Economic Growth in SAARC' (presented at the conference by IMERT and MMRT Pune, 2017), 'Inter-relation Between Indo-Southern African Trade' (presented at a conference organized by Dept of African Studies, JNU and Mohan Lal Sukhadia, Udaipur, 2014), 'Empirical Analysis of Inter-relations Between Economic Growth, Trade and Production Structure of the Indian Economy' (presented at IIOA conference, Washington, 2010). Other research works done by her include empirical investigations done with respect to Export Led Growth in India, Digitalisation of Asia, Greenhouse Gas Emission in India, Factor Endowment of Indian Economic Structure, Net Neutrality in Indian Economy, India's Bilateral Trade Flows with Russia and China etc. Dr Dhir holds Ph.D in Management, PGDBA – HRD & Marketing, M.A. in Economics.

Dr Monika Varshney

Dr. Monika Varshney, Assistant Professor & Head, Department of Computer Applications, D. S. College, Aligarh, M.C.A., Ph.D specializes in Decision Support System and Data Mining. She has more than 13 years of teaching experience. He has contributed 14 research papers in reputed National Journals/ Books, published a Patent in Computer Science Field. She has organized, chaired and participated in many National / International Seminars, Webinars, FDP and Entrepreneurship programs. She is Chief In-charge E-Technical Support of Indian Economic Association, Managing Editor Board Member of Journal SAVASS, Academic Counsellor in IGNOU, Joint Secretary in International Goodwill Society of India, Aligarh Chapter, and Founder Member and Senior Technical Consultant in Autocratic Technosoft Pvt. Ltd. and Aura Emanating Teknology Pvt. Ltd., She has good knowledge of different programming languages, Computer Network Security, Data Science, Machine Learning and Data Mining. She has vast experience to architect ERPs for corporate and business.

Mr Ajeet Singh Rauthan

Mr. Ajeet Singh Rauthan is Manager of Office of the Dean (Research), Birla Institute of Management Technology, Greater Noida. He holds M.A. Degree in Economics from Dr. Hari Singh Gaur University, Sagar, known formerly as Sagar University. He has B.Com degree from Delhi University. He has attended many seminars, workshops and training programs. He has contributed two chapters in the book titled "Dynamics of Underdevelopment of Uttar Pradesh" and published a Teaching Case titled "The Reincarnation of Jet Airways" in The Case Centre UK. He helps and assists research scholars at BIMTECH in the use of online data base software.

Brief Profile : Editorial Board Members and Referees

Prof AP Pandey

Prof Pandey is a well-known Indian economist and academician. He is the former vice chancellor of Manipur University. He is also an Independent Director of National Small Industries Corporation. He is awarded with Sikhsha Ratna for his contribution to the area of Academics.

Dr Ghanshyam Singh

President of Indian economic association. He is a well-known personality in the area of Financial Management, Environmental & Labour Economics He is a prolific writer, Known Seminarist and, at his record, more than one hundred fifty research papers, presented and published in National and International Conferences, Journals. Among his nine published Books, Environmental Economics and Structural Changes in India, published by IEA Trust for Research and Development acclaimed by even International Forums. He having held such distinguished positions as Chairman, Sub-Committee on Highly Skilled Worker, Member, National Minimum Wages Advisory Board and many other Bodies of the Govt. of India. In academic Professional Forum, he has distinguished himself to Work as Vice-President, ISLE as also in Editorial Boards of Labour Journal and Indian Economic Journal etc. He is, presently holding the position of Honorary, Executive Director, NIRUS, Mumbai and President of The Indian Economic Association (IEA) and few more positions.

Prof Ajay Kumar Tomar

Dr. Ajay Kumar Tomar, former (Principal D.S. P.G. College, Aligarh), M.A., Ph.D specializes in Indian Economics and Public finance. He has more than 42 years of teaching experience of U.G./P.G. classes and 35 students have obtained Ph.D. Degree and 3 Post Doctoral Fellows under his supervision. He has contributed 44 research papers in reputed National Journals/Books. He has authored four books on economic issues and edited eleven Books. Dr. Tomar had been member of Executive Council of University, member of Academic Council, member of Board Faculty of Arts, member of Board Faculty of Commerce, Convener, Board of Studies and Research Degree Committee of Agra University. He is former Vice-President of Uttar Pradesh Uttarakhand Economic Association.He is also associated with Indian Economic Association as chief conference coordinator. He is EC member of Bhartiya Arthik Shodh Sansthan, Allahabad, Founder President of Samajik Arthik Vikas Avam Shodh Sansthan and General Secretary of UP Economics & Commerce Association. He had been Principal Investigator of Major Research Project of UGC and Project Director of ICSSR Major Research Project. Presently he is Director of Lal Bahadur Shastri Women College, Aligarh.

Dr. Dharmendra Kumar

Dr. Dharmendra Kumar Asthana is a goal oriented, hardworking, sweet tempered and possess a pleasant personality. He is B.Sc.(Bio), M.A.(Economics), B.Ed. He has done Ph.D. in Economics. He is also Certified Associate of Indian Institute of Bankers (CAIIB), Mumbai. He has a very long experience of 35 years in Financial Institutions on different positions like Marketing Coordinator, Official Language Officer and Strategic Planner. He successfully completed his term as Coordinator -Self Finance Courses BBA, BCA ,D. S. (PG) College, Aligarh. Dr. Asthana also worked as Executive Director - Gyan Vocational Institute of Aligarh and presently working as a Faculty of National Smallscale Industries Corporation (NSIC) Aligarh.

Dr. Asthana effectively working as a Secretary General of – Indian Economic Association(IEA), Regional Secretary -International Goodwill Society of India(IGSI). He take actively participation in different social organisations e.g. Bharat Vikas Parishad, Samajik Aarthik Vikash and Shod Sansthan, (SAVASS), Uttar Pradesh Uttarakhand Economic Association (UPUEA), Gyan Dhara Club, Vayaswee Sahyog Mandal etc. He is also part of prestigious international journal "Indian Journal of Economy and Policy".

Dr. Pooja Jain

Pooja Jain is a Professor in the Marketing Area at Jagan Institute of Management Studies Rohini, Delhi. She is presently acting as the Director of the Institute. Her research interests include rural marketing, consumer behaviour, ICT applications in marketing and Sales management. She teaches courses on marketing management, marketing research, Service marketing and Sales and Distribution management. She has over 20 years of teaching and research experience. She is an avid researcher and has published numerous research papers in national and international journals. In addition, she has also developed multiple cases for class room teaching and some of them have been published in journals of repute. She regularly undertakes consultancy assignments and MDPs for companies in the areas of Leadership, consumer research, sales territory analysis and market positioning for brands.

Padam S Bisht

Prof Bisht specialises in the area of Public Finance/Labour Economics. He has been awarded with Bharat Ratna Dr. Abdul Qalam Gold Medal Award for excellence in his respect field in 2018 by Global Economic Progress Research Association, New Delhi, Bharat Shikshya Ratna Award for excellence in his respect field in 2018 by Global Society for Health and Educational Growth, New Delhi, Prof. Y.P.S. Pangtey Award for book publication in 2021 by D.S.B. Campus, Kumaun University, Nainital.

Prof Bisht has to his credit three research projects on the topics: **(**i) Occupational Transition in the Rural Economy of Kumaun funded by U.G.C. 50,000 (ii) "A Study of Fiscal Constraints in the Working of Municipal Boards of Kumaun and Proposal for a Better Resource Mobilization" , (iii) "Survey of Unorganized labour in Uttaranchal State. Prof bisht has the following books : (i) Tourism & Development in Himalaya , (ii) Current Economic Issues and Policies , (iii) Economy of Uttaranchal : Profile and Dynamics of Change, (iv) Uttarakhand ki Arthvyavastha, (v) Arthshastra Mein Ganitiya Aivm Sankhikiya Vidhiyan, (vi) COVID-19: Impact, Opportunities and Challenges in Uttarakhand, (vii) Small and Marginal Farmers Challenges and Prospects in Kumaon Region. Prof Bisht is a profound researcher with more than fifty national and international publications to his credit.

Dr. Manmohan Krishna

Prof Manmohan Krishna is affiliated to Department of Economics, Allahabad university, where he is currently working as Honorary Chair Professor of NITI Ayog Chair, in Department of Economics University of Allahabad. Dr. Manmohan Krishna has authored and co-authored several national and international publications and also working as a reviewer for reputed professional journals. Dr. Manmohan Krishna is having an active association with different societies and academies around the world. Dr. Manmohan Krishna made his mark in the scientific community with the contributions and widely recognition from honourable subject experts around the world. Dr. Manmohan Krishna has received several awards for the contributions to the Social Sciences. Manmohan Krishna major research interest involves Economics. Prof. Krishna has specialisation in International trade, Financial Economics and Advanced Micro Economics. Prof. Krishna has supervised various research scholars for their Ph.d in various areas of Economics.

Prof Neelam Dhall

Dr. Neelam Dhall is currently a Professor and Dean (Research & Development) at JIMS Rohini. She is an academician, researcher, consultant, and trainer with more than 25 years of experience in the field of HRM. She holds a Ph.D. in Management from G.G.S.I.P. University; a Masters in Psychology from Delhi University; an MBA (HR) from G.J. University and a PG Diploma in IR&PM from S.P. College of Communication & Management, Mumbai. After a brief stint in Corporate Training, she has been actively engaged in academics for the past 23 years. Her research papers have been extensively published & cited in reputed refereed journals. Moreover, she has been regularly reviewing research papers for journals like Operations Research Perspectives by Elsevier; Production, Planning, and Control by Taylor & Francis; European Journal of Training and Development by Emerald, to name a few. She has onducted several training

programs on self-development, emotional intelligence, workplace relationships, leadership development, and change management for various public and private sector companies. Also, she is empaneled as a Corporate Trainer with Tata Power and Delhi Productivity Council. With an academic experience spanning more than two decades, she continues to strengthen the research-driven culture at JIMS, Rohini.

Prof. Yukti Ahuja

Dr. Yukti Ahuja is an Associate Professor at Jagan Institute of Management Studies,Rohini. She has over fifteen years of experience spanning marketing, academic research, teaching and consulting. She is a graduate in English literature from Jesus and Mary College, Delhi University and a post graduate in Business administration from university campus, Guru Gobind Singh Indraprastha University, Delhi. In her corporate endeavour, she has worked with brands like Hindustan Times and Ray-Ban and has completed several industry projects. . She is a keen researcher and has attended and presented papers across prestigious institutions like IITs, IIMs at their national/ international conferences. She has to her credit research work which has been published in national and international journals of repute. Her work revolves around contemporary practices in marketing, the latest one being Influencer marketing and social media impact on consumer decision-making. She has been conducting training programs for executives in the field of marketing, consumer behaviour, market research and leadership. These trainings have been conducted for Power grid, NTPC, Punjab and Sind Bank, NIBSCOM, Delhi Fire Station etc.

Dr. Kesana Srinivasa Rao

Dr Rao is M.A. in Applied Economics (II nd Rank), Post Graduate Diploma in Applied Statistics (Ist Rank), Andhra University and was awarded Ph.D. in Applied Economics on the thesis "Rural Non-Farm Employment and Residual sector Hypothesis" by Andhra University. Rural Development, Skill Development and Human Development are my specialized areas. Presently, Dr Rao is working as Associate Professor, Giri Institute of Development Studies, (ICSSR Institute), Lucknow, Uttar Pradesh. Earlier he was Joint Director, Institute of Applied Manpower Research, Delhi. So far, he has taught 130 countries to the Junior, middle and senior level civil servants in the area of Human Resource Planning and Development and trained Young Professionals for CAPART, Ministry of Rural Development also. He is a Ph.D. Examiner for Osmania University, Dept. of Economics, since 2002, and Nagarjuna University since 2003. Prof Rao has supervised 65 Master's degree and Advanced Diploma Courses of International participants for the partial fulfillment of their courses. Prof. Rao has a rich research experience of 30 years.

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