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Decomposition of Weekly Wholesale Price Indices

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FOREWORD

When inflation rate, which had remained at single digit level during the eighties, touched the double digit zone in 1990-91 and then rose to 13.7 per cent in 1991-92, it became a major concern to economic policy makers. Throughout 1992-93 controlling inflation remained the key issue.

Under such circumstances a study of price behaviour and an attempt to forecast prices for future time periods becomes more important. This study was undertaken at the request of Ministry of Finance, Government of India, and it attempts to analyse the price behaviour by decomposing the various components of the Wholesale Price Index. The highlights of this study are:

(1) Quantification of various components of the price index such as seasonal, trend and other factors. This has been done using the weekly data for the period 1982-83 to 1991-92.

(2) Analysis of price behaviour for 1991-92 by measuring the contribution of various components in the weekly price rise.

(3) Projection of weekly WPI at the 'all-commodities' level. Graphs indicating the movement of WPI, seasonal indices, trend and residual elements have been provided for selected major commodities/commodity groups out of those that have been covered in this paper. For the remaining commodities, graphs can be made available on request.

S. L. Rao
Director General

CONTENTS

Contents of Appendix Tables and Charts

Seasonal and Residual Indices

Tables

Charts

ABSTRACT

CONTROLLING inflation has been a central issue on the government agenda during 1992-93, as the price rise in 1991-92 generated considerable concern. In the light of this, an attempt to explain the behaviour of prices and its projection for future periods attains greater significance. In this paper we have made an attempt to quantify the various components associated with the movements of prices viz., trend, seasonal factors and residual elements (other than trend and seasonal factors). This exercise reveals that during 1991-92, it was the residual component which kept the prices above the trend level. An attempt to project the WPI during 1992-93 at the overall level on a weekly basis has also been made here. It may be noted that this is primarily a statistical exercise and needs to be complemented by analysis of specific factors associated with the movement of residuals component. This analysis may thus be considered as a preliminary basis for more detailed studies of price behaviour.

A. INTRODUCTION

THE trends in inflation rate in the last two years generated considerable concern in India. The annual inflation rate as measured by the Wholesale Price Index (WPI) had remained at the single digit level during the eighties, but it took a leap into the double digit zone in the financial year 1990-91 when it was 10.6 per cent on an yearly average basis and increased further to 13.7 per cent during 1991-92. An examination of the point to point annual inflation rate over the months reveals that it crossed the single digit barrier in November 1990 and reached a peak of 16.7 per cent in August 1991. The inflationary pressure continued to be high thereafter for another one year and dropped to single digit level in August 1992. During the rest of the financial year it stayed at the single digit level. Average inflation rate upto the 49th week of 1992-93 was 9.4 per cent for provisional data.

There are various alternative methods that can be used to analyse the price behavior. We focus here on developing and using an approach for analysing short-term or weekly behaviour of prices. The approach is based on decomposition of the price variations over time into distinct components and then building up the price series again to provide projections into the future. The methodology adopted in the present analysis is given in section B of this paper. The main results are in section C and finally in section D projection of the "all-commodities" price index for 1992-93 based on methodology developed here, is discussed.

B. METHODOLOGY

MOVEMENTS in price levels normally have a trend, a seasonal and a cyclic component. The trend component may be affected by several factors like cost conditions, supply and demand position and future expectations etc. Along with the influence of such factors, it is possible to identify a seasonal pattern in price movements of several products. The seasonal pattern may be associated with physical factors such as rainfall and temperature and social factors such as festivals and school holidays which affect either the supply of a product or its demand. The cyclical component is usually defined for systematic fluctuations over longer time periods. In addition, there would normally be some irregular variations in observed price data representing errors in measurement and effect of erratic left out factors.

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The four components normally associated with movement in time series price data are, thus, the following:

Trend (T)
Seasonal Variation (S)
Cyclical Fluctuation (C)
Irregular Variation (I)

Each of these components may account for certain variations in the observed price level over time. In this exercise we have made an attempt to decompose the impact of the major components of price movement. This would help in not only on analysis of price changes in the recent past but also in forecasting price movement in the near future. Assuming a multiplicative relationship between the various components, we may write the observed price index P as:

$$P = T \times S \times C \times I = T \times S \times R$$

We have attempted to quantify the impact of trend (T) and seasonal variations(S) in the price data. The remaining component termed 'residual'(R) is a combination of cyclical and irregular fluctuations. A brief discussion of the methodology followed for measuring these components viz. trend, seasonal variation and residual variation is given below.

Measurement and Elimination of Seasonal Variation

To single out the seasonal component and construct a weekly index for it, we have taken the ratio of observed price series to the moving average series. The steps involved in this method are the following:

(i) In order to measure the seasonal variation in the data, we take 52-week *moving average* of the observed weekly price series. To choose the periodicity of seasonal variations, we had carried out an exercise by taking moving average of different weeks starting with 2 weeks and going upto 52 weeks. This had indicated that the standard deviation of the moving average series declines continuously as we increase the periodicity of the averaging process. In some cases where a year consisted of 53 weeks, we have used an average of 26th and 27th weeks to get the price index for 26th week so that there are 52 weeks uniformly in all the years. This helps to select the median value for different weeks in step (iv) below.

(ii) Since the 52-week moving average series falls in between different observations (i.e., the first moving average figure falls in between the 26th and the 27th week), we centre 52-week moving average of the price indices by taking a further 2-week

moving average. The *centred 52-week moving average* is assumed to represent the combined impact of T, C and I.

(iii) We then divide the original series by the centred moving average series obtained in step (ii) and multiply it by 100. This gives us the *seasonal index* (SI) for each week of the year. This index is free from trends, cycles and irregular variations. Symbolically,

$$SI = \frac{(T \times S \times C \times I)}{(T \times C \times I)} \times 100$$

We compute such indices for every week of 10 different years covering 1982-83 to 1991-92.

(iv) To arrive at a typical seasonal index for a particular week we select the *median value* from among the seasonal indices for that week in different years. This removes the impact of extreme variations from the seasonal index.

(v) These seasonal indices have been further smoothened to remove short term irregularities in them. First 5-weekly averages of the weekly seasonal index series are taken. The weekly indices in between these average values have been obtained by linear interpolation.

(vi) To make the average of the median values equal to 100 for easy interpretation, the weekly indices should sum upto 5200. If they do not, we adjust the SI by multiplying it by the following adjustment factor:

Adjustment factor = 5200/(Sum of weekly indices)

The degree of seasonality could thus be measured by extent of variation in the adjusted SI away from the base 100.

(vii) Lastly, in order to eliminate the seasonal variations, we *deseasonalise* the price data by dividing the observed price series by the weekly seasonal indices as in step (v) above. Let this deseasonalised price series be represented by Pd.

Measurement of Trend

To get an estimate of the trend component, we fit an equation for the time trend on the deseasonalised data. The first attempt has been to fit a semilog function of the following type using the OLS method:

$$\text{Log}(Pd) = a + bT + e$$

where Pd = deseasonalised price data, T = time period, and e = error term. The

exponential of the estimate of the above dependent variable gives the level of the trend component in the price index. The slope coefficient b multiplied by 100 gives the percentage growth in price due to the trend factor.

We may note here two points on the estimation of the trend component:

(i) When the graph on deseasonalised price indices revealed a break in growth rate, log linear time trend has been fitted separately for two or more time periods e.g. in case of jute cement etc.

(ii) Another point to note is that in case of a few items (e.g., onion), the deseasonalised data showed sharp fluctuation over a short period of some months. This did not indicate a new trend as the deseasonalised price level returned back to the old trend path at the end of this short period. Hence, we have treated such short term fluctuations as essentially indicative of '*accidental factors*' and tried to separate out their effects through use of dummy variables. Such effects have been included in the residual component.

Measurement of Residual (Cyclical & Irregular) Variation

Residual variation is obtained by removing the effect of trend and seasonal factors as estimated above from the observed price series. Let Pd indicate the deseasonalised series and Pdt the estimated trend values using the best fitting trend equation. The residual is obtained as:

$$\text{Residual variation} = \frac{Pd}{Pdt} \times 100 = \frac{T \times R}{T} \times 100$$

C. MAIN RESULTS

THE decomposition of observed price indices into seasonal indices, trend and residual components has been carried out for several commodities/commodity groups following the method outlined above. The detailed results are shown in the various tables in the Appendices. (The tables are numbered by Roman letters followed by a numerical value indicating the serial number of an item as in the content page of the Appendix.) *Chart A* series shows the movement of observed weekly wholesale price index (WPI) on log scale over the period 1982-83 to 1991-92 for selected items as an illustration and visually indicates the existence of trend and seasonal pattern in the price data. The seasonal factors (ratio of observed price to moving average) are shown in *Tables S1 to S4*. Residual indices are documented in *Tables R1 to R4*. The SI for different weeks in a year are given in *Chart C* for selected items. The main results are described briefly below using a few summary tables.

Seasonal Factors

Table 1 summarises the results of the weekly seasonal indices indicating the minimum and the maximum values for different items. The figures in parentheses indicate the week in which the maximum or the minimum occurs in the SI series. Thus,

Table 1
Range in Weekly Seasonal Indices (SI)

S.No.	*Commodity*	*Minimum*		*Maximum*	
1	All Commodities	98.9	(48)	101.1	(18)
2	Primary Articles	98.0	(1)	102.1	(18)
3	Food Articles	97.1	(48)	103.3	(18)
4	Non Food Articles	98.8	(3)	101.2	(18)
5	Foodgrains	98.2	(3)	101.8	(18)
6	Cereals	98.5	(6)	101.7	(18)
7	Pulses	97.6	(3)	101.9	(29)
8	Rice	96.8	(39)	103.8	(23)
9	Wheat	96.1	(8)	104.9	(43)
10	Jowar	97.6	(33)	102.3	(18)
11	Bajra	96.3	(28)	102.7	(18)
12	Arhar	96.4	(8)	103.2	(28)
13	Gram	95.7	(7)	104.3	(28)
14	Onion	81.1	(3)	141.2	(33)
15	Milk	98.0	(42)	102.5	(8)
16	Cotton	95.2	(33)	103.9	(18)
17	Jute	96.0	(33)	106.1	(3)
18	Leather	99.3	(36)	100.9	(3)
19	Groundnut Oil	96.0	(48)	104.8	(18)
20	Edible Oil	97.3	(48)	101.9	(23)
21	Food Products	97.1	(48)	102.6	(21)
22	Sugar	98.9	(32)	101.2	(11)
23	Textiles	99.5	(33)	100.5	(43)
24	Cement	99.1	(8)	100.7	(18)
25	Chemicals and Chemical Products	99.8	(38)	100.2	(27)
26	Manufactured Products	99.3	(38)	100.6	(17)

NOTE: Figures in parentheses indicate the week of occurance of minimum or maximum value starting with first week of April.

in case of all commodities, the peak in the seasonal index is found in the 18th week from the beginning of financial year (i.e. in the middle of August), while SI is at its minimum level in the last week of February. It pushes up or pulls down the deseasonalised price data only within 1 per cent for manufactured products as a whole. Agricultural products in general show 4-5 per cent seasonal variations in both upward and downward directions. Seasonal factors are expected to be very high for perishable or semi-perishable products like vegetables. Onion has been taken as a representative

Table 2

Periods Indicating Above Average Seasonal Index (SI)

S.No.	*Commodity*	*Weeks in which SI is above average (i.e. Base 100)*
1	All Commodities	8-34
2	Primary Articles	10-35
3	Food Articles	9-35
4	Non Food Articles	12-22, 26-44
5	Foodgrains	13-35
6	Cereals	13-35
7	Pulses	15-41
8	Rice	9-33
9	Wheat	1, 30-52
10	Jowar	7-29
11	Bajra	2-23, 39-45
12	Arhar	15-41
13	Gram	18-42
14	Onion	24-40
15	Milk	4-33
16	Cotton	1-26, 51-52
17	Jute	1 -18, 46-52
18	Leather	1-17, 49-52
19	Sugar	1-23, 51-52
20	Groundnut Oil	10-34
21	Edible Oils	13-43
22	Food Products	8-33
23	Textiles	1-6, 38-52
24	Cement	No clear pattern
25	Chemicals and Chemical Products	No clear pattern
26	Manufactured Products	1-29

item from this group and its SI ranges from 81 in April to as high as 141 in November implying fluctuations of the order of -19 per cent to +41 per cent in the deseasonalised price. It may be seen from the table that the magnitude of seasonal variation for manufacturing products is relatively low.

At the "all commodities" level and also for certain commodity groups like primary articles, food articles, foodgrains, cereals and pulses, the seasonal index remains more than 100 during May to November (see, Table 2). During this period the SI index lies above 100 for rice and groundnut oil also. Roughly, this is also the period when milk prices are pushed up due to seasonal pattern. The SI is more than 100 during November to the beginning of April for wheat and during mid-March to August for sugar. In the case of textiles, the seasonal factor keeps the prices relatively high during December to May. For certain other manufactured products like cement and chemicals, there is no clearly identifiable single time period for the seasonal pattern.

Trends

The deseasonalised data (observed price discounted by SI) and the fitted trend lines are shown in *Chart C*. The effect of removing seasonal effects could be seen by comparing *Chart A* and *Chart C*. The selected trend equations are summarised in *Table 3*. The coefficients of the trend variable are small in magnitude since we are dealing with weekly data.

In the case of those commodities where the deseasonalised price series indicated a break in growth rate during different time periods, time trend has been fitted separately for such time periods (e.g. wheat, gram, arhar, cotton, jute, groundnut oil, edible oils, food articles, foodgrains, textiles, cement, manufactured products etc.) Linear time trend with dummy variable to take into account short term fluctuation has been used for onion, jute, jowar, bajra and chemical products.

Residuals

The average residual factors on weekly basis are documented in Tables *R1 to R4*. The residual factor for different weeks at the mean level are shown in the charts of D series. The residual index (RI) essentially captures the effect of factors other than the seasonal and trend components. For most of the food items the RI effect is limited within 2-3 per cent of the mean level of the observed series excluding RI. Residuals account for less than one per cent variations in the manufactured products group.

Table 3
Trends in Deseasonalised Data

S. No.	Commodity	Constant	Time(T)	Dummy variables		R^2
				D1	D2	
1	All Commodities	4.595058	0.001380	-	-	0.98
			(160.4)			
2	Primary Articles	4.626275	0.001371	-	-	0.96
			(105.5)			
3	Food Articles 1	4.692909	0.001345	-	-	0.96
			(96.4)			
	Food Articles 2	3.741233	0.003500	-	-	0.99
			(90.4)			
4	Non Food Articles	4.566200	0.001600	-	-	0.94
			(89.9)			
5	Foodgrains 1	4.685345	0.000758	-	-	0.80
			(32.4)			
	Foodgrains 2	4.410856	0.001869	-	-	0.86
			(40.0)			
6	Cereals 1	4.696737	0.000684	-	-	0.70
			(26.2)			
	Cereals 2	4.391827	0.001833	-	-	0.76
			(26.4)			
7	Pulses 1	4.517231	0.002236	-	-	0.84
			(64.3)			
	Pulses 2	3.748653	0.004510	-	-	0.96
			(59.6)			
	Pulses 3	4.625520	0.001800	-	-	0.89
			(35.2)			
8	Rice	4.671136	0.001222	-	-	0.88
			(63.0)			
9	Wheat 1	4.664122	0.000706	-	-	0.70
			(26.4)			
	Wheat 2	4.336561	0.001889	-	-	0.66
			(20.8)			
10	Jowar	4.479323	0.008960	0.175889	-	0.79
			(16.1)	(1.01)		
11	Bajra	4.533135	0.000987	0.730291	-	0.79
			(25.9)	(1.89)		

(Continued)

Table 3 (Contd.)

S. No.	Commodity	Constant	Time(T)	Dummy variables		R^2
				D1	D2	
12	Arhar 1	4.586523	0.004277 (39.7)	-	-	0.95
	Arhar 2	4.429863	0.002000 (25.4)	-	-	0.68
	Arhar 3	3.421087	0.005000 (45.8)	-	-	0.94
13	Gram 1	4.356380	0.002276 (14.63)	-	-	0.45
	Gram 2	2.480167	0.008195 (37.39)	-	-	0.93
	Gram 3	5.353050	-0.000096 (-1.15)	-	-	0.01
14	Onion	4.598539	0.000677 (9.10)	0.526358 (14.31)	0.604880 (19.0)	0.68
15	Milk	4.660766	0.001590 (167.5)	-	-	0.98
16	Cotton 1	4.376962	0.003000 (30.0)	-	-	0.88
	Cotton 2	5.429912	-0.004900 (-47.3)	-	-	0.96
	Cotton 3	4.313560	0.001700	-	-	0.78
17	Jute 1	4.806327	0.003228 (4.2)	0.519488 (6.22)	-	0.67
	Jute 2	3.628140	0.005100 (57.9)	-	-	0.93
	Jute 3	9.524003	-0.008100 (-23.2)	-	-	0.88
18	Leather 1	4.579262	0.001352 (129.5)	-	-	0.98
	Leather 2	4.377252	0.002200 (46.7)	-	-	0.91
19	Sugar	4.484365	0.001123 (98.0)	-	-	0.95
20	Groundnut Oil 1	4.502193	0.001913 (28.32)	-	-	0.73
	Groundnut Oil 2	3.359506	0.004530 (37.08)	-	-	0.90

(*Continued*)

Table 3 (Contd.)

S. No.	Commodity	Constant	Time(T)	Dummy variables D1	Dummy variables D2	R^2
21	Edible Oils 1	4.598132	0.001632 (44.9)	-	-	0.85
	Edible Oils 2	3.654265	0.003914 (49.9)	-	-	0.95
22	Food Products	4.522570	0.001524 (150.2)	-	-	0.98
23	Textiles 1	4.657683	0.000607 (16.9)	-	-	0.54
	Textiles 2	4.292814	0.001920 (164.2)	-	-	0.99
24	Cement 1	4.778480	0.002250 (55.11)	-	-	0.95
	Cement 2	5.115880	-0.000670 (-18.48)	-	-	0.64
	Cement 3	3.954380	0.002680 (37.77)	-	-	0.90
25	Chemicals and Chemical Products	4.612263	0.000881 (243.2)	0.100607 (47.01)	-	0.99
26	Manufactured Products 1	4.615584	0.001080 (135.7)	-	-	0.99
	Manufactured Products 2	4.403482	0.001080 (238.8)	-	-	0.99

NOTE: 1. Dependent variable is deseasonlised WPI series in log form.
2. Figures in parentheses indicate the t-ratios.

Table 4

Range in Weekly Residual Indices (RI)

S.No.	*Commodity*	*Minimum*	*Maximum*
1	All Commodities	99.3 (4)	100.6 (42)
2	Primary Articles	98.9 (1)	100.8 (19)
3	Food Articles	98.8 (8)	100.8 (22)
4	Non Food Articles	98.7 (26)	101.7 (21)
5	Foodgrains	98.2 (5)	102.2 (26)
6	Cereals	97.9 (5)	102.7 (46)
7	Pulses	97.9 (49)	102.7 (20)
8	Rice	98.3 (11)	102.1 (46)
9	Wheat	96.2 (4)	103.7 (42)
10	Jowar	97.0 (13)	105.1 (51)
11	Bajra	96.5 (30)	107.2 (50)
12	Arhar	97.9 (40)	102.9 (41)
13	Gram	95.9 (51)	102.0 (11)
14	Onion	85.9 (9)	115.3 (21)
15	Milk	98.3 (1)	101.1 (14)
16	Cotton	98.7 (52)	101.5 (18)
17	Jute	92.8 (24)	108.1 (30)
18	Leather	98.3 (52)	100.7 (23)
19	Sugar	98.7 (52)	101.5 (18)
20	Groundnut Oil	96.2 (52)	103.0 (21)
21	Edible Oils	98.1 (52)	101.6 (16)
22	Food Products	99.4 (2)	100.8 (41)
23	Textiles	99.6 (9)	100.6 (40)
24	Cement	98.2 (45)	101.7 (8)
25	Chemicals and Chemical Products	99.4 (1)	100.4 (31)
26	Manufactured Products	99.3 (52)	100.4 (19)

NOTE: Figures in parentheses indicate the week of occurrence of minimum or maximum value starting with first week of April.

Decomposition for 1991-92

In this section we have attempted to analyse the contribution made by the trend component, seasonal and residual factors in the movement of weekly WPI during 1991-92. One may note that *each of the three components dominates the other two in different weeks of the year.* The trend has a positive contribution to the observed price changes in all the cases, with the exception of gram. The seasonal and residual factors, however, contribute both positively and negatively in different periods within a year to the price change in one week over the previous week. *Table 5* shows the frequency distribution of weeks by direction-wise impact of the seasonal and residual factors in 1991-92 for different commodities. The main points emerging from this table are the following:

(i) The seasonal and residual factors both contributed to the price rise above the trend level for more than 25 per cent of the weeks in 1991-92 for key items like rice, wheat, jowar, bajra, cotton, jute, milk, sugar and textiles. Similar behaviour was noticed at the commodity group level for primary articles, food products, foodgrains, cereals, edible oils, manufactured products and chemical products.

(ii) The seasonal and residual factors both operated to pull down the price level from the trend level more frequently in the case of wheat, onion, arhar, jowar, sugar, primary articles, food articles, foodgrains, cereals, pulses, food products, textiles, leather, manufactured products and groundnut oil than in the case of other items. The number of weeks in which both the factors had *negative effect* for this list of items ranges between 1 and 26.

(iii) The negative *residual factors neutralised (partially or fully) the positive seasonal effects* on price rise for more than 30 per cent of the weeks in case of rice, gram, pulses, groundnut oil, edible oils, non food articles and cement. Similar neutralising effect occurred for all other items between 11-30 per cent of the weeks.

(iv) The positive residual factor contributing to the price rise *did not permit of the negative seasonal effect* to bring down the prices from the trend level *for about 30 per cent of the weeks* of the year for gram, arhar, bajra, jute, milk, food articles, food products, chemicals and at the all-commodity level. Such offsetting effects took place for 20-30 per cent of the weeks in the case of rice, jowar, onion, cotton and groundnut oil and also for primary articles, cereals and food products. For other commodities offsetting effect of this type was for 7-20 per cent of the weeks.

Table 5

Frequency Table on Directionwise Impact of SI and RI in 1991-92

S.No.	Commodity	SI +VE / RI +VE	SI +VE / RI -VE	SI -VE / RI +VE	SI -VE / RI -VE	Total
1	All Commodities	21	6	16	9	52
2	Primary Articles	15	3	13	14	52
3	Food Articles	10	12	16	14	52
4	Non Food Articles	9	16	15	12	52
5	Foodgrains	14	6	20	12	52
6	Cereals	13	8	13	14	52
7	Pulses	8	12	14	18	52
8	Rice	21	16	14	1	52
9	Wheat	23	12	4	13	52
10	Jowar	19	8	14	11	52
11	Bajra	17	10	18	7	52
12	Arhar	5	10	16	21	52
13	Gram	8	17	18	9	52
14	Onion	7	23	12	10	52
15	Milk	13	14	17	8	52
16	Cotton	14	13	13	12	52
17	Jute	14	13	17	8	52
18	Leather	4	18	4	26	52
19	Groundnut Oil	5	17	12	18	52
20	Edible Oil	18	24	9	11	52
21	Food Products	14	13	13	12	52
22	Sugar	15	12	7	18	52
23	Textiles	14	8	10	20	52
24	Cement	9	23	9	11	52
25	Chemicals and Chemical Products	17	10	16	9	52
26	Manufactured Products	15	12	6	19	52

Since both RI and SI operated in opposite directions for a majority of the weeks in 1991-92, it may be of interest to further examine the question on how frequently one index more than offsets the effect of the other. The answer to such a question appears in *Table 6*. The third column in this table shows the number of weeks in which (i) SI is *positive (price increasing)* but RI is *negative (price decreasing)*; and (ii) SI effect gets partially offset by RI, i.e., absolute value of SI is more than absolute value of RI. The next column shows the number of weeks in which positive SI value is more than offset by negative RI. Similarly, columns 5 and 6 show partial and complete neutralisation for SI negative weeks.

Table 6 indicates the dominant role of the residual factors in 1991-92. The residual effect completely offsets the seasonal effect in a large number of weeks in 1991-92 for all the commodities considered here. In fact, whenever RI and SI move in opposite directions, RI in general completely neutralises SI for most of the weeks. In the case of "all commodities", for example, positive RI more than offsets negative SI for 8 weeks and partially offsets SI for the same number of weeks (i.e. 8). Similarly, positive SI dominates negative RI for 2 weeks but it gets dominated for 4 weeks at the aggregate level. Note that when *positive SI is more than offset by negative RI* (as in column 4 of Table 6), the net result is that *actual price remains below the trend level.* On the other hand, when *negative SI is more than offset by positive RI* (as in column 6 of Table 6), the actual prices are pulled up to a level higher than the trend level.

The results are more pronounced at specific commodity level. In the case of rice, the negative seasonal effect operates for 14 weeks in a year. But in as many as 8 of these 14 weeks in 1991-92, the positive residual factors are so dominant that the actual prices are higher than the trend level. In the case of bajra, negative seasonal impact in 16 out of 18 weeks is completely offset by residual factors. Cereals, pulses, foodgrains and food articles also show similar pattern. In the case of wheat, on the other hand, the residual factors contributed to reducing the price from the trend level in 12 weeks whereas it led to price increase in only 1 week of the year. Complete neutralisation of negative SI is also more pronounced for jute, jowar, bajra, gram, arhar, sugar as well as manufactured products and food article groups.

Table 6

Frequency Distribution of Weeks Showing Offsetting of SI by RI in 1991-92

S.No.	Commodity	SI Positive Weeks		SI Negative Weeks	
		Partial Offset (SI > RI)	Complete Offset (SI < RI)	Partial Offset (SI > RI)	Complete Offset (SI < RI)
(1)	(2)	(3)	(4)	(5)	(6)
1	All Commodities	2	4	8	8
2	Primary Articles	3	0	6	7
3	Food Articles	6	6	2	14
4	Non Food Articles	5	11	6	9
5	Foodgrains	1	5	3	17
6	Cereals	2	6	1	12
7	Pulses	2	10	2	12
8	Rice	6	10	6	8
9	Wheat	0	12	3	1
10	Jowar	2	6	1	13
11	Bajra	3	7	2	16
12	Arhar	0	10	2	14
13	Gram	2	15	2	16
14	Onion	5	18	5	7
15	Milk	1	13	8	9
16	Cotton	3	10	6	7
17	Jute	2	11	5	12
18	Leather	0	18	0	4
19	Groundnut Oil	2	15	6	6
20	Edible Oils	4	20	4	5
21	Food Products	4	9	5	8
22	Sugar	1	11	0	7
23	Textiles	1	7	3	7
24	Cement	1	22	1	8
25	Chemicals and Chemical Products	2	8	2	14
26	Manufactured Products	5	7	0	6

D. PROJECTION OF WEEKLY PRICES

IN order to make projection for a future time period, we need estimates of T, SI and R for that period. The effects of factors reflecting the impact of T and SI are captured by the trend and the seasonal indices as discussed in the preceding section. Since the residuals are a result of diverse set of factors affecting the supply and demand for the commodities, for any specific year, only some subjective assessment can be made to obtain estimates of the residual component. After much experimentation with alternative methods to incorporate the residual element in our forecast (at the 'all-commodity' level), the procedure that we have finally adopted involves the following steps:

1. Using the growth rates, obtained by fitting linear trend on deseasonalised data from 1982-83 to 1991-92, we obtain deseasonalised trend values for future periods. Let us denote these forecasts of trend values by Tn (where n refers to the time period, i.e., nth week of the financial year for which we are making the forecast), then

$$\text{Log } Tn = \alpha + \beta.n = y \text{ (say)}$$

$$\text{or} Tn = e^{y} \qquad \text{..... (1)}$$

where n=521, 522 etc. for weeks of 1992-93 starting with April first week (since the regression on the sample period used 520 observations).

2. We reseasonalise the trend values (Tn) by multiplying it by the weekly seasonal indices (SIn) that we had constructed earlier. Let us denote the reseasonalised trend values by TnSn. We then have

$$TnSn = Tn \times (SIn/100) \qquad \text{..... (2)}$$

3. To incorporate the residual component into our projection, we have used the residual index (RIn), which is an average of the residual variation observed during each week for the past ten years, as the first approximation for residual component of the price for future time periods. The forecast so obtained can be expressed as :

$$WPIn = TnSn \times (RIn/100) \qquad \text{..... (3)}$$

4. The forecast obtained in step 3 has been further adjusted to eliminate the systematic bias in it for recent years. Observed WPI (WPIo) for the last three financial years (1988-89 to 1991- 92) has been regressed on the estimated WPI (WPIe) for the same time period. This equation can be expressed as follows:

$$WPIo = \alpha + \beta (WPIe) \quad \text{..... (4)}$$

where WPIe denotes estimated WPI for the sample period using methods as in steps (1) to (3). We plug in the weekly projections WPIn (beyond the sample period) in equation (4) to arrive at the forecast.

5. As provisional WPI is the latest estimate of prevailing prices at given point of time, we have used it to make final correction in our forecast. The estimate of WPI (obtained through steps 1 to 4) is corrected on the basis of the difference between estimated average and observed average in provisional WPI figures. Correction for the first four weeks has been made on the basis of provisional data for that period. The adjustment for the rest of the weeks is carried out on the basis of last four available provisional figures.

Using the above methodology we have made an estimate of the likely inflation rate in 1992-93. These estimates are documented in the *Table 7*. Average inflation rate for the year 1992- 93 based on provisional price data is projected to be 9.4 per cent. In September, we had projected the average inflation rate for this year to be 9.7 per cent. It may be noted that observed average inflation rate upto the 49th week of 1992-93 is 9.4 per cent.

It may be noted here that the projections of inflation rate given here are on the basis of "provisional" WPI for the present year and the "final" WPI for 1991-92. As the final WPI figures exceed the provisional ones by about 1 per cent, inflation rate on the basis of final figures would be higher by about 1 percentage point than what has been projected.

Table 7

Inflation Rate - All Commodities

Weeks (Financial Year)	*Observed WPI 1991-92*	*Observed WPI 1992-93*	*Projected WPI 1992-93*	*Inflation Rate*		*Inflation Rate Prov. (92-93) over Final (1991-92)*
				Observed 1991-92	*1992-93*	
1	192.3	217.0	217.1	11.7	12.9	12.8
2	192.6	217.5	217.6	11.5	13.0	12.9
3	192.9	218.5	218.1	11.6	13.1	13.3
4	193.3	218.6	218.7	11.4	13.2	13.1
5	193.8	218.5	219.5	11.6	13.2	12.7
6	194.5	218.9	220.0	11.5	13.1	12.5
7	195.0	219.5	220.2	11.7	12.9	12.6
8	195.7	220.6	220.5	12.1	12.7	12.7
9	196.8	220.9	221.2	12.3	12.4	12.2
10	197.6	221.2	222.2	12.1	12.4	11.9
11	198.5	221.3	222.5	12.1	12.1	11.5
12	199.2	221.8	222.8	12.1	11.8	11.3
13	200.1	222.8	223.2	12.3	11.5	11.3
14	201.0	223.6	224.1	12.4	11.5	11.2
15	201.8	224.2	224.7	12.6	11.4	11.1
16	202.6	224.7	225.1	12.9	11.1	10.9
17	205.8	224.9	225.7	14.5	9.7	9.3
18	207.3	226.2	226.6	15.0	9.3	9.1
19	208.4	226.6	227.3	15.6	9.1	8.7
20	209.6	227.1	227.5	16.3	8.5	8.3
21	210.4	226.7	227.3	16.7	8.0	7.7
22	210.3	226.6	226.8	16.4	7.8	7.8
23	210.6	226.6	226.6	16.5	7.6	7.6
24	210.6	226.2	226.4	16.5	7.5	7.4
25	210.4	228.9	229.2	16.3	8.9	8.8
26	210.1	229.4	229.0	15.9	9.0	9.2
27	210.0	229.6	229.7	15.3	9.4	9.3
28	210.1	229.7	230.0	15.2	9.5	9.3

(*Continued*)

Table 7 (Contd.)

Weeks (Financial Year)	*Observed WPI 1991-92*	*Observed WPI 1992-93*	*Projected WPI 1992-93*	*Inflation Rate*		*Inflation Rate Prov. (92-93) over Final (1991-92)*
				Observed 1991-92	*1992-93*	
29	210.2	230.8	230.6	14.1	9.7	9.8
30	210.4	231.5	230.8	14.0	9.7	10.0
31	211.2	231.8	231.4	14.3	9.6	9.8
32	212.1	231.5	231.8	14.6	9.3	9.1
33	212.6	231.4	231.9	14.9	9.1	8.8
34	213.0	231.5	231.5	14.9	8.7	8.7
35	212.9	231.1	230.9	14.6	8.5	8.5
36	212.9	231.4	231.0	14.4	8.5	8.7
37	212.8	231.0	231.2	13.8	8.6	8.6
38	212.9	231.1	231.0	13.9	8.5	8.5
39	214.2	231.0	231.4	14.3	8.0	7.8
40	214.9	230.2	231.9	14.0	7.9	7.1
41	215.1	230.1	232.2	13.7	7.9	7.0
42	215.5	230.1	232.8	13.3	8.0	6.8
43	215.6	230.7	230.7	13.1	7.0	7.0
44	215.8	230.6	230.5	12.9	6.8	6.9
45	215.7	230.7	230.8	12.5	7.0	7.0
46	216.5	230.7	230.6	12.9	6.5	6.6
47	216.7	232.5	231.3	13.0	6.7	7.3
48	217.1	231.9	231.8	13.2	6.8	6.8
49	217.7	232.6	232.3	13.6	6.7	6.8
50	217.7		232.7	13.6	6.9	
51	217.6		233.2	13.5	7.2	
52	217.8		233.4	13.6	7.2	
AVERAGE*	*207.9*	*226.8*	*227.5*	*13.7*	*9.4*	*9.4*

NOTE: Average refers to the period for which data/projections are indicated.

E. CONCLUSION

IN this paper we have attempted to decompose the trend, the seasonal, and the residual components of the observed prices for a number of commodities /commodity groups on a weekly basis using data for the period 1982-83 to 1991-92. The decomposition reveals the differential roles played by the three components in explaining the actual price levels. We have also attempted to analyse the contribution of each of these components in the weekly price changes of 1991-92. The results clearly bring out the dominant role of the residual factors in the price movement during the financial year 1991-92. We have also attempted short term projection of WPI at the all-commodities level using the three components associated with the movement of prices. These projections were done for the financial year 1992-92 on a weekly basis.

In September, we had projected the average inflation rate for the financial year 1992-93 to be 9.7 per cent. In conclusion, we may note that while the decomposition as attempted in this paper helps in quantification of the relative impact of the components, this exercise needs to be complemented by analysis of specific economic factors responsible for the particular movement of the residual component.

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ANNEXURE

Table 1S
Weekly Seasonal Index

Weeks	*All Commodities*	*Primary Articles*	*Food Articles*	*Non Food Articles*	*Foodgrains*	*Cereals*
1	99.5	98.0	97.3	98.9	98.7	98.9
2	99.6	98.0	97.3	98.9	98.5	98.7
3	99.7	98.0	97.4	98.8	98.2	98.6
4	99.7	98.3	97.9	98.8	98.3	98.6
5	99.8	98.6	98.4	98.9	98.3	98.6
6	99.9	98.9	98.9	98.9	98.3	98.5
7	99.9	99.2	99.3	98.9	98.3	98.5
8	100.0	99.6	99.8	99.0	98.3	98.5
9	100.2	99.8	100.2	99.2	98.7	98.8
10	100.3	100.1	100.6	99.5	99.0	99.2
11	100.4	100.4	101.0	99.7	99.4	99.5
12	100.6	100.7	101.4	100.0	99.8	99.8
13	100.7	101.0	101.7	100.2	100.1	100.1
14	100.8	101.2	102.1	100.4	100.5	100.4
15	100.9	101.4	102.4	100.6	100.8	100.7
16	101.0	101.6	102.7	100.8	101.1	101.1
17	101.0	101.8	103.0	100.9	101.4	101.4
18	101.1	102.1	103.3	101.1	101.8	101.7
19	101.1	101.9	103.1	100.8	101.7	101.7
20	101.0	101.8	102.8	100.6	101.6	101.7
21	100.9	101.7	102.6	100.3	101.5	101.7
22	100.9	101.6	102.3	100.0	101.3	101.7
23	100.8	101.4	102.1	99.7	101.2	101.7
24	100.8	101.4	102.0	99.8	101.2	101.5
25	100.7	101.4	101.9	99.9	101.2	101.4
26	100.6	101.3	101.9	100.0	101.1	101.3
27	100.6	101.3	101.8	100.0	101.1	101.1
28	100.5	101.2	101.7	100.1	101.1	101.0
29	100.4	101.2	101.6	100.2	101.0	100.9
30	100.4	101.1	101.5	100.4	100.9	100.8
31	100.3	101.0	101.4	100.5	100.9	100.7
32	100.2	101.0	101.3	100.6	100.8	100.6
33	100.1	100.9	101.2	100.8	100.7	100.5
34	100.0	100.6	100.7	100.8	100.4	100.2
35	99.8	100.2	100.2	100.7	100.2	100.0
36	99.6	99.9	99.7	100.7	99.9	99.7
37	99.4	99.5	99.2	100.7	99.6	99.5
38	99.2	99.2	98.7	100.6	99.4	99.2
39	99.2	99.1	98.6	100.6	99.5	99.3
40	99.2	99.0	98.4	100.5	99.6	99.3
41	99.2	99.0	98.2	100.4	99.7	99.4
42	99.2	98.9	98.1	100.4	99.8	99.4
43	99.2	98.8	97.9	100.3	99.9	99.5
44	99.1	98.7	97.7	100.1	99.8	99.5
45	99.1	98.5	97.6	99.9	99.8	99.5
46	99.0	98.4	97.4	99.7	99.8	99.6
47	99.0	98.2	97.3	99.4	99.7	99.6
48	98.9	98.1	97.1	99.2	99.7	99.6
49	99.0	98.1	97.2	99.2	99.5	99.5
50	99.1	98.1	97.2	99.1	99.3	99.3
51	99.2	98.0	97.2	99.0	99.1	99.2
52	99.3	98.0	97.3	99.0	98.9	99.0

Table 2S
Weekly Seasonal Index

Weeks	*Pulses*	*Rice*	*Wheat*	*Jowar*	*Bajra*	*Arnar*	*Gram*
1	97.8	98.2	100.0	98.9	99.8	97.6	97.1
2	97.7	98.4	99.2	99.0	100.0	97.5	96.6
3	97.6	98.5	98.3	99.0	100.1	97.4	96.1
4	97.7	98.8	97.9	99.3	100.3	97.2	96.0
5	97.9	99.0	97.4	99.6	100.5	97.0	95.9
6	98.0	99.2	97.0	99.9	100.7	96.8	95.8
7	98.2	99.5	96.5	100.2	100.9	96.6	95.7
8	98.4	99.7	96.1	100.5	101.1	96.4	95.7
9	98.6	100.1	96.2	100.7	100.8	96.9	95.7
10	98.8	100.5	96.4	101.0	100.6	97.4	95.8
11	99.1	100.9	96.5	101.2	100.4	98.0	95.8
12	99.3	101.3	96.7	101.5	100.2	98.5	95.9
13	99.5	101.7	96.8	101.8	99.9	99.1	95.9
14	99.9	102.0	97.1	101.9	100.5	99.7	96.9
15	100.3	102.3	97.4	102.0	101.0	100.2	97.9
16	100.7	102.6	97.7	102.1	101.6	100.8	98.8
17	101.1	102.9	98.1	102.2	102.2	101.4	99.8
18	101.4	103.1	98.4	102.3	102.7	101.9	100.8
19	101.4	103.3	98.4	102.0	102.2	101.8	101.0
20	101.3	103.4	98.5	101.7	101.8	101.7	101.2
21	101.2	103.5	98.6	101.4	101.3	101.7	101.4
22	101.1	103.7	98.6	101.1	100.8	101.6	101.6
23	101.1	103.8	98.7	100.8	100.3	101.5	101.8
24	101.2	103.6	98.8	100.8	99.5	101.8	102.3
25	101.4	103.3	98.9	100.8	98.7	102.2	102.8
26	101.6	103.1	99.0	100.7	97.9	102.5	103.3
27	101.8	102.8	99.1	100.7	97.1	102.8	103.8
28	102.0	102.6	99.2	100.6	96.3	103.2	104.3
29	101.9	102.1	99.6	100.0	97.0	103.1	104.3
30	101.8	101.6	100.1	99.4	97.7	103.0	104.3
31	101.7	101.2	100.5	98.8	98.4	102.9	104.2
32	101.7	100.7	101.0	98.2	99.1	102.9	104.2
33	101.6	100.3	101.4	97.6	99.8	102.8	104.2
34	101.5	99.6	101.5	98.1	99.8	102.5	104.0
35	101.4	98.9	101.6	98.5	99.8	102.2	103.8
36	101.4	98.2	101.6	99.0	99.8	101.9	103.7
37	101.3	97.5	101.7	99.4	99.7	101.6	103.5
38	101.2	96.8	101.8	99.9	99.7	101.3	103.3
39	100.9	96.8	102.4	99.8	100.0	100.9	102.5
40	100.6	96.8	103.0	99.7	100.3	100.6	101.7
41	100.3	96.8	103.7	99.6	100.5	100.2	100.8
42	99.9	96.8	104.3	99.6	100.8	99.8	100.0
43	99.6	96.8	104.9	99.5	101.1	99.5	99.2
44	99.4	96.9	104.7	99.3	100.7	99.2	99.3
45	99.1	97.1	104.5	99.1	100.3	98.9	99.4
46	98.9	97.2	104.4	98.9	99.9	98.6	99.5
47	98.7	97.3	104.2	98.7	99.5	98.3	99.6
48	98.4	97.4	104.0	98.5	99.1	98.0	99.6
49	98.3	97.6	103.2	98.5	99.2	97.9	99.1
50	98.2	97.8	102.4	98.6	99.4	97.8	98.6
51	98.1	97.9	101.6	98.7	99.5	97.7	98.1
52	97.9	98.1	100.8	98.8	99.7	97.6	97.6

Table 3S
Weekly Seasonal Index

Weeks	*Onion*	*Milk*	*Cotton*	*Jute*	*Leather*	*Groundnut Oil*
1	83.5	99.3	100.6	104.8	100.6	97.4
2	82.3	99.5	101.0	105.4	100.8	97.7
3	81.1	99.7	101.3	106.1	100.9	98.0
4	82.0	100.2	101.4	105.3	100.9	98.2
5	82.8	100.8	101.6	104.5	100.9	98.5
6	83.6	101.3	101.7	103.7	100.9	98.7
7	84.4	101.9	101.8	102.9	100.9	99.0
8	85.2	102.5	102.0	102.1	100.9	99.2
9	87.0	102.1	101.9	102.1	100.7	99.7
10	88.9	101.8	101.9	102.0	100.6	100.1
11	90.7	101.5	101.9	102.0	100.5	100.6
12	92.6	101.2	101.9	101.9	100.4	101.0
13	94.4	100.9	101.9	101.9	100.3	101.5
14	93.8	100.8	102.3	101.6	100.2	102.1
15	93.2	100.8	102.7	101.3	100.1	102.8
16	92.6	100.7	103.1	100.9	100.1	103.4
17	91.9	100.6	103.5	100.6	100.0	104.1
18	91.3	100.6	103.9	100.3	99.9	104.8
19	92.8	100.6	103.3	99.4	99.9	104.6
20	94.2	100.7	102.8	98.6	99.9	104.4
21	95.6	100.7	102.3	97.7	99.9	104.2
22	97.1	100.8	101.7	96.8	99.9	104.1
23	98.5	100.8	101.2	96.0	99.9	103.9
24	103.6	100.9	100.8	96.5	99.9	103.5
25	108.6	100.9	100.4	97.1	99.9	103.2
26	113.6	101.0	100.1	97.6	99.9	102.8
27	118.7	101.0	99.7	98.2	99.9	102.4
28	123.7	101.1	99.3	98.7	99.8	102.1
29	127.2	100.9	98.5	98.2	99.8	101.7
30	130.7	100.7	97.7	97.6	99.7	101.3
31	134.2	100.6	96.9	97.1	99.6	101.0
32	137.7	100.4	96.0	96.5	99.5	100.6
33	141.2	100.2	95.2	95.9	99.4	100.3
34	136.0	99.8	95.5	96.2	99.4	100.0
35	130.8	99.4	95.7	96.4	99.4	99.7
36	125.6	99.0	95.9	96.7	99.3	99.4
37	120.5	98.6	96.2	97.0	99.3	99.1
38	115.3	98.2	96.4	97.2	99.3	98.8
39	109.3	98.1	97.1	97.5	99.3	98.4
40	103.4	98.1	97.8	97.8	99.4	98.0
41	97.5	98.1	98.5	98.1	99.4	97.6
42	91.5	98.0	99.1	98.4	99.4	97.2
43	85.6	98.0	99.8	98.7	99.5	96.8
44	86.4	98.1	99.7	99.3	99.5	96.7
45	87.1	98.2	99.5	99.8	99.6	96.5
46	87.9	98.3	99.3	100.4	99.7	96.3
47	88.7	98.4	99.1	101.0	99.8	96.2
48	89.5	98.5	99.0	101.5	99.9	96.0
49	88.3	98.7	99.3	102.2	100.1	96.3
50	87.1	98.8	99.6	102.8	100.2	96.6
51	85.9	99.0	100.0	103.5	100.3	96.8
52	84.7	99.2	100.3	104.1	100.5	97.1

Table 4S
Weekly Seasonal Index

Weeks	*Edible Oils*	*Food Products*	*Sugar*	*Textiles*	*Cement*	*Chemicals & Chem Pds.*	*Manu. Products*
1	98.2	98.2	100.3	100.4	99.8	100.0	100.0
2	98.4	98.5	100.5	100.4	99.9	100.0	100.1
3	98.6	98.7	100.6	100.4	99.9	100.0	100.2
4	98.7	99.0	100.7	100.3	99.8	100.0	100.3
5	98.8	99.2	100.8	100.2	99.6	100.0	100.3
6	98.9	99.5	100.9	100.0	99.4	100.0	100.3
7	99.1	99.8	101.0	99.9	99.3	100.0	100.3
8	99.2	100.0	101.1	99.8	99.1	100.0	100.3
9	99.4	100.3	101.1	99.7	99.3	100.0	100.3
10	99.6	100.5	101.1	99.7	99.4	100.0	100.3
11	99.8	100.7	101.2	99.6	99.6	100.0	100.4
12	99.9	100.9	101.2	99.6	99.7	100.0	100.4
13	100.1	101.2	101.2	99.6	99.8	100.1	100.4
14	100.3	101.4	101.1	99.6	100.0	100.1	100.4
15	100.4	101.7	101.1	99.6	100.2	100.1	100.5
16	100.5	101.9	101.0	99.7	100.4	100.1	100.5
17	100.7	102.2	100.9	99.7	100.6	100.1	100.6
18	100.8	102.4	100.8	99.8	100.7	100.1	100.6
19	101.0	102.5	100.6	99.8	100.7	100.1	100.6
20	101.3	102.5	100.5	99.7	100.6	100.1	100.6
21	101.5	102.5	100.3	99.7	100.5	100.0	100.6
22	101.7	102.5	100.2	99.7	100.4	100.0	100.5
23	101.9	102.6	100.0	99.7	100.3	100.0	100.5
24	101.8	102.4	99.9	99.7	100.4	100.0	100.5
25	101.6	102.3	99.8	99.7	100.4	100.1	100.4
26	101.5	102.2	99.7	99.7	100.4	100.1	100.3
27	101.3	102.0	99.6	99.6	100.4	100.2	100.2
28	101.1	101.9	99.4	99.6	100.4	100.2	100.2
29	101.0	101.5	99.4	99.6	100.5	100.2	100.1
30	100.8	101.2	99.3	99.6	100.5	100.2	99.9
31	100.6	100.9	99.2	99.6	100.6	100.1	99.8
32	100.5	100.5	99.2	99.6	100.6	100.1	99.7
33	100.3	100.2	99.1	99.5	100.7	100.1	99.6
34	100.5	99.8	99.1	99.6	100.4	100.0	99.6
35	100.7	99.5	99.0	99.7	100.2	100.0	99.5
36	100.9	99.1	99.0	99.8	99.9	99.9	99.4
37	101.1	98.7	98.9	99.9	99.6	99.9	99.4
38	101.4	98.3	98.9	100.0	99.3	99.8	99.3
39	101.1	98.3	98.9	100.1	99.5	99.8	99.4
40	100.8	98.2	99.0	100.2	99.7	99.9	99.4
41	100.6	98.1	99.0	100.3	99.8	99.9	99.5
42	100.3	98.0	99.1	100.4	100.0	99.9	99.5
43	100.0	98.0	99.1	100.5	100.1	100.0	99.5
44	99.5	97.8	99.2	100.5	100.0	100.0	99.5
45	99.0	97.6	99.3	100.4	99.9	99.9	99.5
46	98.4	97.4	99.5	100.4	99.8	99.9	99.4
47	97.9	97.2	99.6	100.4	99.7	99.9	99.4
48	97.3	97.0	99.7	100.4	99.5	99.9	99.3
49	97.5	97.3	99.8	100.4	99.6	99.9	99.5
50	97.7	97.5	99.9	100.4	99.6	99.9	99.6
51	97.9	97.7	100.1	100.4	99.7	99.9	99.7
52	98.1	98.0	100.2	100.4	99.8	99.9	99.9

Table 1R
Weekly Residual Index

Weeks	*All Commodities*	*Primary Articles*	*Food Articles*	*Non Food Articles*	*Foodgrains*	*Cereals*
1	99.5	98.9	98.9	99.5	99.5	99.4
2	99.5	99.0	99.0	99.4	99.1	98.9
3	99.4	99.0	99.0	99.3	98.6	98.3
4	99.3	98.8	98.9	99.2	98.3	98.0
5	99.4	98.8	99.0	99.0	98.2	97.9
6	99.5	99.0	99.2	99.3	98.3	98.0
7	99.6	99.1	99.2	99.5	98.6	98.3
8	99.6	98.9	98.8	99.5	98.7	98.5
9	99.6	99.1	99.3	99.4	98.6	98.4
10	99.7	99.4	99.7	99.3	98.6	98.5
11	99.7	99.4	99.7	99.2	98.5	98.3
12	99.7	99.6	99.9	99.5	98.4	98.3
13	99.7	99.7	100.1	99.4	98.3	98.3
14	99.9	100.0	99.7	99.4	98.4	98.3
15	99.9	100.1	100.0	99.8	98.7	98.7
16	99.9	100.0	100.1	99.7	98.9	98.9
17	100.0	100.1	99.9	100.2	99.0	99.0
18	100.1	100.2	100.1	100.1	99.1	99.1
19	100.3	100.7	100.9	100.6	100.0	99.9
20	100.4	101.0	101.1	101.5	100.5	100.4
21	100.4	100.9	101.0	101.7	100.5	100.4
22	100.3	100.7	100.8	101.4	100.6	100.4
23	100.2	100.2	100.7	100.4	100.8	100.4
24	100.1	100.0	100.6	99.6	100.7	100.4
25	100.0	99.7	100.2	99.4	100.5	100.2
26	99.8	99.4	100.0	98.7	100.0	99.8
27	100.0	99.8	99.9	100.2	99.6	99.5
28	100.0	99.9	100.2	99.7	99.8	99.6
29	100.1	99.9	100.1	99.8	99.9	99.8
30	100.1	99.9	100.1	99.5	99.9	99.8
31	100.1	100.0	100.0	100.0	99.8	99.8
32	100.1	100.2	100.1	100.0	99.9	99.9
33	100.1	100.2	100.0	99.9	99.9	99.6
34	100.1	100.3	100.1	99.8	99.9	99.6
35	100.0	100.2	99.8	100.0	99.9	99.6
36	100.1	100.1	99.4	100.1	99.8	99.5
37	100.2	100.3	100.4	100.2	100.1	99.9
38	100.2	100.3	100.1	100.5	100.3	100.1
39	100.2	100.2	99.8	100.7	100.5	100.5
40	100.3	100.1	99.8	100.7	100.9	101.0
41	100.5	100.4	100.3	100.8	101.4	101.6
42	100.6	100.6	100.7	100.7	101.9	102.4
43	100.4	100.5	100.8	100.4	101.8	102.4
44	100.4	100.4	100.5	100.5	101.7	102.3
45	100.4	100.4	100.5	100.4	101.8	102.4
46	100.3	100.5	100.6	100.3	102.2	102.7
47	100.3	100.5	100.4	100.7	102.0	102.5
48	100.3	100.7	100.7	100.3	101.8	102.4
49	100.2	100.3	100.2	99.9	101.4	101.9
50	100.0	100.1	99.9	99.6	101.6	102.1
51	99.9	100.0	99.8	99.6	101.6	102.0
52	99.7	99.9	99.8	99.1	101.5	101.9

Table 2R
Weekly Residual Index

Weeks	*Pulses*	*Rice*	*Wheat*	*Jowar*	*Bajra*	*Arhar*	*Gram*
1	98.6	98.7	100.6	98.1	99.0	99.5	99.8
2	98.5	98.6	99.6	97.3	99.0	99.1	99.6
3	98.7	98.6	97.8	97.2	99.0	99.6	99.2
4	98.3	98.6	96.9	97.1	99.1	99.5	99.4
5	98.5	98.7	96.2	97.2	99.9	99.4	99.7
6	98.5	98.6	96.2	97.4	100.4	100.1	100.6
7	98.7	98.7	96.9	97.6	99.9	100.0	101.9
8	98.3	98.7	97.8	97.3	98.4	99.2	101.6
9	98.6	98.6	97.6	97.3	97.1	100.1	101.6
10	98.9	98.6	97.9	97.0	97.3	100.0	101.9
11	99.0	98.3	97.9	97.7	97.6	100.2	102.0
12	98.8	98.3	98.0	97.1	97.6	100.0	101.8
13	98.8	98.5	97.8	97.0	96.9	99.9	101.6
14	98.8	98.6	97.7	97.4	97.2	99.9	101.1
15	101.5	98.9	98.2	97.5	98.0	99.6	101.6
16	101.8	99.0	98.6	98.0	98.5	100.2	101.6
17	101.5	99.2	98.5	99.0	98.6	99.8	101.1
18	102.0	99.4	98.8	97.6	97.9	100.8	100.9
19	102.2	100.1	99.7	98.8	99.0	101.0	100.7
20	102.7	100.4	99.9	99.6	100.6	100.9	101.2
21	102.5	100.2	100.1	99.5	100.2	100.1	101.6
22	102.2	100.4	99.8	98.8	99.2	100.3	101.3
23	102.1	100.5	99.8	99.1	97.0	101.3	101.0
24	102.1	100.5	99.8	98.7	97.0	100.1	100.9
25	101.9	100.3	99.8	98.0	97.8	100.9	100.0
26	101.1	99.9	99.6	97.6	97.3	100.0	99.6
27	100.7	99.7	99.0	97.1	98.3	98.7	99.7
28	101.4	99.8	99.5	97.1	97.6	100.4	100.7
29	101.6	100.0	99.5	97.7	97.0	101.5	101.0
30	101.3	100.2	99.4	98.7	96.5	99.6	100.9
31	101.0	100.3	99.2	97.5	97.3	99.8	100.2
32	101.3	100.1	99.7	98.7	97.7	100.6	100.8
33	101.2	100.0	99.8	100.1	97.7	99.3	101.0
34	101.4	99.7	100.2	101.1	98.3	100.3	101.0
35	101.0	99.8	100.3	100.9	99.8	99.8	100.5
36	100.3	99.7	100.2	102.8	99.8	99.2	99.4
37	99.5	100.3	100.7	102.5	100.1	99.4	98.2
38	99.4	100.7	101.0	102.2	101.1	99.6	97.7
39	99.4	100.8	101.4	103.0	100.9	99.1	98.4
40	99.4	101.0	101.9	103.9	101.4	97.9	99.3
41	100.1	101.1	102.7	103.5	101.9	102.9	100.4
42	99.7	101.5	103.7	104.0	102.1	102.5	99.9
43	99.5	101.7	102.9	104.9	102.0	102.1	99.7
44	98.9	101.7	102.9	104.2	103.2	100.6	99.2
45	98.8	101.8	103.0	104.0	103.3	100.1	98.7
46	99.4	102.1	103.3	104.2	106.0	100.5	99.1
47	99.1	101.9	103.3	104.1	105.3	99.9	98.8
48	98.4	101.6	103.2	104.5	106.0	100.0	97.1
49	97.9	101.4	102.3	104.4	106.5	99.6	96.8
50	97.9	101.4	102.9	103.9	107.2	98.9	96.4
51	98.6	101.2	103.0	105.1	107.2	98.1	95.9
52	98.4	101.3	103.0	105.0	106.2	98.3	96.1

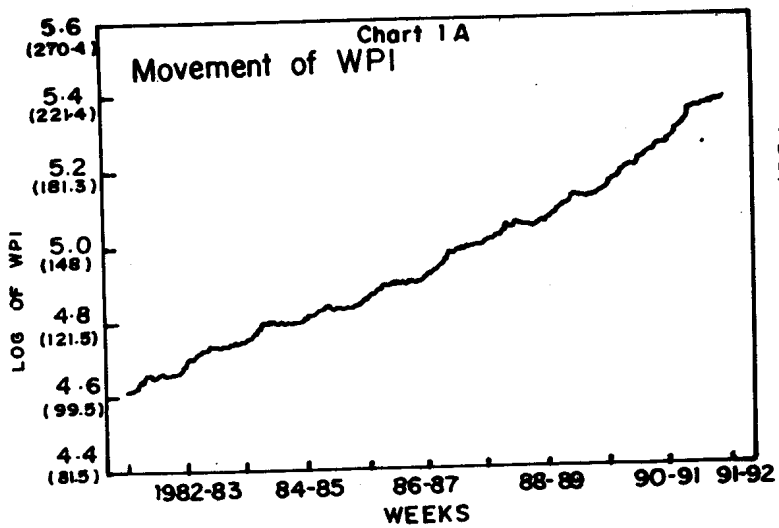
Table 3R
Weekly Residual Index

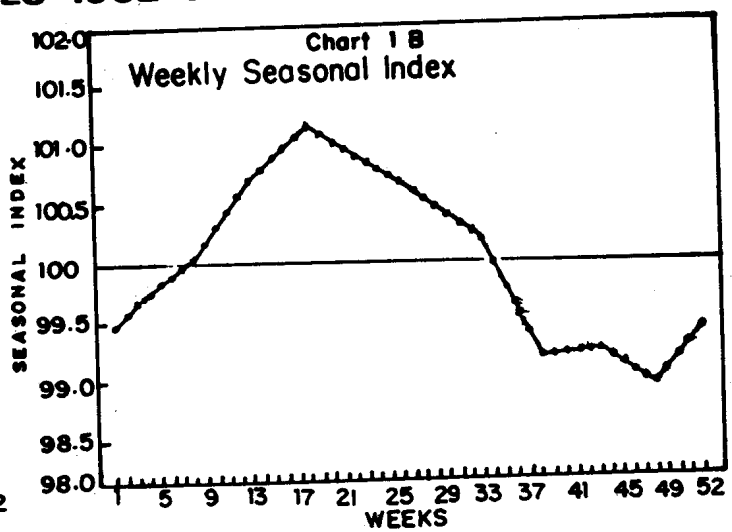
Weeks	*Onion*	*Milk*	*Cotton*	*Jute*	*Leather*	*Groundnut Oil*
1	91.2	98.3	100.1	97.5	100.5	98.6
2	91.9	99.4	100.3	96.5	100.2	98.8
3	92.2	100.4	99.9	96.5	100.3	99.9
4	91.3	99.7	100.2	96.2	100.4	101.0
5	91.6	99.7	99.5	95.8	100.6	100.4
6	90.1	100.6	99.9	97.7	100.6	100.5
7	90.6	100.3	99.5	98.6	100.5	100.7
8	88.4	99.7	99.7	98.6	100.4	100.3
9	85.8	100.3	99.6	99.1	100.4	100.0
10	90.9	100.4	100.3	99.2	100.3	100.2
11	96.0	99.7	99.5	99.4	100.3	100.5
12	97.8	99.6	99.8	99.7	100.4	100.3
13	95.1	100.2	100.4	100.4	100.3	99.9
14	99.7	101.1	100.0	98.7	100.2	99.7
15	102.0	100.3	100.0	98.7	100.1	100.9
16	103.7	100.1	100.5	96.3	100.0	102.4
17	103.8	100.2	101.1	97.0	100.2	102.0
18	107.4	100.5	102.3	96.0	100.3	101.8
19	111.6	100.0	104.0	95.4	100.4	102.4
20	112.6	100.2	105.4	94.9	100.2	102.5
21	115.3	100.2	105.9	94.2	100.1	103.0
22	113.7	99.7	105.7	94.2	100.3	102.1
23	114.9	99.6	104.5	93.9	100.7	101.2
24	112.2	99.5	100.2	92.8	100.6	101.9
25	110.5	99.5	98.7	92.9	100.4	101.0
26	106.8	99.5	97.9	93.9	100.4	100.1
27	102.0	99.9	98.0	96.8	100.4	102.2
28	103.9	99.9	97.2	106.0	100.5	101.3
29	102.2	100.1	98.3	102.7	100.4	99.5
30	100.4	100.1	98.1	108.1	100.2	98.9
31	100.0	100.0	98.3	106.6	100.1	98.6
32	103.4	99.3	97.9	104.4	100.2	98.0
33	99.9	99.3	98.0	100.3	100.1	99.4
34	101.7	99.1	98.1	99.1	99.9	98.6
35	103.4	100.0	97.6	101.7	99.9	98.0
36	102.8	99.4	97.8	101.4	99.9	97.9
37	102.4	100.8	99.2	100.6	99.8	98.6
38	100.3	100.4	100.1	102.2	99.7	98.6
39	99.0	100.5	100.2	103.7	99.6	99.5
40	100.5	99.9	99.5	104.5	99.7	101.8
41	102.9	100.0	100.1	105.2	99.7	101.5
42	107.5	100.7	99.2	105.5	99.5	101.6
43	110.4	100.5	98.3	104.9	99.3	101.8
44	105.4	100.2	99.0	104.8	99.4	100.5
45	99.2	100.3	98.0	105.9	99.3	100.0
46	98.0	100.5	99.2	105.5	99.3	97.8
47	94.0	100.1	99.5	106.4	99.6	98.3
48	89.5	101.0	99.1	104.8	99.4	97.8
49	90.9	101.0	100.2	103.0	99.2	97.9
50	90.9	99.8	101.2	100.4	98.8	97.1
51	90.7	99.3	102.0	99.4	98.5	96.5
52	91.7	99.3	101.1	99.1	98.3	96.2

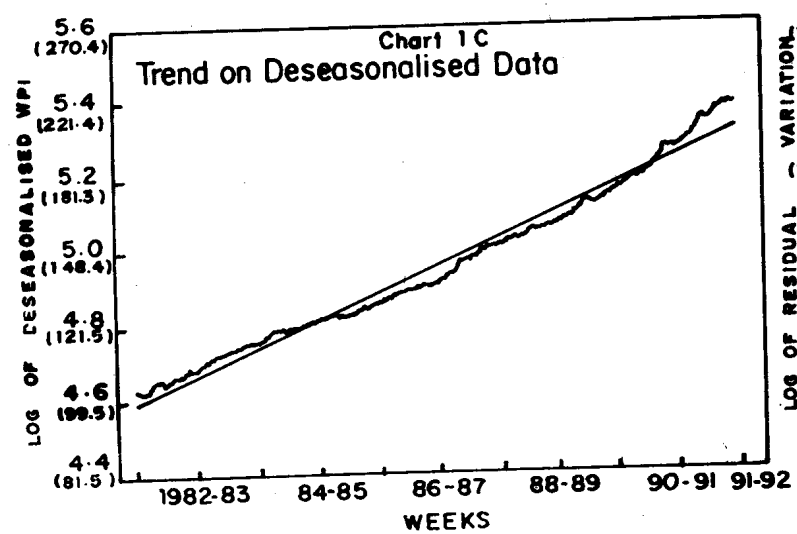
Table 4R
Weekly Residual Index

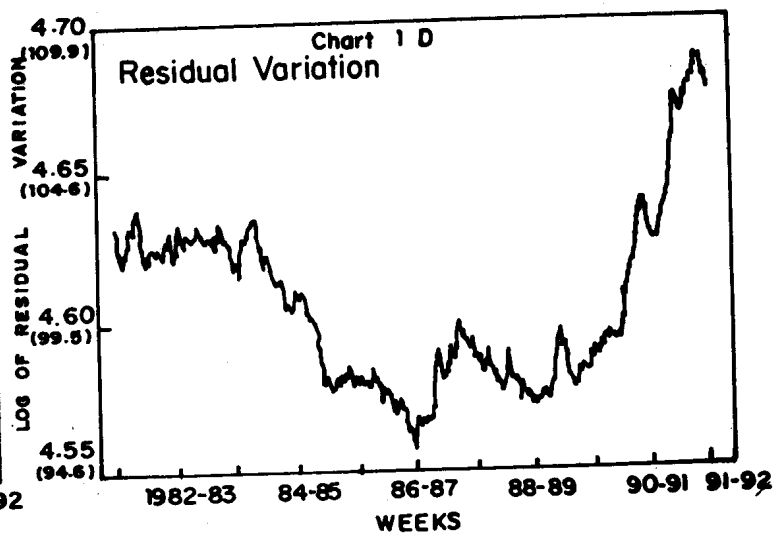
Weeks	*Edible Oils*	*Food Products*	*Sugar*	*Textiles*	*Cement*	*Chemicals & Chem Pds.*	*Manu. Products*
1	99.7	99.2	99.7	99.9	100.3	99.4	99.9
2	99.7	99.1	99.4	99.9	101.2	99.4	100.0
3	99.5	99.3	99.3	99.9	101.5	99.4	99.9
4	99.9	99.4	99.2	99.9	101.6	99.4	99.9
5	99.5	99.2	99.1	99.9	101.2	99.4	100.0
6	99.7	99.2	99.4	99.8	101.1	99.4	99.9
7	99.4	99.3	99.7	99.7	101.6	99.4	99.9
8	99.7	99.3	99.6	99.8	101.7	99.4	99.9
9	100.5	99.3	99.8	99.6	101.5	99.4	99.9
10	100.5	99.6	99.9	99.7	100.6	99.5	100.0
11	100.7	99.6	99.7	99.7	101.9	99.5	100.0
12	100.6	99.6	99.5	99.6	101.6	99.5	99.9
13	100.3	99.6	99.4	99.6	101.1	99.5	99.9
14	100.5	99.8	99.8	100.1	100.8	99.4	100.1
15	101.0	99.9	100.2	99.9	101.3	99.4	100.1
16	101.6	100.1	100.3	99.9	100.8	99.4	100.1
17	101.5	100.1	101.4	100.0	101.2	100.0	100.2
18	101.6	100.1	101.5	100.2	101.0	100.0	100.3
19	101.4	100.4	101.3	100.5	100.6	100.1	100.4
20	101.3	100.6	101.1	100.5	100.5	100.1	100.4
21	100.9	100.6	101.3	100.4	100.3	100.2	100.3
22	100.2	100.3	101.1	100.3	100.3	100.2	100.3
23	100.2	100.5	101.0	100.3	100.5	100.3	100.3
24	100.1	100.7	101.4	100.1	100.7	100.4	100.3
25	99.8	100.5	101.2	100.1	100.4	100.3	100.3
26	99.4	100.2	100.4	100.1	100.3	100.2	100.2
27	100.1	100.4	100.4	100.0	100.3	100.3	100.2
28	100.0	100.4	100.3	99.9	100.2	100.2	100.2
29	99.8	100.6	100.2	100.0	100.1	100.3	100.2
30	99.5	100.6	100.2	99.9	99.6	100.3	100.2
31	99.3	100.2	100.2	100.0	99.5	100.4	100.2
32	99.5	100.1	100.1	100.0	99.4	100.3	100.2
33	100.4	100.2	100.2	99.8	98.8	100.3	100.2
34	100.1	99.7	100.1	99.8	98.8	100.3	99.9
35	99.5	99.4	99.9	99.6	98.9	100.3	99.7
36	99.0	99.4	100.2	99.8	98.9	100.3	99.7
37	99.0	99.5	99.8	99.7	98.6	100.3	99.7
38	98.7	99.6	99.2	100.0	98.7	100.3	99.6
39	99.4	99.7	99.1	99.8	98.4	100.2	99.6
40	100.1	100.5	99.6	100.6	98.7	100.4	100.2
41	100.1	100.7	99.8	100.5	98.5	100.3	100.2
42	100.3	100.7	99.5	100.5	98.4	100.3	100.1
43	99.9	100.6	100.1	100.3	98.4	100.3	100.0
44	100.2	100.4	100.3	100.1	98.4	100.3	100.0
45	100.0	100.4	100.1	100.3	98.2	100.4	110.0
46	99.9	100.3	99.8	100.1	98.3	100.2	99.8
47	100.3	100.3	99.4	100.0	98.5	100.2	99.8
48	100.2	100.2	99.3	100.1	98.8	100.2	99.8
49	99.6	99.9	99.5	100.3	99.4	100.3	99.8
50	99.0	99.7	99.2	100.0	99.4	100.2	99.6
51	98.5	99.4	98.9	99.7	99.8	100.3	99.5
52	98.1	99.2	98.7	99.7	99.7	100.2	99.3

ALL COMMODITIES-1982-83 TO 1991-92

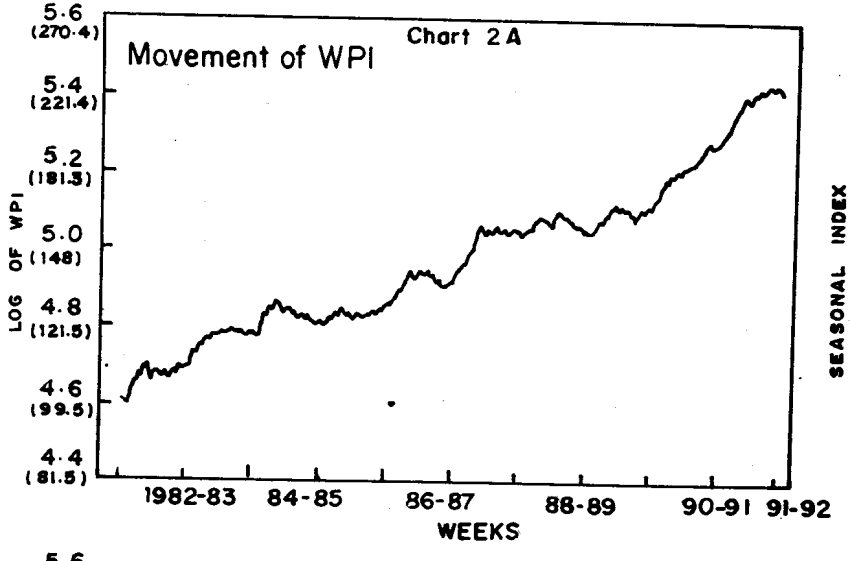


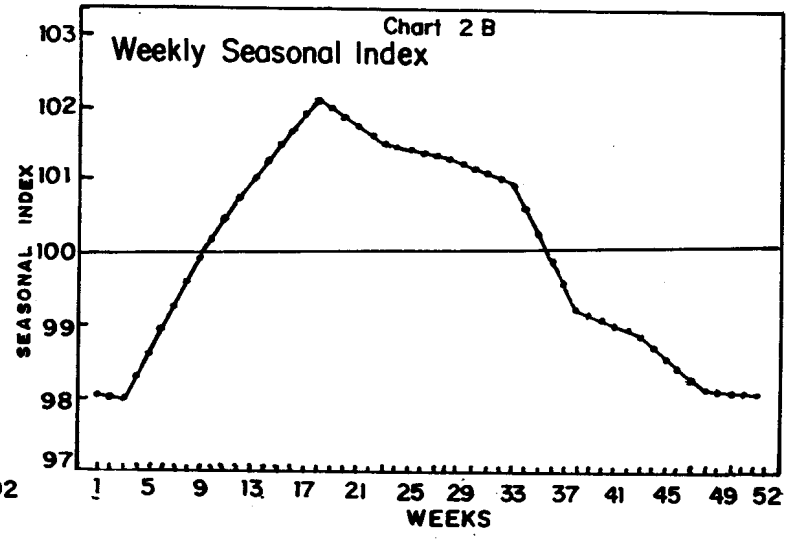


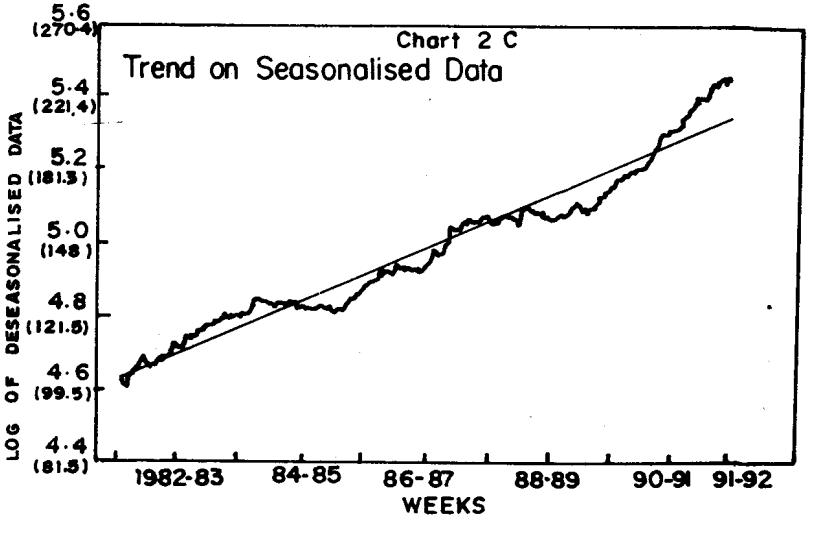


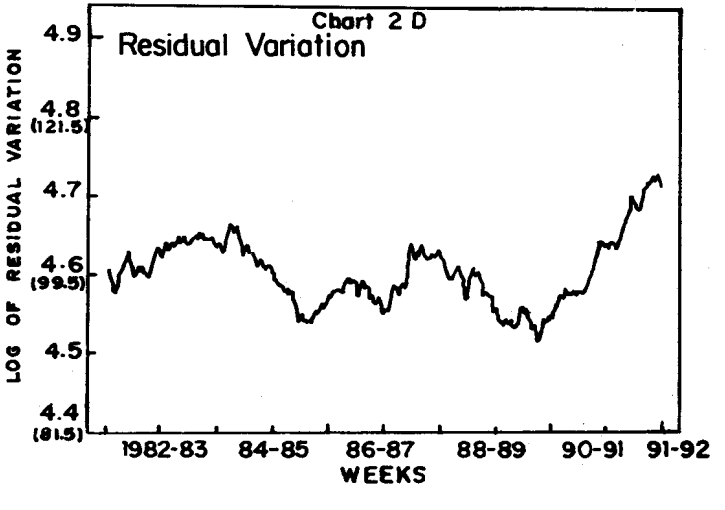


PRIMARY ARTICLES - 1982-83 TO 1991-92

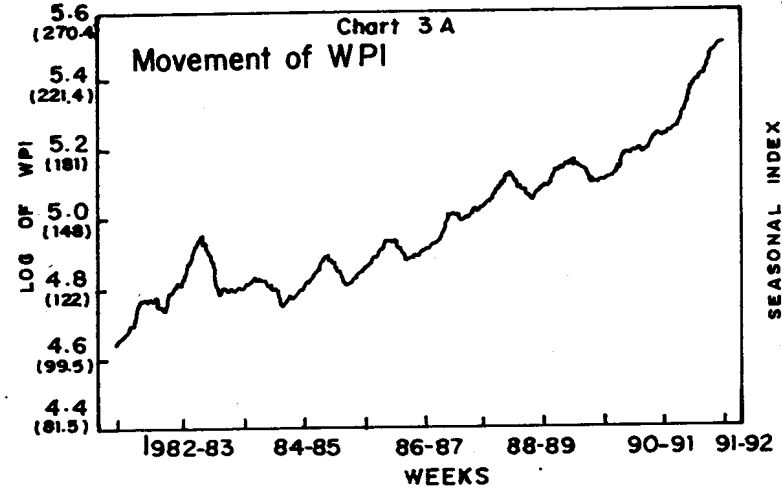


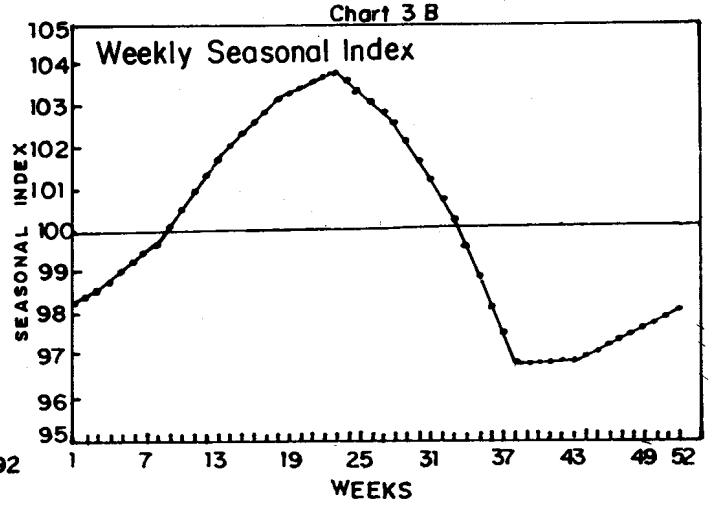


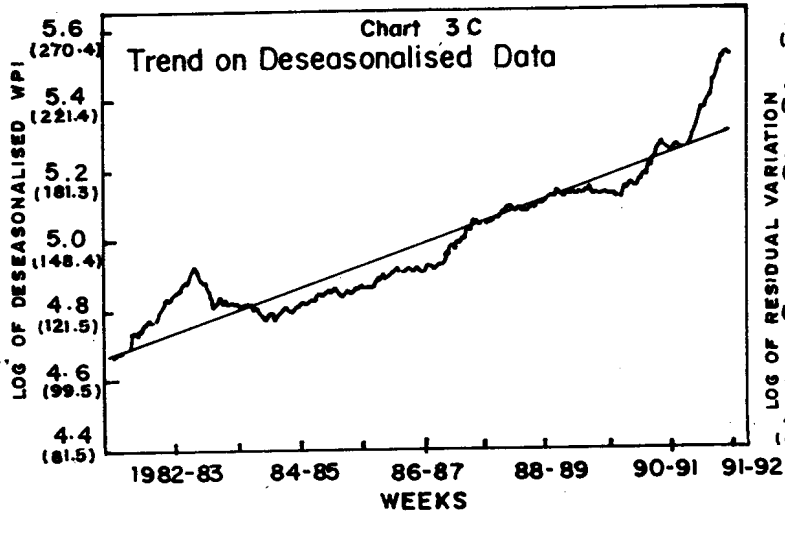


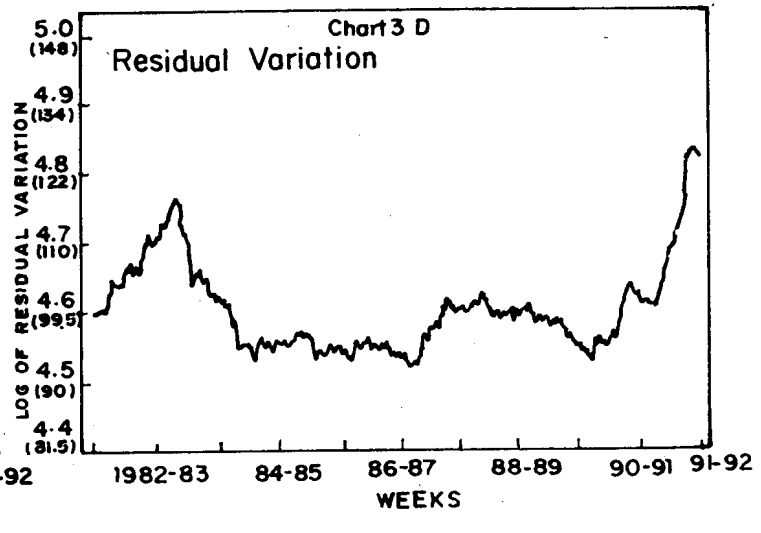


RICE - 1982-83 TO 1991-92

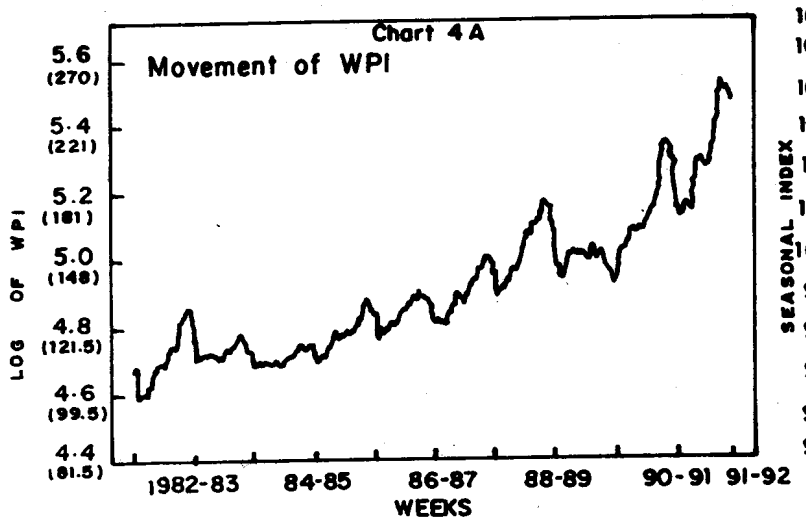


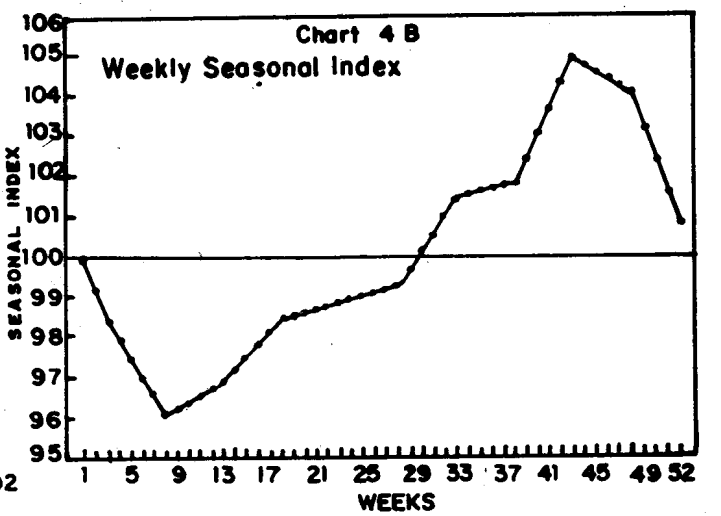


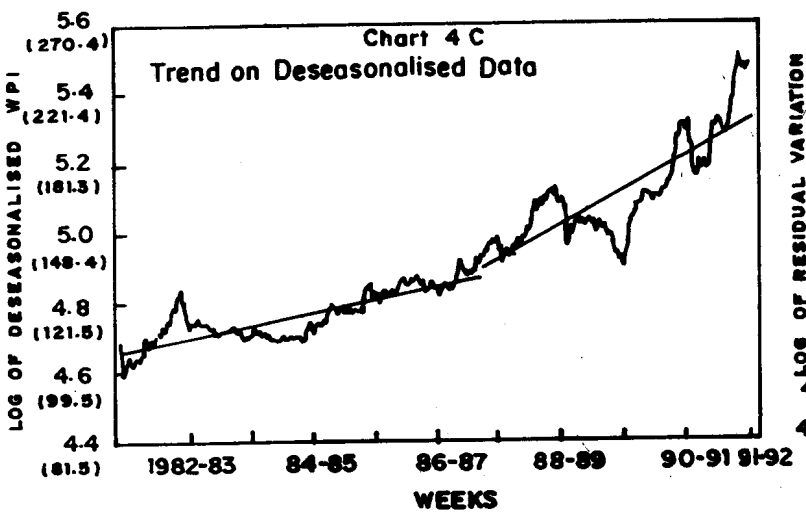


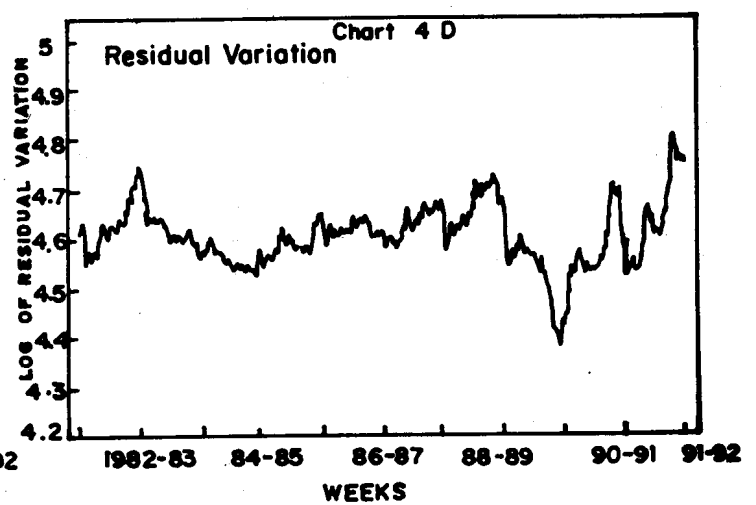


WHEAT- 1982-83 TO 1991-92









MANUFACTURED PRODUCTS 1982-83 TO 1991-92