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Mellor,J.W.; Dar,A.K.

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CHANGE IN RELATIVE PRICES OF AGRICULTURAL COMMODITIES, INDIA, 1952-53 TO 1964-65

By John W. Mellor and Ashok Dar

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Change in Relative Prices of Agricultural Commodities, India, 1952-53 to 1964-65

The relationship between agricultural and non-agricultural prices influences (a) incentive to produce within the agricultural sector, (b) the distribution of income, not only between agricultural and non-agricultural sectors, but also between high and low income groups in society, and (c) the rate of capital formation in manufacturing industry, the latter through direct and indirect effects tracing from agriculture's role as a supplier of industrial raw material and of wage goods (3). As a consequence, in a low income economy still economically dominated by the agricultural sector, as is true for India, changes in the relative prices of agricultural commodities may be among the most important determinants of economic growth and income distribution. And, those changes will have quite different effects in different parts of the economy.

Recognition of this important role of the relative level of agricultural prices has brought considerable discussion of the issue. Some persons, e.g. Professor T. W. Schultz and Edward Mason, have argued that Indian public policy has significantly influenced the relative level of agricultural prices in a direction which has discouraged agricultural development, and, by implication, total development as well (2,5). Others, most notably including Professor M. L. Dantwala, have questioned both the fact of policy having such an influence and the existence of a secular turn in domestic terms of trade against the agricultural sector (1).

It is difficult to provide statistical evidence on the question of change in the domestic terms of trade between the agricultural and non-agricultural sectors because of the short period of time which is relevant and the presence of large year to year fluctuations in agricultural prices. Current concern is primarily with the short period of time since the inception of the First Plan, since we are primarily concerned with the movement of prices and of policy during the period of planned effort at development. We want to know if current policies are optimal not those of some distant past. This problem is accentuated because the most relevant and suitable statistical series commence in 1952, even later than the beginning of the First Plan. Accentuating this problem, year to

year fluctuations in agricultural prices have been large relative to the secular increase in prices during the past decade and a half.

The short period of time to be studied and the large year to year fluctuations pose two major problems of statistical analysis. First, differences in trends among prices and in price relationships which are of great economic significance may be reduced to statistical insignificance. Second, and relative to this, in working with a short time series with large fluctuations, the precise choice of the period studied will make a large difference to the trends measured. Extreme observations placed at one end or the other of a short time series have a very major effect on the slope of the trend. Thus choosing a period with one or two very low production years, such as 1950-51 and 1951-52 at the beginning and a high production year such as 1964-65 at the end will give a quite different trend value than choosing a slightly earlier or later set of years. Since industrial prices are not as heavily influenced by weather, the relationship between agricultural and industrial prices will also be influenced by the choice of period of study. Thus there is bound to be uncertainty and controversy concerning past trends in relative prices.

In this paper we first estimate trends for agricultural and industrial prices by standard least squares procedures and compare the trend coefficients. Second, we use a non-parametric test for sign of trend in the ratios of agricultural and industrial prices. The latter technique, primarily used for study of short series, does not assume any form of relationship, e.g. straight line or curve, between the variables.

The period chosen for study is the thirteen years from 1952-53 to 1964-65. The current series of index numbers of wholesale prices commences in 1952-53 with that year as the base. The first year of the series falls after the years of Korean boom in prices and after the two unusually poor crop years of 1950-51 and 1951-52 and might be thought of as a relatively normal year. The last year of the period was one of an unusually large crop, but falls prior to the extremely poor, atypical years of 1965-66 and 1966-67. In general the period studied appears to have a relatively normal sequence of years at its beginning and end.

The analysis does not include the recent years of extreme drought (1965-66 and 1966-67), first because one encounters a whole series of problems in regard to agricultural price data during this period of extreme scarcity and major price differences among states. For example, an all-India analysis must use some weighted average of the widely disparate prices in different states. The proper system of weights for this particular period and situation is by no means clear. Secondly, one of the questions which the present situation poses, as a shift occurs to more normal levels of production, is that of what have been normal price relationships prior to the recent large shortfalls and how were the relevant trends progressing. This study, for a period prior to the recent radical price increases for agricultural commodities, should shed light on that question.

Table 1 presents the trend values and growth rates for prices in various commodity groups drawn from both agricultural and non-agricultural sectors. It is clear from the table that for the period chosen different commodity groups have demonstrated quite different rates of growth of prices and that the various agricultural and non-agricultural groups are thoroughly intermingled in the list. Metal products and oil seeds have shown the greatest price increases and chemicals and cereals the least, the top two and the bottom two in rate of growth of prices including one industrial group and one agricultural group. Taking a weighted average of groups, we find that the growth rates have been as follows:

Industrial raw material crops	(Items 2,5)	3.6
Industrial products	(Items 1,3,8,9)	2.9
Foodgrains	(Items 7,10)	2.3

Thus we find that foodgrains prices during this period have gone up less rapidly than industrial prices while industrial raw material crops had gone up more rapidly than industrial prices.

Table 2 and Figure 1 show the relative prices obtained by dividing one series by another. A non-parametric test for existence and sign of trend, consisting of "ranking" each observation and computing positive scores and Kendall's rank-correlation coefficient has been carried out (6,7). For the ratio of foodgrains to all non-foodgrains prices (the latter including non-foodgrains agricultural commodities as well as industrial commodities) the calculations show the total score S=8 and a rank correlation coefficient of +0.1. This suggests a slight trend movement against the prices of foodgrains during this period, a finding consistent with observation of the growth rates of the various commodity groups.

For the ratio of prices of foodgrains to industrial prices the results are, the total score S=2 and the rank correlation coefficient = -0.026, suggesting no positive or negative trend between the prices of foodgrains and industrial goods. This is in contradiction to the difference in the least squares trend values and thereby emphasizes that the high degree of variability in these prices calls for extreme caution in interpretation of trends. It is of some significance however that foodgrains prices do not show a significant trend relative to industrial prices, but do show a significant downward trend relative to all other prices. The clear point is that the most significant feature of agricultural prices has been the divergent trend between foodgrains prices on the one hand and non-foodgrains agricultural products on the other hand. The industrial raw material crops are of particular importance in this comparison. Although the policy focus has in recent years been on foodgrains and great concern has been expressed concerning progress in foodgrains production, these data suggest that more of a drag on economic development may have come from the relatively less rapid growth of supply, relative to demand, of the other agricultural products.

Table 1 Estimate of Trends for Prices of Various Commodities

India: 1952-53 to 1964-65

No.	Commodity	Base Year = 1952-53 Weight[x]	Trend Value	Growth Rate[**]
1.	Metal Products	12	5.9	4.4
2.	Oil Seeds	60	5.5	4.3
3.	Intermediate Manufactures	41	4.4	3.8
4.	Fruit & Vegetables	23	3.9	3.3
5.	Fibers	61	3.6	3.0
6.	Milk & Ghee	84	3.1	2.9
7.	Pulses	43	2.6	2.9
8.	Textiles	147	2.8	2.5
9.	Chemicals	20	2.2	2.1
10.	Cereals	192	2.0	2.0

x The weights are based on the estimated marketable surplus of all commodities: thus the agricultural commodities which are consumed without passing through a market are not taken into account. These weights are used by Government of India and are given in the publication of Index of Wholesale Prices in India. A different system of weights, for example a system based on acreage or total production, would give much more weight to foodgrains relative to other crops. However, for study of market prices, weights based on marketing seemed most appropriate.

** In percent per year; estimated by dividing the trend coefficient by the average price index for each commodity.

Table 2 Estimates of Relative Prices Between Foodgrains, Industry, All Agriculture and All Non-Foodgrains

India: 1952-53 to 1964-65

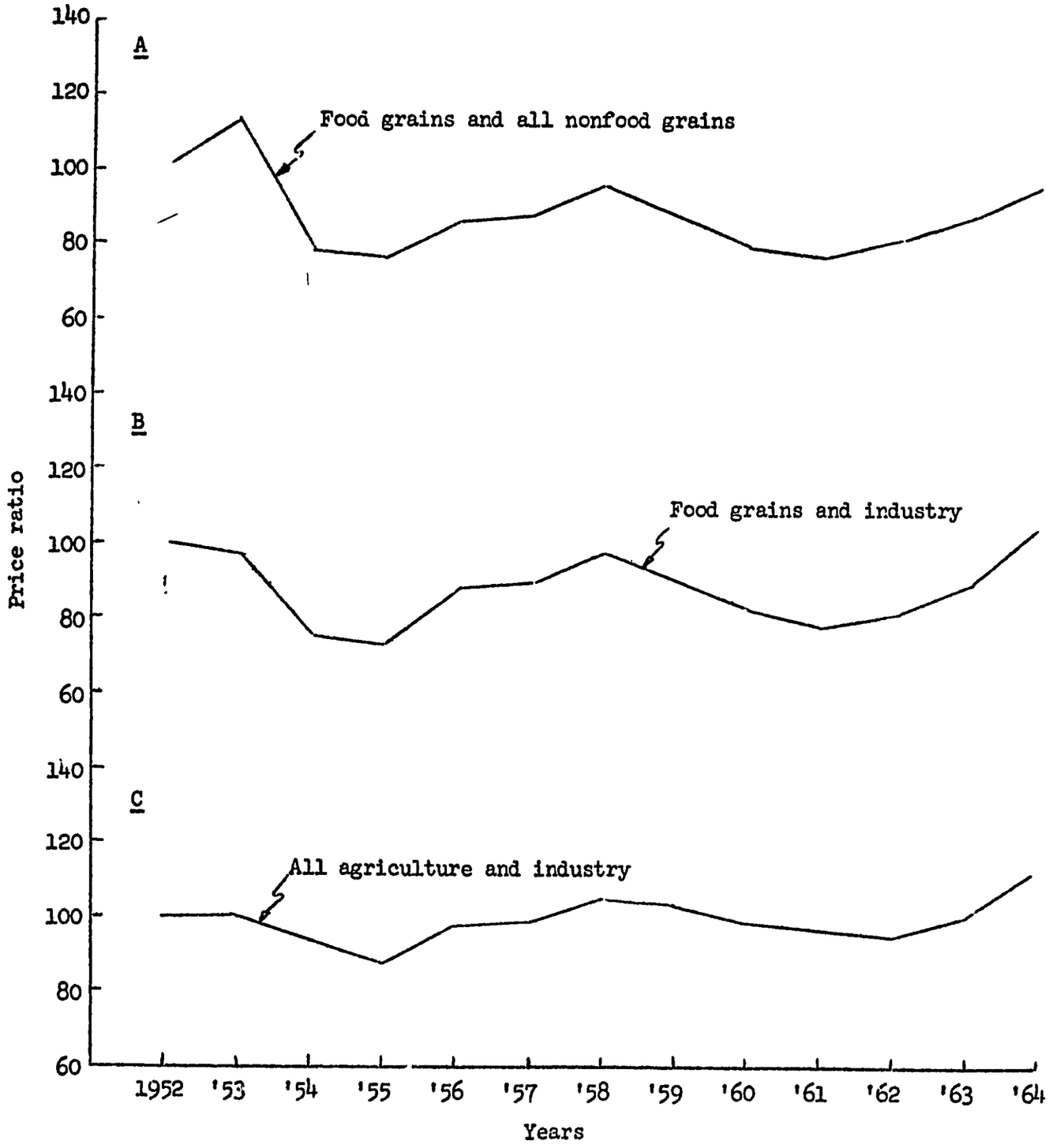
Years	PRICE INDEXES a/				RATIOS		
	Foodgrains	All Agriculture	All Non-Agriculture	Industry	Foodgrains / Industry	Foodgrains / All Non-Foodgrains	All Agriculture / Industry
(1)	(2)	(3)	(4)	(5)	(2)/(5)=(6)	(2)/(4)=(7)	(3)/(5)=(8)
1952-53	100	100	100	100	100.0	100.0	100.0
1953-54	97	107	104	100	97.0	93.5	100.7
1954-55	76	96	99	102	74.5	76.5	94.1
1955-56	73	88	97	100	73.0	75.3	88.0
1956-57	93	104	108	106	87.7	85.8	98.1
1957-58	97	107	111	108	89.8	87.6	99.1
1958-59	106	114	111	108	98.1	95.7	105.6
1959-60	102	116	116	112	91.1	87.6	103.6
1960-61	102	123	129	124	82.3	78.8	99.2
1961-62	100	123	131	127	78.7	76.4	96.9
1962-63	106	123	131	129	82.2	81.0	95.3
1963-64	116	131	134	131	88.5	86.3	100.0
1964-65	144	155	150	137	105.1	95.8	113.1

Source: Reserve Bank of India, Monthly Bulletin, Bombay, Various Years Table 40a.

a/ Price Indexes are weighted averages of the groups in Table 1. Foodgrains include items 7 & 10. All Agriculture includes items 2, 4, 5, 6, 7 and 10 and All Non-Foodgrains is all items except 7 & 10. Industry includes items 1, 3, 8 and 9.

Figure 1

Movement of Relative Prices Between Food Grains, All Nonfood Grains, Industry and All Agriculture



There are undoubtedly complex supply and demand inter-relationships with respect to foodgrains and industrial raw material crops. It is likely that the income elasticity of demand for cotton textiles is on the order of 1.2 and that for edible oils 0.8 as compared to a much lower value of 0.5 for foodgrains. In a development situation, with rising per capita incomes, we should, therefore, expect more rapid growth in demand for the industrial raw materials crops than for foodgrains. Unless there is a very elastic aggregate supply situation or highly elastic substitutions between foodgrains and industrial raw material crops we should expect this more rapid growth in demand to be translated into more rapid increases in prices. The drag on development implied by such price increases is probably substantial, although surprisingly the literature has placed its primary emphasis on agriculture as a producer of wage goods rather than on its role as a supplier of industrial raw materials. Complex relationships show up when we contemplate a period of extreme drought with consequent fall in total agricultural production and in per capita national income. In such a period we would expect foodgrains prices to increase more rapidly than industrial raw material crops prices, primarily because of the greater impact of declining incomes on the demand for industrial raw material crops. Finally this discussion points to the complexity of the whole discussion of terms of trade between agriculture and industry when a high proportion of industry is based on raw materials produced in the agricultural sector, and in which an even higher proportion of farmer expenditures for "industrial" products are for those for which the primary raw material is agriculture.

The statistical points are emphasized by comparison of the relative prices of agriculture as a total to industry. Calculations show the total score S = +14 and the rank correlation coefficient as +0.2. The conclusion is that at about the 15 percent level of significance trend in the terms of trade between agriculture and industry has been slightly in favor of the agricultural sector. Again, this is primarily because of the behavior of the non-foodgrains prices. It will be noted that the foodgrains bear a much lighter weight in the weighted averages than their relative importance in total production. In a discussion of changes in relative prices however it seems relevant to weight by marketings, as has been done, rather than by production.

Turning from the question of trend, it clearly emerges from Figure 1 that during the period of study there have been two periods of relatively declining agricultural prices and two periods of relatively rising agricultural prices. During the first three years agricultural prices declined relative to non-agricultural prices, for the next three years they rose, for the next three or four they fell once again and for the last two or three they once again rose. Undoubtedly, during the two series of years of consecutively rising prices, the pressure on wages and on profits must have been significant and deleterious to the development of the non-agricultural sector. However, each period of relative decline in foodgrains prices must have had a counterbalancing effect. Likewise the price incentive to increase agricultural production must have been growing during the most recent 2 or 3 years and during the period ending 1959. It is inter-

esting to note that recent major criticisms of Indian agricultural price policy began to develop after 1963, describing a normal lag in observation of the down turn in agricultural prices of the preceding few years. These criticisms seem to have reached print about the time relative agricultural prices had reached their plan period highs!

The tendency for sharp fluctuations in agricultural production and for runs of successively declining and rising relative prices call for care in making judgement about the performance of the agricultural sector and in making proscriptions for that sector. In the periods of declining relative agricultural prices often unjustified and potentially dangerous conclusions tend to be drawn concerning the effects of imports and domestic price policy. Likewise, even more unjustified conclusions may be drawn concerning the effectiveness of production policy. The two situations together divert attention away from the basic, critical, long term development oriented policies for producing, disseminating and otherwise facilitating technological change and towards policies of price regulation and trade and food aid restriction. A more balanced view would aid both agricultural and industrial development policy (4). The same tendency for fluctuations in production and prices will undoubtedly continue into the future and will likely continue to be misleading concerning the effect of various policies.

Conclusions:

Three conclusions are apparent from examination of the data. First the movement of agricultural prices relative to other prices shows little if any trend in either direction for the period studied and that much more important than trend through the period are intermediate term fluctuations. It is important to recognize such intermediate term changes and not be forced into precipitate long term action which might in fact be counter-developmental. Secondly the totality of agricultural prices is comprised of sub-groups of commodities which have shown somewhat different rates of price increase and trends relative to other prices. In the period studied, industrial raw material crops have shown a much sharper rate of increase in prices than have foodgrains. This is not surprising given the rate of per capita income growth and the higher derived income elasticities of demand for these commodities. Given the dependence of a high proportion of Indian industry on these raw materials and the price record during this period one should give pause before taking up policies which might affect foodgrains at the expense of these other crops. Third, by the end of the period considered, 1964-65, foodgrains prices and agricultural prices as a whole had risen relative to industrial prices to the highest level in the period studied. From the purely price point of view that represents a more favorable position for stimulating agricultural production increase and a less favorable position for stimulating industrial production or for urban worker welfare than had prevailed in any earlier part of the period studied. Subsequent to 1964-65 foodgrains prices have risen even further relative to non-agricultural prices.

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