THE INDIAN AGRARIAN SET-UP—A STUDY IN PARADOX[1]

Methodologically, Indian Economics has yet to develop its own body of tools and concepts which may be used successfully in building up an analytical framework capable of interelating the crucial variables of the system and thereby explain and predict its mode of operation.

Drawing upon the recent development in econometrics in the West, most of the attempts at statistical model-building have come up against the exigency of having to use dubious and inadequate statistics on the one hand, and inept analytical concepts on the other.

While problems of stability of the parameters involved in the process of estimation, knowledge of the distributions underlying the estimates, availability of a sufficiently large number of observations etc. have bedevilled the statistical procedure, the problem of inept concepts and definitions underlying both the statistics and the analytical devices has tended to reduce much of the meaningfulness of whatever models have been set up.

To mention instances of such statistical and analytical barriers, one may refer to the very disturbing findings of Dr. Daniel Thorner[2] regarding the longest and most important global statistical series in India, namely the labour force statistics thrown up by the Decennial Census. Apart from the factor of administrative vagary, the reasons for the debacle of the Indian Census Dr. Thorner located in the uncritical application of neo-classical concepts, particularly the concept of factor of production to the altogether different context of household enterprise obtaining in India. In pursuance of this, the current census is operating on the basis of the household as the unit of investigation, rather than the individual.

The problem of hammering out a new set of concepts and inter-relationships to explain the behaviour of the economic system was

[1] This paper has been presented before the Second Econometric Conference, June 1961.

[2] Comparability of Census Returns—Daniel & Alice Thorner. Paper read at the First Indian Conference on Research in National Income,

highlighted in the analytical approach adopted in Dr. Datta's "*Economics of Industrialisation*", wherein the usual employment—output—income approach of modern western economics was decomposed into a structural analysis of employment, a price-income analysis of fluctuations and an inflation-oriented analysis of investment and output. The analysis resolved itself into a paradox of the relative inelasticity of investment and output in the face of a large quantum of structural under-employment and a highly sensitive price-income nexus coupled with a degree of foreign-trade sensitivity altogether out of proportion to the very low share of foreign trade in national income.

Two other notable paradoxes revealed are: the finding of Dr. Kalecki that the so-called 'Market Problem' often coincides with or is just at one remove from an inflationary situation—which phenonmenon Dr. Kalecki attributed to the peculiar characteristics of the mechanism of distribution of income in underdeveloped countries; and the recent finding of Dr. Hoselitz read before the California Seminar on Urbanisation in India, namely, that the degree of urbanisation achieved in India is not matched by the degree of industrialisation and economic development, contrary to all historical evidence exhibited by advanced countries in corresponding stages. This finding, incidentally, contradicts the conclusions of the global regression analysis of Kingsley Davis*

While these are instances of the set of paradoxes one comes up against while analysing the Indian economy as a whole with usual concepts, at the macro-economic level, so to speak, instances of such paradoxes on the micro-economic plane are not lacking too. For example George Rosen came up against the highly significant paradox in India's manufacturing industry, of the capital output ratio varying inversely instead of directly with the size of the firm, which stands in flat contradiction to the behaviour of this ratio elsewhere. There is also the other example of the degree of concentration in manufacturing industries varying inversely instead of directly with the size of industry†, which

* Article by Kingsley Davis in *Economic Growth*, Brazil, India, Japan edited by Prof. Simon Kuznets.

† Article in *Journal of Industrial Economics*, Vol. VI by Visanadhan. The method of this article is not quite rigorous in as much as the measure of concentration chosen is not based on the entire distribution.

is just the reverse of what one would expect, viz., concentration should be concomitant with maturity rather than infancy of an industry.

The purpose of the present article is to add to this rather challenging list of paradoxes, another paradox relating to the agrarian set-up in India in terms of statistical hypotheses grafted on to a statistical procedure that avoids all assumptions and requirements underlying parametric methods of estimation and testing of hypotheses. The hope of the author is that accumulation of meaningful paradoxes may be conducive to the formulation of a total conceptual frame for the Indian economy.

II

The Paradox and the Indicators

The paradox may be stated as follows : that progress of structural preconditions of development has not been accompanied by a corresponding fruition of the technical potential in the agrarian set-up.

By structural preconditions of development is meant the usual long-term variables of the classical model of economic development relating to agriculture in particular and the system as a whole in general as obtaining in the following indicators :

(1) The degree of development of the wage system of payment as the price of labour *a la* Adam Smith and Ricardo, represented by the proportion of agricultural labour households to all rural households.

(2) The degree of shift of labour force from agriculture—*i.e.*, primary processing—to other sectors, which, Adam Smith held, contrary to the Physiocrats, to be an essential pre-condition of increasing opulence and productivity,—represented by the proportion of population not dependent on agriculture.

(3) The degree of independence from rentiers—an obvious supposition of classical economics, as the necessary pre-requisite to the unfettered utilisation of the original and indestructible powers of the soil represented by : (a) the proportion of operated area under rural households not

taken on lease and (*b*) the proportion of leased area leased-in by rural households from rural households *i.e.* not from absentee owners, denoting the degree of independence of tenants from absentee owners.

(4) The degree of scarcity of available land in relation to labour, a condition precedent for the emergence of wage-labour as the necessary fringe of underemployed peasants, like the cotters of England—a condition for a perfectly elastic labour market at the subsistence wage—represented by the percentage of households operating less than 1 acre of land.

(5) The degree of commercialisation, and hence monetisation of agriculture, a necessary condition for the extension of the secondary sector and integration of the market. Incidentally, this is alleged to be not only a necessary but a sufficient condition for the capitalisation of the economy by Pirenne, Sombart and the Historical School—represented by the per cent of cultivated area under cash crops.

(6) Next follow two other indicators, reflecting the unevenness in the distribution of property and the state of the labour market : (*a*) concentration ratio of land ownership, (*b*) per cent of casual labourers among all agricultural labourers representing, respectiveily, the two-fold process of impoverishment along with concentration of property in agriculture and freedom from constraints on perfect mobility in the labour market. Casual labourers are those who, unlike attached labourers, are not attached to any particular employer under obligatory conditions akin to bondage. Classical economists—particularly Ricardo, had their quota of invectives and bias against monopoly in landed property. Nevertheless, the agraran history of developed Western countries holds out the phenomenon of increasing monopoly of landed property in the hands of the "Enclosing" landlords as in England or of the Junkers as in Germany. It is also a necessary condition for the emergence of fee wage labour in the heart of rural society, prepared to be herded out into the rising urban centres of the Industrial Revolution.

These are the indicators of the structural preconditions of development.

The degree of fruition of the technical potential is indicated by :

(1) Scale of enterprise—represented by concentration of land in households operating more than 25 acres each.

(2) Condition of land utilisation—represented by : (*a*) percentage of area irrigated and (b) percentage of area cropped more than once.

(3) Income and productivity :—(*a*) Proportion of non-food expenditure to total expenditure in the rural sector is taken as an indicator of the income-level *via* the level of living ; (*b*) annual income of agricultural labourers representing the income level of wage-labour, which, within the framework of static analysis or even of comparative statics should be an indicator of the marginal productivity of labour ; and (*c*) unit variable cost—represented by cost of seed, manure, human and animal labour charges per unit of output an indicator of the degree of efficiency of the given level of utilisation of material variable inputs ; (d) ratio of non-labour variable cost to labour cost—indicating the efficiency of utilisation of labour in relation to other non-labour costs.

III

The Method

The statistical method will be to take the figures of the two sets of indicators in six breakdowns by census-zones, replace the actual magnitude by ranks, test the significance of the two coefficients of concordance for the two sets, then replace the two sets by ranking each according to the sums of ranks of the respective set and finally test the significance of correlation between these two rankings. The tests of significance are throughout against the hypothesis of nullity.

The conditions underlying the statistical and analytical method are :—

(*a*) that the orderings are invariant with respect to sampling errors of the actual magnitudes ; and

*(*b*) that since the sum of ranks maximizes the correlation between the resultant ranking and each of its components and also corresponds to the first principal or centroid component of a set of multiple ranks, we can circumvent the absence of any method to test the agreement between two coefficients of concordance by substituting for the two sets of multiple ranks rankings according to their respective sums which represent the "best' estimate of the "true" ranking ; and

(c) that, for analytical purposes, the different census zones ranked according to the various criteria, represent different situations in com parative statics, in the same sequence as the rank-orderings. In other words, the ranking of a particular zone indicates its relative position in a sequential process in time governed by the same constellation of forces for all the census zones. We are, as a matter of fact, trying to deduce from cross-section data the implications of the concatenation of essentially long term forces generating sets of time-series.

The decision to choose only six observations (for the six census zones) for each indicator at a point of time is governed by the availability of comparable statistics. The caution, therefore, has to be set at the very start, that the following argument is more illustrative and notional than rigorous and quantitative. As a matter of fact, the strictly quantitative part of the information we have chosen to forego by virtue of our decision to follow non-parametric distribution-free methods only. It would be possible to arrive at firmer conclusions through the usual methods of multivariate analysis if the data for the two sets of indicators were available for a larger number of observations, either in space or in time. Further, apart from the inadequacy of the number of observations, census zones at which level figures are available hardly constitute homogeneous agrarian regions, which seriously qualifies studies based on data at that break-down level.

Thus, the outcome of our test is that there is a significant degree of agreement in the ranking of the different zones as per the indicators of the structural preconditions of development.

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* *Vide* (i) *Rank Correlation Methods* by M. G. Kendall.
(ii) *Course of Multivariate Analysis* by M. G. Kendall,

IV

THE TESTS

EXHIBIT I

Ranking of Census Zones by Structural Indicators

Census Zones	% of agricultural labour h.h. in all rural h.h.	% population not dependent on agriculture	% area not leased-in to total operated area	% area not leased in from absentee owners to total leased-in area	% of h.h. with less than 1 acre of operational holding	% of cultivated area under cash crops	land ownership concentrationratio	% of casual labour in all labourers
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
North India	2	2	6	4	2	1	1	3
East India	4	1'	3	2	5	2	2	2
South India	6	5	4	6	6	6	6	6
West India	3	6	2	3	3	4	3	5
Central India	5	3	5	5	4	5	4	4
North-West India	1	4	1	1	1	3	5	1

These two are actually tried ranks, which we choose to neglect, without any significant error

mean value of the sum of ranks = $\frac{1}{2} \times 8 \times 7 = 28$

Zone	North India	East India	South India	West India	Central India	North-West India
Sum of ranks square	21	21	45	29	35	17
of mean deviations	49	49	289	1	49	121

Sum of squares of mean deviations, S = 558 Coefficient of concordance $W = \frac{12 \times 558}{64 \times 6 \times 55} = 0.5$ (approx.)

Significant at 1% level against the null hypothesis of W = 0, implying its rejection.

The best estimate of the "true" ranking is given by ranking the zones according to the sum of ranks which is :—

Zones	North India	East India	South India	West India	Central India	North-West India
True Ranking	2½	2½	6	4	5	1

Thus, taking the structual complex as a whole, it can be said that South India is the peak point followed by Central India and West India so far as maturity of the preconditions for development in agriculture is concerned, and North West India is the lowest point preceded by North India and East India.

We shall compare this "true" ranking according to the structural complex with the "true" ranking according to the technical complex.

The technical complex, as we have explained, consists of seven indicators.

Thus, the outcome is that there is no agreement among the rankings if we include unit costs as a critertion of technical efficiency, but if we exclude this criterion, there is significant agreement among the rankings according to the other technical indicators. The difference on inclusion of the unit cost criterion is probably because of the fact that this criterion reflects more, under the present low technique, of natural soil productivity rather than of technical productivity. The best estimate of the "true" ranking of census zones taking the technical complex as a whole, as given by the sum of the ranks (irrespective of whether we include or exclude column 8-*i.e.* output per unit cost as a criterion) is as follows :—

Zones	North India	East India	South India	West India	Central India	North-west India
True ranking	3	2	1	4	5	6

Thus, diametrically opposed to the "true" ranking according to the structural indicators, South India is at the lowest point, instead of the peak point, preceded by East India and North India and North West

Exhibit II

Ranking of Census Zones by technical indicators

Census zones	ranks according to							sum of ranks	
	% of land under h.h. operating 25 acres	ratio of non-labour cost of labour cost	% of sown area sown more than once	% of sown area irrigated	annual income per agri cultural labourer h. h.	% of food expenditure to total expenditure	output per unit cost	excluding col.8	including col.8
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
North India	1	4	5	3	5	2	2	20	22
East India	2	1	6	2	4	1	5	16	21
South India	3	2	3	1	1	3	6	13	19
West India	4	5	1	5	2	4	3	21	24
Central India	5	3	2	4	3	5	4	22	26
North-West India	6	6	4	6	6	6	1	34	35

mean value (excluding col.8) = ½×6×7 = 21
mean value (including col.8) = ½×7×7 = 24.5

Zones	North India	East India	South India	West India	Central India	North-West India	Sum of squares	Coefficient concoce
Square of mean deviations (including col. 8)	6.25	12.25	30.25	0.25	2.25	100.25	151.50	0,18
Square of mean deviations (excluding col. 8)	1	25	64	0	1	169	260	0.30

The value of the sum of squares including col. (8) is not significant the null-hypothesis W = O, either at 1% or at 5% level
The value of the sum of squares excluding col. (8) is significant at 5% level and just falls short of 1% level against the null-hypothesis of W = O.

India is at the peak point, instead of the lowest point, followed by Central India and West India.

As the sum of the component ranks for any set of multiple rankings gives the best estimate of the "true" ranking and is also the rank approximation to the first principal on centroid component of the actual variate values of the two sets of variables considered as two multivariate systems, we now proceed to substitute the "true" rankings for the two sets of multiple ranks representing the structural complex and the technical complex, taken in their entirety respectively.

EXHIBIT III

"True" Rankings of Census Zones

Census zones	True ranks by structural complex	True ranks by technical complex
(1)	(2)	(3)
North India	2*	3
East India	3*	2
South India	6	1
West India	4	4
Central India	5	5
North-West India	1	6

Neglecting the ties, which does not make any significant differences, we have : $\Sigma d^2 = 52$; $\rho = 0{\cdot}5$ (approx.)

The result is not significant either at the 1% or the 5% level against the null-hypothesis of $\rho = 0$, probability of getting a value of $\Sigma d^2 \geqslant 52$ being as much as 0·178 for $n = 6$.

Thus, the "true" ranking of census zones as per the structural complex does not correspond to the "true" ranking as per the technical complex. We, therefore, come to accept our main hypothesis that the process of creation of the structural preconditions of development has not been accompanied with realisation of the corresponding technical potential. There is, thus, a lack of correspondence between the growth in the structural determinants of development and the technical performance of the system. That is the paradox we set out to demonstrate.

* We have chosen to neglect the ties without significant error.

V

Implications

We have restricted ourselves to the period 1950-51 to 1953-54 in regard to the new data for the several indicators. If, now, it is assumed that the situation in 1950-51 to 1953-54, *i.e.* the period during which the legislations abolishing intermediaries got under way, represents the outcome-situation of a series of changes over time governed by the constellation of forces represented in the two sets of indicators, the foregoing analysis implies that legislations and measures which, at the best, merely accentuate to a certain degree the tempo of the same set of structural forces, without introducing any new element in the situation may not succeed in reversing the state of the technical performance of the system.

It is now acknowledged on all hands that the whole bunch of legislation undertaken during the last decade amounts to, at the best, the removal of the top-most ties of intermediary rights and bestowing occupancy right on "tenants", defined so as to exclude share-croppers in many states, without any significant inroads into the pattern of distribution of land-ownership. The big idea that India is already a country of "small farmers, not small farms" can, under the circumstances, offer little encouragement to hopes of technological changes and rise in agricultural productivity, so long as the structural preconditions remain as such.

It is the use-pattern of productive assets that governs the rate of growth of production in the final analysis. It is submitted, therefore, that, notwithstanding the development of the structural preconditions, the lack of correspondence between them and the technical performance of the system, points toward a change in the pattern of ownership and use of assets, which in agriculture is mainly land, whose concentration ratio is as high as 0·76 over the whole of India.

Apparently, Ricardo's bias against monopoly of landed property in England or Henry George's similar bias in America holds with much greater force in this country, where apparently, substantial landowners are not quite the Enclosing Landlords of England in the 15th and 18th

centuries, nor are they quite the Pioneers who upturned the virgin soil westward. Whether and how acting up to Ricardo's bias in adopting policy measures would produce the desired results in the technical performance of the systems, are questions which are more than what analysis of ex post statistics can answer ex ante. The foregoing analysis has merely sought to disapprove the proposition that measures which at the best merely accentuate the process of development of some of the structural preconditions that had already developed in the period before 1950 will necessarily produce the desired results in the technical complex.

The demonstration of the paradox also points to the need for interpreting the significance of classical determinants for an underdeveloped economy subject to certain ramifications unforeseen in the classical model. Thus, it may be necessary to define and identify certain sufficient conditions subject to which the necessary conditions of the classical system may be deemed to generate the required correspondence between the structural and the technical complex.

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