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NOTES ON FOODGRAINS PRICES, INDIA, 1967-68 and 1968-69

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Notes on Foodgrains Prices, India,

1967-68 and 1968-69

The following comments and calculations are based on analysis in a paper by Mellor and Dar entitled "Determinants of Foodgrains Prices, India, 1949-50 to 1963-64." That paper presents a price equation with R^2 of 0.83 which is used in the following note for projections to periods later than that from which the equation was derived.[1] There is a consequent liability to error from any changes in the underlying relationships. Throughout the paper, April price is used as most representative of the effect of supply-period balances of preceding years.

The equation used has two features of special note. Firstly, it attaches considerable weight to expansion of the money supply as a source of increased prices. Secondly, it gives much more weight to the supply-demand balance in a lagged year than to the immediately preceding year. This implies that farmers store heavily from bumper crops and draw from storage in poor crop years. Thus the effects of the good and poor crops tend to be somewhat muted and delayed by one year. This very factor, however, provides the major source of unpredictability about future prices, because these storage policies are subject to unpredictable change with change in farmer psychology and economic means. The economic capability of farmers to store foodgrains has undoubtedly increased over the past decade or two. The most striking features of the price calculations are as follows (See Table 1):

1. The price increase from April 1964 to April 1965 was estimated to be only 8 points on the index, a six percent rise, while the reported rise was 14 points, or about 11 percent.

2. Again the price increase for 1965-66 was estimated to be only 2 points and was reported as 21 points or 15 percent.

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[1] $P_t = 41.48 + \underset{(0.08)}{0.56}(D-S)_{t-1} + \underset{(0.80)}{2.25}(D-S)_{t-2} + \underset{(0.35)}{2.06} M_t$

$R^2 = 0.83$

where

- P_t = price of foodgrains in the first week of April of year (t).
- D = estimated aggregate real demand for foodgrains for the year commencing July 1. (Estimated from the 1949-50 base plus population and income effects).
- S = estimated aggregate supply of foodgrains for the year commencing July 1.
- t-1 = the year commencing July 1 preceding April 1 of the year (t).
- t-2 = the year commencing July 1 of the year preceding t-1.
- M_t = total money supply in the first week of April of year (t).

3. In 1966-67 the price rise was estimated to be 30 points and was reported as 38 points (32 points for cereals), a roughly similar increase. Thus the discrepancy between the estimated and reported figure for April 1967 arose largely out of the unanticipated rise in 1964-65 and particularly 1965-66.

4. The price equation shows an increase in foodgrains prices in April 1968 over April 1967, 9 points or six percent. However, note that this is about 12 percent below the reported level of prices in 1967. The reason for the estimated increase in prices from 1967 to 1968 is the lagged effect of past poor years. For April, 1969, given another quite good year (same production, more normal weather being balanced by further advances in technology), the index is shown to decline by 3 percent.

Several different interpretations of the discrepancy between the reported and estimated prices are plausible. Each explanation has a somewhat different set of implications for future price behavior. Each of these will be discussed with their implications to price behavior.

1. A first possibility is that the estimated equation is inappropriate for the purpose for which it is used. For obvious reasons I reject this assumption. The implications of accepting it are obvious.

2. A second explanation is that the price index of reported prices used is an inappropriate reflector of the underlying supply and demand balances reflected in the estimated equation i.e. the equation is right, the reported prices are wrong. There are several variants on this argument. One would be that the all-India index of foodgrains prices is a simple average of prices in reported markets, that prices in the deficit states carry a heavy weight, and that the market, particularly in the deficit states is very thin, with a combination of small supply and demand dominated by higher income, price inelastic consumers. The result of such circumstances would be excessively inflated reported free market prices. The substantial volume of urban consumption accounted for through government programs gives added plausibility to this argument.

The argument gains added plausibility since such circumstances would probably have come into major play in the April 1966 prices and continued in the April 1967 prices. The former year is the one when a major discrepancy between estimated and reported prices occurred, a discrepancy which continued in 1967.

Accepted in its entirety the argument states that a "real" index of foodgrains prices would now be at about 166 and would rise to 175 by April 1968.

In terms of actual prices these calculations suggest a price for wheat of about Rs.76 per quintal, which is about 5 percent under present wholesale prices in the Punjab. This in turn suggests a slight decline in wheat prices between now and the harvest period next April and of course

financial losses for purchasing now and storing until then. These assumptions suggest a price for paddy of about Rs.57 per quintal which is roughly the level shaking out as the procurement price. This provides agricultural prices about ten percent higher, relative to nonagricultural prices, than those that ruled during what are generally considered favorable years for agriculture, such as 1949-50.

The argument that all the discrepancy between estimated and reported prices lies with unrepresentativeness of the reported price index does not seem fully plausible. To accept this means to accept prices in the lowest price, surplus states as fully representative of conditions and hence giving no weight to the very much higher prices in the deficit states. It is my judgement that the problem of reported prices explains some but not all of the discrepancy.

A third explanation of the discrepancy between estimated and reported prices is that the coefficient on the "money supply" factor was much less appropriate for the recent period of rapidly rising prices than for the earlier period from which it was developed. If the added inflationary influence is due to increased velocity incident to extreme foodgrains shortages or due to a decrease in transactions incident to such foodgrains shortages then we might expect the equation to underpredict the price rise in 1965-66 (but not in 1964-65).

It could be argued that in a period of inflation, velocity is likely to increase and the price increases due to foodgrains shortage itself may have added to such an increase in velocity. As a counter, it should be noted that the equation predicts prices very well for 1963-64 which was part of a sequence of years of more rapidly rising money supply. Somewhat more plausibly it could be argued that in 1965-66, while the money supply increased as much as in the preceding few years, the transactions dropped way off, and thereby the money expansion had much more effect on prices. This argument is more in keeping with the discrepancy in estimation falling largely in the one year 1965-66. If the transactions factor is the cause of discrepancy, then one might expect it to reverse itself in 1967-68 with its big crop year and thus for prices to return to the level estimated with the equation.

A fourth explanation is that farmer stocks were built up somewhat more than normal in 1964-65 and were not liquidated as much as would be normal in 1965-66 or in 1966-67. Normal behavior would have been for a large build up of on-farm stocks in 1964-65 with a bumper crop, particularly one occurring after a somewhat poorer than average crop year. Likewise it would be normal for those stocks to be completely drawn down in 1965-66, leaving few stocks on hand for further drawdown in 1966-67. It is this "normal" behavior which results in the big price jump in the estimated values occurring in 1966-67, rather than in 1965-66. It also accounts for the lack of decline in prices in 1964-65 despite the bumper crop.

The storage explanation of the discrepancy between estimated and reported prices seems inconsistent with the extremely short crop in 1965-66.

However, there are some current reports concerning holdings of stocks by farmers and to some extent by consumers which support the argument.

The following should be kept in mind when viewing the suggestions concerning stocks.

Firstly, on-farm storage presumably takes place only on the farms of the larger cultivators. Even in the very poor crop years they have had enough production to more than meet their own needs. So it is not a question of small farmers very short of food storing even in the face of scarcity.

Secondly, the period under discussion is an unusual one in that for four successive years foodgrain prices have increased by enough to make across season storage profitable (20, 11, 15 and 24 percent respectively). Except for this period only once since 1949-50 have prices increased in more than two successive years sufficiently to make across season storage profitable. Prior to the bumper crop year of 1964-65 prices had risen nearly 20 percent, in part due to a smaller than normal increase the previous year. This contributed to an inflation psychology which could easily lead to larger than normal storage in 1964-65. In 1965-66 acute scarcity and an even greater inflation psychology could easily have led larger cultivators to in net maintain their stocks rather than drawing them down sharply as would be more normal.

Thirdly, levies were introduced in 1964 and broadened in 1965. There is evidence that farmers have traditionally responded to the introduction of levies by holding back on marketings.

Fourthly, the aggregate changes in storage stocks may well cover counter-balancing crosscurrents among different farmers and regions. For example, in 1966-67, stocks may have declined in some areas, such as Bihar and risen in the others. To say that the aggregate pattern was of a specific nature is not to say that all regions and farmers moved consistent with it. Some may have moved more one way and others less or even in the opposite manner.

Thus it seems quite reasonable to think that although under normal circumstances two bad years would have seen a depletion of stocks, in this particular case the sequence of events has been such that on farm storage stocks are now abnormally high, i.e. about what one would expect after a very good crop year rather than a poor one.

Table 3 indicates the implication of various alternative assumptions about storage stocks and their effects on prices. Given the storage argument, one might still have prices in 1967-68 which are the same as those predicted by the equation if farmers were to build their stocks further in 1967-68 just as though they had no stocks after a poor production year. It is important to emphasize that the index of 175 is built on the assumption of a substantial buildup in on-farm stocks in 1966-67. (But also keep in mind that the index of 175 for 1967-68 is somewhat higher than the estimated index for 1966-67.)

If one assumes that on-farm stocks are now substantial and that farmers will therefore not build stocks further, then an index of 153 seems plausible. This latter would represent a decline of foodgrains prices, but still better than the average of the last one and one-half decades and comparable with the situation in years of slightly below trend line levels of agricultural production.

It is quite possible that farmers observation of a stabilizing of prices would cause actual unloading of stocks. In that case prices would fall lower than an index of 153. A substantial unloading might take prices to 146 or even slightly lower. If such unloading were concentrated in a short period of time, heavily burdening the market, the price decline could be considerably more. At that point the support price announced by the Prices Commission could come sharply into play.

The Role of PL 480 in the Calculations

PL 480 enters into the calculations with imports of 8 million tons in 1966-67 and 6 million tons in subsequent years. A lesser PL 480 import would of course raise prices above the levels calculated. Uncertainty concerning PL 480 could have a much more substantial effect on prices by inducing an element of scarcity psychology inducing larger farmers to hold back on marketing pending clarification of PL 480 imports. It should be kept clearly in mind that elimination of PL 480 would completely nullify the effects of the big crop this year, reducing supplies below those of last year and given the demand growth, increasing the supply-demand gap to a size larger than that of 1965-66. On the positive side, certainty of PL 480 imports of 8 million tons would greatly reduce the incentive to farmers to hold stocks and thereby greatly facilitate the building of buffer stocks by the government. If certainty regarding PL 480 precipitated a sharp price decline, it would simply indicate that the hypothesis that farm stocks were high was correct and would provide opportunity for a transfer of those stocks from farmer hands to government hands where they would represent a publicly controlled buffer stock. Such a transfer would, of course, pose important problems of finance for the government. A later note will comment more fully on PL 480.

Comment on the Levy Price

The levy as set forth by the APC is in essence a tax on agriculturists. As background, it should be kept in mind that the levy can be handled so that it is in effect a fixed tax, and, hence, not a marginal tax and, hence, basically not discouraging to technological advance and use of more inputs. Secondly, it should be kept in mind that the taxes on agriculture have been declining in India, while they have been rising on other sectors of the economy. Perhaps most important is the fact that if we compare by income groups, agriculturists are taxed substantially lower than their income peers in the nonagricultural sector of the economy.

If we take the "normal" estimated price for 1967-68 as the index of 175 and, hence, a paddy price of 57, then the levy of Rs.45 represents

a tax of Rs.12 per quintal. This is on less than 10 percent of production and, hence, represents less than Rs.1 per quintal on total production. If we take the "normal" price assuming large carryover stocks, then the levy has little or no tax element in it and becomes more nearly a support price.

Comment on Incentive Prices

The question of incentive prices is an exceedingly complex one and the following comments are only meant to emphasize a few points and are not intended as a position on the matter.

Firstly, the new technologies which are forming the basis of agricultural production increase over the next decades serve to reduce the per unit cost of production. The improved input-output ratios themselves provide a positive incentive for adoption.

Secondly, although the relationships between agricultural prices and aggregate agricultural production and between agricultural prices and industrial investment are little known, it does seem clear that higher prices in themselves do provide positive encouragement to increased agricultural production and are a depressant to industrial investment. A development oriented agricultural price policy must take the balance of these forces into account. Even though we do not have the knowledge for a clear position regarding the balance we should at least remember that we are dealing with a problem of resolution of opposing forces.

Thirdly, reported market prices are widely divergent in different states. U.P. wheat prices, for example, are now reported some 50 percent higher than Punjab wheat prices. Even greater discrepancies exist among some rice states. There are those who will argue that incentive prices should be at these upper levels.

Fourthly, in the period from 1949 to date there is no evidence of a secular turn in the terms of trade against agriculture in India. During this period there have been two periods during which the terms of trade turned against agriculture and two in which it turned towards it.

Perhaps this is enough to indicate the potential for confusion when such an elusive term as incentive prices is used. Nobody can possibly be opposed to incentive prices. The problem is to define them consistent with efforts at development and with precision.

CONCLUSIONS

The following conclusions are of course subject to all the qualifications which appear in the body of this note.

The most likely price index for foodgrains for April 1968, representing the 1967-68 year, is between 150 and 175. This represents a decline of from 11 to 23 percent from the reported index for April 1967, but that index probably overstates the "actual" level of prices; the extent of

decline will vary considerably from state to state. The paddy procurement price of about Rs.55 reportedly agreed upon for 1967-68 falls a little above the middle of the range implicit in the above. The paddy support price suggested by the APC falls at around an index of 145 which is the lowest set of prices likely to arise short of a major speculatively induced decline. The upper level of most likely prices for 1967-68 provides terms of trade relative to other sectors of the economy which are highly favorable as compared with the situation prevailing during the last one and one-half decades. The lower level is somewhat less favorable than the average for this period, but of course not out of line with the situation in past years of unusually favorable weather. Even with prices at an index of 145, farm incomes will be greatly higher in 1967-68 than the preceding two years.

If prices are at significantly higher level than the index of 175, it would most likely arise from uncertainty regarding PL 480 supplies inducing holding of stocks by farmers. The consequence would be postponement of the favorable effects on the rest of the economy of recovery in agricultural production. If prices drop more below the lower levels, it will be because in fact on-farm stocks are high and farmers unload them rapidly in recognition that prices are unlikely to continue rising significantly over the next couple of years. It would be useful to take clear policy steps to guard against either eventuality.

Table 1

Estimated Foodgrain Prices, April 1963-64 to 1968-69
(Based on price equation fitted to data for 1949-50 to 1963-64 and data in Table 2)

Year	Based on 2 1/2 percent pop. growth	Percent increase from previous years	Based on 2 percent pop. growth	Reported Prices		
				Foodgrains		Cereals
1963-64	125		124	126	(20)	124
1964-65	133	(6)	129	140	(17)	138
1965-66	135	(1)	130	161	(15)	160
1966-67	166	(23)	160	199	(24)	192
1967-68	175	(6)	167			
1968-69	170	(-3)	163			

Table 2

Assumptions for Price Calculations

Year	Population	Income per Capita	Demand	Gross Prod.	Net Prod. (87.5%)	Imports	Change in Govt. Stocks	Total Supply	D-S	M	Est. Price	Rep. Price	Alternative Pop. 2 1/2%	Price
	(000,000)	Rs.	(000,000)											
1964-65	477.5	317	80.94	87	77.9	7.5	1.1	84.3	-3.4	44	129	140	488	133
1965-66	487.1	298	79.62	72	63.0	10.7	0.1	73.6	6.0	45	130	161	500	135
1966-67	496.8	311	83.33	78	68.3	8.0	-	76.3	7.0	49	160	199	513	166
1967-68	506.7	341	89.00	95	83.1	6.0	1.0	88.0	1.0	53	167	-	526	175
1968-69	516.8	341	90.73	95	83.1	6.0	1.0	88.0	2.73	57	163	-	540	170

Table 3

Alternative Price for April 1967-68

	Price Index	Change from 1966-67 Estimate (%)	Decline from 1966-67 reported	Decline from 1967-68 Estimate	Paddy Equiv. Rs. per Quintal	Wheat Equiv. Rs. per Quintal
Estimated from Equation	175	+6	-11	-	57	76
Above but assume on-farm stocks are average	153	+8	-23	-12	50	67
Above but assume on-farm stocks fully carried over from 1964-65	146	-12	-27	-17	47	63