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## **RESEARCH NOTES**

### **THE ROLE OF ZONAL POLICY IN CREATING AN IMPERFECT MARKET STRUCTURE IN THE PUNJAB**

This note deals with the impact of the one of the aspects of foodgrains price policy, namely, zonal policy on the following aspects of foodgrains market structure: (a) regional price differentials and market integration, and (b) seasonal price behaviour of selected foodgrains.

#### **CHOICE OF MARKETS AND SOURCES OF DATA**

To study the above problem for three major foodgrains of the Punjab, namely, wheat, gram and maize, the markets shown in Appendix 1 were selected purposively to represent the following categories: (1) major producing and export markets of the Punjab, (2) major consuming markets of the Punjab, and (3) distributing and terminal markets of foodgrains in India. These were the markets for which time-series data of equivalent varieties were available from published sources. Besides, the terminal and distributing markets belonged to those States to which the Punjab State sent the largest quantities of selected foodgrains.

The Government zonal policy measures, as they operated in the Punjab State in respect of selected foodgrains, were classified into free trade, multi-State zone and single State zone periods. These details along with the period of study for wheat, gram and maize are indicated in Appendix 2. The wholesale monthly price data for similar varieties of selected foodgrains were obtained from the published sources for each policy period. Though there was a gap of time when a particular policy was repeated (Appendix 2), yet it became necessary and logical to pool the price data for the purposes of studying inter-market price relationships and the seasonality in prices for each foodgrain during different zonal policy periods. The data on the actual handling costs in transferring one quintal of selected foodgrains from the markets of Punjab to those of the selected terminal markets were obtained from the traders, railway records and truck unions. The transfer cost included the expenses which the trader paid as a buyer in the Punjab markets and the expenses he incurred as a seller in the terminal market, plus the actual transport charges. Such data were collected with the help of a specially structured schedule from 92 randomly selected traders scattered over 12 different markets of the Punjab.

#### **IMPACT OF ZONAL RESTRICTIONS ON REGIONAL PRICE DIFFERENTIALS AND MARKET INTEGRATION**

In a perfectly competitive market, the inter-market price differentials will be equal to or less than the cost of shipment between the two points. A price rise which is more than this cost will be suggestive of imperfections in the market. This will also indicate that the flow of commodity between producing and distributing markets was inadequate. Such a situation could

emerge either because of inherent market imperfections such as absence of perfect knowledge on the part of the buyers and sellers or due to causes which are outside the system. The latter also includes imposition of restrictions by the Government on the free movement of commodity on private account and the transport bottlenecks.

It was hypothesized that the imposition of the zonal curbs on the free movement of foodgrains on private account increased the price differentials between the markets of the Punjab and the relevant terminal markets in other States, so that prices in the Punjab were depressed as compared with those prevailing in the deficit States. The coefficients of variation of prices of selected foodgrains under different zonal policy periods in the selected markets were worked out and the results are shown in Table I. The results are discussed separately for each foodgrain.

TABLE I—COEFFICIENTS OF VARIATION OF PRICES OF FOODGRAINS UNDER DIFFERENT ZONAL POLICY PERIODS\* IN PRODUCING, CONSUMING AND TERMINAL SELECTED MARKETS

Foodgrain				Free trade	Multi-State zone	Single State zone
Wheat	..	..	..	9.86	10.85	23.80
Gram	..	..	..	4.34	11.05	19.14
Maize	..	..	..	1.64	9.70	8.17

\*As per Appendix 2.

### *Wheat*

During the free trade period, the coefficient of variation amongst the prices in the selected markets was low and was estimated at 9.86 per cent. This indicated relatively a more consistent spatial price structure among the selected markets. When the restrictions on the movement of foodgrains on private account were tightened, the inter-market price differentials somewhat increased as can be seen from the coefficient of variation in the prices of wheat which increased to 10.85 per cent. That the inter-State price differentials of wheat during single State zone period sharply increased is evident from the coefficient of variation in the prices of wheat in the selected markets during this policy period which touched a new height, *i.e.*, 23.80 per cent.

### *Gram*

During the free trade policy period, the coefficient of variation in the prices of gram of the selected markets was as low as 4.34 per cent. During the multi-State zone period, the coefficient of variation of prices in the sample markets worked out to be 11.05 percent, which was higher than the coefficient of variation at 4.34 per cent for the free trade period. The coefficient

of variation further increased to 19.14 per cent during single State zone period.

### *Maize*

During the free trade period, the price differentials were found to be negligible, and the coefficient of variation was only 1.64 per cent. Inter-market price differentials during the multi-State zone period increased faster as compared with the earlier situation. The coefficient of variation in the price of maize in the selected markets increased to 9.70 per cent as against 1.64 per cent noted for the free trade period, and remained at about the same level during the single State zone period.

The price differentials in the same sets of markets under differential zonal situations were compared with the respective costs of transportation. The impact of zonal policy in distorting the inter-market price relationships becomes evident from Table II which shows that consequent upon the restrictions on the free movement of foodgrains on private account, the price differentials, in general, sharply increased. The price differentials in the case of wheat between Khanna and Hapur, and between Khanna and Khagaria which were Re. 0.74 and Rs. 8.36 per quintal during the free trade period, increased to Rs. 7.74 and Rs. 16.64 respectively during the multi-State zone period. The price differentials further increased to Rs. 32.44 and Rs. 51.22 per quintal for the same sets of markets when the zonal restrictions were tightened and the Punjab was declared a single State zone.

TABLE II—INTER-MARKET PRICE DIFFERENTIALS AND TRANSPORT COSTS FOR WHEAT, GRAM AND MAIZE UNDER DIFFERENT ZONAL POLICY SITUATIONS

(Rs./quintal)								
Foodgrain markets			Free trade		Multi-State zone		Single State zone	
			Price differen- tials	Transport cost	Price differen- tials	Transport cost	Price differen- tials	Transport cost
<i>Wheat</i>								
Khanna—Bombay	..	..	14.81	9.82	3.25	9.50	15.68	10.15
Khanna—Hapur	..	..	0.74	7.05	7.74	6.70	32.44	8.18
Khanna—Khagaria	..	..	8.36	8.56	16.64	8.37	51.22	9.90
<i>Gram</i>								
Barnala—Patna	..	..	6.06	9.07	26.31	10.61	43.52	10.69
Barnala—Hapur	..	..	3.34	6.64	12.06	7.91	35.21	7.99
Barnala—Delhi	..	..	2.77	6.34	12.01	7.51	12.85	7.59
<i>Maize</i>								
Jagraon—Bahraich	..	..	0.56	7.56	0.12	7.69	4.92	8.36
Jagraon—Dohad	..	..	0.37	8.76	6.66	8.89	23.96	9.59
Jagraon—Khagaria	..	..	0.80	7.86	14.33	7.99	12.09	8.61

Source : Data on the cost of transportation are based on interviews with traders.

Similarly, in the case of gram, the price differentials on per quintal basis between Barnala and Patna, between Barnala and Hapur, and between Barnala and Delhi increased from Rs. 6.06, Rs. 3.34 and Rs. 2.77 during the free trade period to Rs. 26.31, Rs. 12.06 and Rs. 12.01 respectively during the multi-State zone period. Again, when the Punjab State was declared as a single State zone for gram, the price differentials for the given sets of markets further increased to Rs. 43.52 Rs. 35.21 and Rs. 12.85 per quintal respectively.

For maize the extent of price variation between Jagraon and other terminal markets during the free trade period was only marginal. The price disparities between these markets increased during the multi-State zone period. The price differentials between Jagraon and Bahraich, between Jagraon and Dohad, and between Jagraon and Khagaria were found to be of the order of Re. 0.12, Rs. 6.66 and Rs. 14.33 respectively. The corresponding price differentials during the single State period were Rs. 4.92, Rs. 23.96 and Rs. 12.09 per quintal respectively.

A careful examination of the regional price disparities of the selected foodgrains showed that the price differentials in the absence of zonal restrictions were the lowest, and in general, were lower than the costs of shipments.<sup>1</sup> Subsequently, when the zonal policy was pressed into action, the price disparities between the Punjab markets and those of other State markets widened sharply and in most cases exceeded the costs of shipments. This happened because the formation of zones shut off the normal trade channels and trade relations of the private trade operating in the deficit and surplus States of the country. Thus, the existence of the price differential over and above the transport costs could be attributed primarily to the zonal policy of the Government which suppressed price competition and introduced imperfections in the market.

The contribution of zonal policy in creating an imperfect foodgrain market structure in the Punjab was also studied using the correlation analysis.<sup>2</sup> The degree of correlation between the prices (monthly average) in various markets was taken as an index of the extent of market integration. No doubt, employed singly, correlation analysis tells only little about market integration. However, correlation analysis as a supplement to our earlier treatment of the subject served a useful purpose. As such, the coefficients of correlation between various consuming, producing and terminal markets of wheat, gram and maize were worked out for different zonal policy situations. How-

1. Does the negative price spread (after adding the cost of shipment) mean that the private trade which moved foodgrains from the Punjab markets to the terminal markets suffered losses? Since in our analysis, we dealt with the average price stretching over a number of years, no such categorical inference can be drawn. Foodgrains were exported by the private trade to many distributing markets during the free trade period. To estimate the overall profits/losses we need to examine simultaneous movements of prices of selected foodgrains, which is beyond the scope of this paper.

2. No doubt, time-series correlations of raw price data contain the trend and seasonal components which would give an upward bias to the correlation coefficients. The detrended and deseasonalised price series would have given more reliable correlation coefficients. Yet in the present study the detrended and deseasonalised monthly price movements in pairs of markets for each zonal situation could not be found as in the case of some of the zonal policy situations the number of monthly price data observations was not adequate to permit the use of the above-mentioned techniques (Appendix 2). As such, time-series correlation coefficients of raw price data were computed.

ever, here coefficients of correlation between the same sets of markets for different policy periods are discussed as per the results reported in Table III.

TABLE III—INTER-MARKET COMPARISON OF CORRELATION COEFFICIENTS OF WHEAT, GRAM AND MAIZE UNDER DIFFERENT ZONAL POLICY PERIODS

Foodgrain markets				Free trade	Multi-State zone	Single State zone	Overall
<i>Wheat</i>							
Khanna—Delhi	..	..	..	0.93476	0.86205	—0.28583	0.77080
Khanna—Bombay	..	..	..	0.70221	0.28227	—0.28583	0.29270
Khanna—Hapur	..	..	..	0.94431	0.73089	—0.12649	0.79000
Khanna—Khagaria	..	..	..	0.75862	0.65403	—0.10248	0.74823
<i>Gram</i>							
Barnala—Patna	..	..	..	0.82459	0.88136	0.71407	0.89766
Barnala—Hapur	..	..	..	0.93854	0.88871	0.57662	0.75435
Barnala—Delhi	..	..	..	0.92970	0.85120	0.56483	0.89766
<i>Maize</i>							
Jagraon—Barnala	..	..	..	0.80285	0.36913	0.29901	0.70912
Jagraon—Dohad	..	..	..	0.89256	0.08323	0.35815	0.74879
Jagraon—Khagaria	..	..	..	0.84460	0.03678	0.32170	0.69768

It was noted that in the case of wheat the coefficient of correlation during the free trade period was quite high between Khanna, on the one hand, and those of Delhi, Bombay, Hapur and Khagaria, on the other, but declined sharply during the single State zone period. Similarly, the coefficients of correlation in respect of gram and maize declined sharply when the zonal restrictions were imposed on the free movement of foodgrains. Thus, correlation analysis also supports the hypothesis that the imposition of zonal curbs on the free movement of foodgrains distorted regional price patterns and the markets no longer remained integrated.

#### ZONAL POLICY AND SEASONALITY IN PRICES

The contribution of zonal policy in the creation of imperfections in the foodgrain market structure of the Punjab was also examined by studying the seasonality in the prices of selected foodgrains relative to their storage costs. As in the case of excessive inter-market price spread over and above the costs of shipments, the inter-temporal price rise over and above the costs of storage also raised the basic question regarding market imperfections. To examine the contribution of zonal policy from this angle, the study of the extent of seasonal price fluctuations under different zonal policy periods in respect of wheat, gram and maize was made and the results are shown in Tables IV and V.

TABLE IV—INDEX OF SEASONAL PRICE VARIATION OF WHEAT, GRAM AND MAIZE UNDER DIFFERENT ZONAL POLICY PERIODS

Month	Wheat			Gram			Maize	
	Free trade	Multi-State zone	Single State zone	Free trade	Multi-state zone	Single State zone	Free trade	Multi-State zone
April .. ..	99.77	98.29	104.36	93.20	104.40	93.89	94.82	120.92
May .. ..	97.09	97.41	100.64	94.68	104.76	93.34	97.79	121.49
June .. ..	94.27	92.72	101.30	97.14	100.83	94.66	103.39	111.68
July .. ..	97.91	93.05	101.70	100.42	104.75	99.67	110.62	98.05
August .. ..	95.29	95.80	99.00	100.05	104.93	101.38	111.37	97.81
September .. ..	94.61	99.35	100.02	100.99	103.02	91.89	111.02	87.60
October .. ..	96.17	98.35	98.56	101.35	87.23	127.60	94.53	90.79
November .. ..	102.63	100.00	99.34	103.38	106.10	101.11	92.68	86.36
December .. ..	104.30	102.64	98.66	105.54	92.62	96.40	95.59	86.39
January .. ..	105.46	104.79	97.61	102.01	88.01	103.07	96.39	86.71
February .. ..	107.74	109.83	98.79	102.10	100.76	100.99	95.56	97.62
March .. ..	104.76	107.77	100.02	99.14	102.59	96.00	95.70	114.54

\*The time reference of the zonal policy situations is as shown in Appendix 2.

TABLE V—AMPLITUDE OF SEASONAL VARIATION OF PRICES OF SELECTED FOODGRAINS UNDER DIFFERENT ZONAL SITUATIONS IN THE PUNJAB

Foodgrain/Zonal situation	Index of seasonal low	Index of seasonal high	Seasonal high as percentage of seasonal low
<i>Wheat</i>			
Free trade .. ..	94.27	107.74	14.29
Multi-State zone .. ..	92.72	109.83	18.45
Single State zone .. ..	97.61	104.36	6.92
<i>Gram</i>			
Free trade .. ..	93.20	105.54	13.24
Multi-State zone .. ..	87.23	106.10	21.63
Single State zone .. ..	91.89	127.60	38.86
<i>Maize</i>			
Free trade .. ..	92.68	111.37	20.17
Multi-State zone .. ..	86.36	121.49	40.68



Table IV shows that during the free trade period, when the private trade was free to purchase, store and sell wheat, prices fluctuated throughout the year. The prices of wheat began to decline as the harvest of the crop approached or actually took place. The index of seasonal price variation was the lowest (94.27) during June, when the marketing season for wheat was at its peak. The off-seasonal maximum level (107.74) was reached in February. The seasonal high as a percentage of seasonal low prices worked out to be 14.29 (Table V). During the multi-State zone period, the seasonal price variation of wheat followed almost the same pattern. During the single State zone period, quite a different type of seasonality pattern of wheat prices was observed. The lowest seasonal price (97.61) was noted in January, that is during the lean period, whereas the highest price (104.36) was recorded during the post-harvest period, that is, in April. The seasonal high as a percentage of seasonal low was only 6.92. Such a reversal of the seasonality pattern of wheat prices was due to the 'wait and see' mentality of the private trade. The single State zonal arrangements created a degree of uncertainty in the market which affected the purchases, sales and storage operations of the private trade.

As regards the seasonality pattern in the prices of gram, it was noted that the seasonality index was the lowest (93.20) in April and the highest (105.54) in December during the free trade period. The seasonal high as a percentage of seasonal low for this period stood at 13.24. During the multi-State zone and single State zone periods the lowest seasonal indices stood at 87.23 (October) and 91.89 (September), where the highest indices worked out to be 106.10 (November) and 127.60 (October) respectively.

With regard to maize, during the free trade period, the index of maize price was the lowest (92.68) in November. Thereafter, it began to firm up and reached the maximum (111.37) in August. The seasonal high as a percentage of seasonal low for this policy period worked out to be 20.17. During the multi-State zone period, the lowest seasonal price index (86.36) was noted in November, whereas the highest price index (121.49) was in May. The seasonal high as a percentage of seasonal low now increased to 40.68.

It may be concluded from the above discussion that the extent of seasonal price variation in the case of wheat diminished during the zonal restriction period. However, in the case of gram and maize, no such trend was observed presumably because other factors, such as the level of production, flow of market arrivals, storage operations of private trade, procurement, etc., were more dominant than the zonal arrangements in so far as the seasonal pattern of prices is concerned.

Our study also suggests that the off-seasonal rise in prices of selected foodgrains, in general, was not very high. In the case of wheat it was found that the off-seasonal rise in prices over the post-harvest period was of the order of 13.22 per cent (average of three situations shown in Table V). This figure may not be regarded as exceptionally high, though some reductions may be

possible. The reversal of the seasonal price pattern obtained during the period of zonal restriction supports the thesis that the zonal policy formed one of the major sources of market imperfection. In the light of the findings of this study, it would seem that freeing the market from the rigidity of zonal curbs would reduce the regional price differentials. The Government policy should, therefore, aim at facilitating competition rather than restricting it in the market.

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#### APPENDIX 1

SELECTED MARKETS FOR WHEAT, GRAM AND MAIZE FOR STUDYING INTER-MARKET PRICE RELATIONSHIPS

Market category	Foodgrains		
	Wheat	Gram	Maize
Export and producing markets of the Punjab	Moga Khanna Abohar	Abohar Mansa Barnala	Jagraon Hoshiarpur Khanna
Consuming markets of the Punjab	Amritsar Ludhiana Patiala	Amritsar Ludhiana Patiala	Amritsar Ludhiana Patiala
Terminal markets in India	Bombay Delhi Hapur	Delhi Patna Hapur	Bahraich Delhi Khagaria

#### APPENDIX 2

ZONAL STRUCTURE (RESTRICTIONS) OF WHEAT, GRAM AND MAIZE IN THE PUNJAB

Zonal restriction	Wheat	Gram	Maize
Free trade (No zonal restrictions)	April 4, 1961 to March 23, 1964	April 1960 to May 1964	July 1957 to September 1958
Multi-State zone	(i) June 1957 to April 1961	(i) June 1964 to March 1965	September 1958 to April 1967
	(ii) March 23, 1964 to March 1967	(ii) April 1966 to March 1967	
	(iii) March 23, 1968 to April 1969		
Single State zone	April 23, 1968 to March 23, 1968	(i) April 1965 to March 1966	April 1967 to March 1968
		(ii) April 1967 to March 1968	

Source: Annual Reports of the Civil Supplies Department, Punjab, Chandigarh.

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