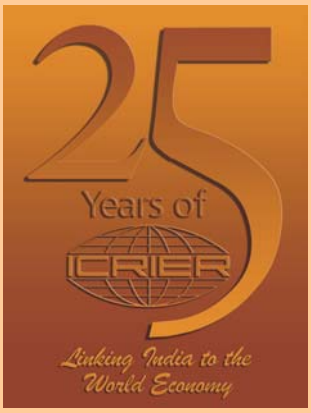

Working Paper No. 183

DOMESTIC MARKET INTEGRATION

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Domestic Market Integration

Abstract

The paper looks into the level of integration of commodity markets in India, across centres and states using consumer price data. It measures the extent to which domestic markets for goods in India are integrated, and recommends policy options to facilitate integration. The paper addresses questions: Are domestic markets for goods integrated across states? Has market integration increased over time? What are the policy options to facilitate integration?

The paper tests the methodology proposed by Bradford and Lawrence (2004) on the consumer prices of goods in major states across India. This is then repeated using consumer price data at two points in time (1994 and 2004), allowing an assessment of whether Indian markets have integrated over time. Market integration is also tested for individual commodities across markets.

The annual consumer prices for commodities were compiled from the Labour Bureau series of average monthly consumer prices of commodities for Industrial workers across 70 constituent centres in 18 states and monthly data was compiled from the *Indian Labour Journal*, a monthly publication from Labour Bureau, Ministry of Labour Government of India. Authors are thankful to Labour Bureau, Shimla for providing data on consumer prices at the disaggregated level.

This study was commissioned by The World Bank as the background paper on market integration in *The World Bank Development Policy Review: Inclusive Growth and Service Delivery: Building on India's Success. July 2006*

JEL Classification: E3, L22

Key Words: Market Integration, Consumer Prices, Primary Food, Manufactured Goods, India

Foreword

The working paper is based on a study undertaken by ICRIER on request of The World Bank as a background paper on market integration for their Development Policy Review of India: "Inclusive Growth and Service Delivery: Building on India's Success". The central issue addressed by the study is whether domestic markets for goods across different states are integrated and if this integration has changed over time. Increasing spatial integration of markets ensure greater price stability between deficit and surplus states, an issue that becomes specially relevant for ensuring access to food and basic necessities.

The study uses consumer price data to test the level of integration of domestic markets across states and across commodity markets between 1994 and 2004. The results of the study clearly indicate that across India, the markets are moving towards one price and getting integrated for both primary and manufactured goods. The study has undertaken this analysis across different product groups and even reclassified broad groups to ensure robustness of the results.

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DOMESTIC MARKET INTEGRATION[1]

1. Introduction

The objective of the study is to measure the extent to which domestic markets for goods in India are integrated, and to recommend policy options to facilitate further integration. The study provides possible answers to questions: Are domestic markets for goods integrated across states? Has market integration increased over time? What are the policy options to facilitate integration?

The paper tests the methodology proposed by Bradford and Lawrence (2004) on the consumer prices of goods in major states across India. This is then repeated using consumer price data at two points in time (1994 and 2004), allowing an assessment of whether market integration has increased over time. Market integration is also tested for individual commodities.

2. Review of Literature

2.1 Definition of market integration

Market integration is defined as the degree of price transmission between two either vertically or spatially related markets. The operational definition of market integration is known as the law of one price (LOP)—identical products sell at a uniform price across different markets. Homogeneous commodities follow the law of one price (Monke and Petzel 1984).The assumption required for the LOP to hold is of profit maximization and priceless transportation, distribution and resale. If LOP holds for a

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product in all the markets then it would be characterized as an integrated market. In the domestic economy if LOP holds then domestic market integration exists (Bradford and Lawrence 2004).

Lack of integration is referred to as segmentation. A market is geographically segmented if the location of the buyer and seller influences the terms of transaction in a substantial way (that is, by more than marginal cost of physically moving the goods from one location to another). A perfectly competitive market should be fully integrated (Knetter and Goldberey 1996). The premise of full price transmission and market integration corresponds to those of the standard competition model, in a frictionless undistorted world, the LOP is supposed to regulate spatial price relations (Conforti 2004).

It was inferred that significant transaction costs effect market prices (Meyer 2004).
If the difference in prices between the two regions is only because of transport cost then the markets are said to be spatially integrated (Ravallion 1986). Spatial market integrations refer to co-movements of prices and more generally, to smooth transmission of price signals and information across spatial separated markets (Goletti, Ahmed and Farid, 1995).

These definitions of price discrimination and market integration have important consequences for measurement and interpretation. Price data is not purely a function of market integration.

2.2 Sources of market integration?

Measurement of market integration can be viewed as basic data for developing an understanding of how specific markets work (Ravallion 1986). Integrated markets do not necessarily imply efficient spatial allocations (Knetter and Slaughter 1999). It is worth considering what price dispersion actually reveals about integration. What factors

make arbitrage costly and thus enable price discrimination. In order to understand long run market segmentation we need to study price details market wise; product by product. Deviation in the LOP is not merely because of product differentiation.

Palaskas and Harriss (1993) attempt to answer the question of how markets work, by evaluating the behaviour of prices of staple foods and then by explaining the price behaviour with reference to market institutions. In making inferences about market efficiency from the data on prices, the concept of integration has been central. In the domestic market, laws regulating the distribution and resale of commodities, information, transportation cost and other transaction cost can result in price differentiation (Knelter and Goldberey, 1996). Distance between a pair of markets explains price variations to an extent. In case of consumer prices for final goods, similarity in tastes is a positive factor in price integration across state/ regions. Within industry production activities matter for price dispersion in intermediate goods but not for final goods (Knetter and Slaughter, 1999).

Variation in demand elasticity due to income and availability of substitutes can also lead to price dispersion. Theoretically, price dispersion across markets arises as a result of differences in demand characteristic across groups of consumers and the ability of firms to exploit differences in demand because of costs of resale across markets. In the case of differentiated products if prices differ but have a high degree of substitutability in production or consumption, shocks from changes in supply and demand of one product are transmitted to other products in the commodity group (Monke and Petzel, 1984). Supply sources are more important than demand sources in driving prices (Alexander and Wyeth, 1994). This mechanism leads to price linkages across the differentiated products that can be identified statistically. Integrated markets are defined as markets in which prices of differentiated products do not behave independently. Pricing along production chains will depend exclusively on production costs, with all firms producing on the highest isoquant compatible with their isocost lines. Price

transmission is affected by transport and transaction cost, market powers, increasing returns to scale in production, exchange rates and border and domestic policies (Conforti 2004). Transportation costs may cause the relative prices of two qualities to differ across regions by an amount unrelated to the original prices (Monke and Petzel, 1984). Transportation cost can act as wedge between different markets, which need to be overcome by the total price differences between two locations or industries to allow for arbitrage and integration to take place between different markets. This treatment can be assumed to be stationary that is, proportional to traded quantities rather than fixed. Along the production chain some agents might behave as price makers while others as price takers, depending on the degree of concentration of each industry. Testing for price transmission can be interpreted as an exercise to check the degree of efficiency of the markets, in terms of extent of congruence with competitive models, or as a test for market integration. In India within the domestic market, price transmission appears to be fairly complete between the wholesale and the retail price (Conforti 2004).

Many studies have looked into market integration indirectly through econometric analysis rather than examining the transportation system, interviewing traders, tracking shipments and looking for unexploited arbitrage opportunities (Baulch 1997). If data were available on trade flows and transfer costs in addition to prices it would have been simpler to test market integration, but such this data is rarely available in a way that is comparable to price data. It is also inadvisable to estimate transfer cost based on inter-market price differentials. In such cases the price differentials between the two markets does not reflect the cost of moving produce between them. Applied econometric analysis for market integration based on price data alone has been used in various studies, because they neglect the role of transaction costs (Meyer 2004).

Knetter and Slaughter (1999) identify a high level of market integration with rapid decreases in costs of resale relative to other costs in the economy. The link between these factors is difficult to establish due to data constraints. Ideally, we would like to

know whether the permissible range of price dispersion is rising or falling relative to the product price itself. Price measures do not always permit very strong conclusions about the changing nature of market integration. The present study focuses on spatial market integration, thus the analysis relates to the literature on the law of one price.

3. Methodological Approach

The study looks into the levels of consumer price ratios for the goods market across states in 2004. We analyse domestic prices across different centres/ markets or states. The consumer price/retail price data has been used for 2004 for disaggregated commodities and for later comparison between 1994 and 2004 only selected commodities are used. This is done because 1994 data is not available for all commodities. These are the prices that consumers pay for different commodities, agricultural as well as manufacturing. Capital goods are not included here. During data collection every effort has been made to ensure comprehensive coverage and comparability. In addition we analyse the data at a fairly disaggregated level. These incorporate estimates of arbitrage costs due to transportation and shipping. The measures are reported as ratios to the lowest of the sample.

Rather than trying to identify official and unofficial barriers to trade across states, the study tries to detect the impact of barriers and other economic factors through comparisons of prices of goods in different states, using the methodology proposed by Bradford and Lawrence (2004). Not much work has been done in the context of India to identify if the domestic economy is following the law of one price. This study would be one of the first to look into this issue for Indian states. This study has taken account of few methodological features that should improve the result. Many studies of international integration have used retail price data that include domestic distribution costs. Although this may provide a slightly distorted picture, these additional costs nevertheless are the reflection of the standard of living in different states. In a fully integrated market after the transportation costs are subtracted the producer price should

converge, that is, wholesalers through out the markets should be able to purchase goods at the lowest possible price. But unavailability of this data set at any level hampers our efforts to investigate the inter-state price integration using the wholesale prices.

The consumer price data has information across 70 centres, which are not uniformly distributed across states. For our purpose, while using the complete data set of around 200 commodities for the year 2004, 34 centres from 18 states were selected on the basis of state ranking according to population in 2001 and state gross domestic product for 2002–03 at constant price (base 1993–4). States with highest share in total country population and GDP have more centres to represent their diversity. The selected centres are the ones with highest population in a state. For the comparison between 1994 and 2004, 24 commodities were selected across all the centres except Pondicherry, Chandigarh, Srinagar (Jammu and Kashmir)[2]. States like Uttar Pradesh and Maharashtra were divided into east and west based on the geographical locations of the centres in these states. Since this consumer data pertains to 2004, Chattisgarh and Jharkhand, the new formed states of Madhya Pradesh and Bihar respectively, are analysed separately. For 1994 these new states were divided on the basis of geographical location of centres in these states, to enable comparison according to present geographical structure. Each state consumer price is an average of centres in the state. The list of centres in each state is presented in Appendix 2a for the year 2004 and in Appendix 2b for the selected commodities' analysis for 1994 and 2004.

The cleaned up consumer price data for all disaggregated commodities were converted into ratios by dividing each consumer price by the lowest in the sample. In the study we aggregated the most detailed price data into categories and sub-categories using the expenditure weights for industrial workers, provided by the labour bureau. Same expenditure weights have been used for same products in different centres. The basic products included in the sample are presented in Appendix 3.

[2] These centres have less than 1 per cent share in country's population and GDP.

4. Data

First, the annual consumer prices for commodities for 2004 is computed from the Labour Bureau series of average monthly consumer prices of commodities for Industrial workers across 70 constituent centres in 18 states. These are the prices paid by industrial-worker families and are utilized in compilation of consumer price index numbers. These prices were obtained directly from the Labour bureau office, Ministry of Labour, Shimla. Data on statewise population, gross state domestic product were compiled from the Census 2001 and National Accounts Statistics.

For comparison at two points in time annual consumer prices for selected commodities for 1994 and 2004 are computed from the series of monthly averages prices paid by industrial-worker families. This monthly data 1994 and 2004 is compiled from *Indian Labour Journal*, a monthly publication from Labour Bureau, Ministry of Labour Government of India.

4.1 Data issues

The Labour Bureau conducts a monthly survey for sample households in 70 identified centres across the country. Individual centres have a questionnaire on monthly statement of retail prices which are specific to each centre on the basis of their consumption pattern. But the overall format of the questionnaire is alike. There are certain concerns regarding the data and its application which are discussed in detail below.

First, the concern is that, some of the studies of law of one price may not be using the prices of products that are strictly comparable and also that even goods with the same name may vary in quality. This problem is less prominent when we have to compare states within a country, because the general pattern of consumption and products are quite similar. In order to take account of quality and comparison of similar products, one has to be cautious during data collection to ensure that the prices pertain to the

average quality of the good consumed by majority of the population. Over all more than 250 final goods and a few services are accounted through these monthly surveys. An average monthly consumer price is computed for each commodity across centres by the labour bureau.

During research every effort has been made to ensure that the products of the same quality are compared across states. For most manufactured goods, the same make and model are compared or the comparisons are made from a list of two or more models when each item in the list is thought to be identical and is predefined and listed in the questionnaire. For other manufactured and food items, we rely on exact description of the item to the prices. For example one description reads as Powder milk: 'Amulspray', 500 gms in; Biscuits, 'Britannia' 100gms packet. On occasion, different goods that were deemed 'equivalent in use' have been compared. There are some commodities which might belong to the consumption basket in southern India, but in northern India. For example in the textile section silk sarees appear in the questionnaire of Tamil Nadu (Chennai) but in Punjab (Amritsar) ladies suit lengths are an important element.

A second issue relates to the comprehensiveness of coverage. Samples of a few products gathered at select retail outlets may not represent the full array of goods or modes of distribution through which goods are sold (Bradford and Lawrence 2004). Efforts have been made to sort out this problem by using the data from the survey which is conducted at the household level. Prices are collected from 70 centres every month. Number of centres varies across states depending on its geographical size. Average monthly data has been used to construct the annual series for each centre/state.

A third issue relates to the use in many studies of the price index rather than prices of individual goods (Bradford and Lawrence, 2004). Here the concern is that the indexes can be used only for testing changes in prices rather than measuring price levels. Index taken from different sources may include different products and use different weights in

aggregating them. Also the index may contain both tradable and non-tradable goods. To account for this, the present study has used raw monthly average consumer prices for each centre for disaggregated goods. This data tries to cover the maximum possible range of products. This data base of consumer prices is used to compute the overall consumer price index of the country. Goods are for the most part tradable. The data on services provided in the consumer price data were excluded from the present study. Goods whose prices are administered by the government are not used in the analysis. These goods are coal, kerosene oil, electricity, petrol and cooking gas.

The data set has been scrutinized for problems such as inconsistencies in the units of measurement used for commodities across centres. In order for the per unit price data to be usable a common unit across centres was determined. To check for the outliers in the data base, values greater than two times median and values less than one-fourth of median were verified from the original monthly data for possible data entry problems. Since some of the goods were accounted in some states and not in others, thus only those goods were included for the final analysis which were reported from at least six centres and included in the questionnaire designed by labour bureau.

Goods falling into a similar group or sub-group were identified using the WPI classification given by Ministry of Commerce and Industry, Government of India. The categorization of groups and sub-groups based on this classification used during the study are presented in Appendix 1a and 1b.

5. Results and discussion

5.1 Market Integration at State level

5.1.1 All Commodities, Selected Centres 2004

Table 1 reports expenditure-weighted averages of consumer prices of goods in 20 major states of India for 2004. The lowest price among all the states in each category is

Table 1: Consumer prices in states relative to lowest price in the sample, 2004

State	All Commodities		Primary Food		Manufactured	
	Ratio	Rank	Ratio	Rank	Ratio	Rank
Bihar	1.00	1	1.00	1	1.09	6
W. Uttar Pradesh	1.01	2	1.03	2	1.06	3
E. Uttar Pradesh	1.02	3	1.07	5	1.03	2
Chattisgarh	1.03	4	1.04	3	1.10	9
Haryana	1.03	5	1.11	9	1.00	1
Jharkhand	1.04	6	1.06	4	1.10	10
Orissa	1.04	7	1.08	7	1.09	8
Punjab	1.05	8	1.11	8	1.07	5
Madhya Pradesh	1.07	9	1.08	6	1.14	15
Delhi	1.07	10	1.12	11	1.10	12
E. Maharashtra	1.08	11	1.15	14	1.07	4
West Bengal	1.09	12	1.15	12	1.10	11
Andhra Pradesh	1.12	13	1.17	15	1.14	14
Kerala	1.12	14	1.21	16	1.09	7
Tamil Nadu	1.13	15	1.12	10	1.24	20
Karnataka	1.14	16	1.22	17	1.11	13
Gujarat	1.14	17	1.15	13	1.22	19
Assam	1.16	18	1.23	18	1.16	16
Rajasthan	1.18	19	1.23	19	1.20	18
W. Maharashtra	1.47	20	1.77	20	1.20	17
Summary Statistics						
No. of Observations	20		20		20	
Minimum	1.00		1.00		1.00	
Maximum	1.47		1.77		1.24	
Mean	1.10		1.15		1.11	
Median	1.07		1.12		1.10	
SD	0.10		0.16		0.06	
CV	0.09		0.13		0.06	

Note: Data are expenditure-weighted average ratios of state consumer prices for goods to the lowest price in the sample. In this table the states are arranged in order of ranking by all commodities.
Lowest price state is ranked as 1. E: East; W. West.

assigned a value of 1 and the other prices for that category are reported as a ratio to that price. Thus these ratios do not use any one particular state as a reference, but the benchmark varies from commodity to commodity, depending on which state has the lowest price in that commodity.

A striking feature of the data is the range of prices that consumers pay across states within India. For the 'All commodity' group the consumer price ratio varies in the range

of 1–1.47. The mean consumer price ratio is 1.10, or 10 per cent above the lowest price in the 2004 sample. If we consider West Maharashtra (1.47) as an outlier even then consumers in Rajasthan pay 18 per cent higher price than the lowest price state Bihar.

Does regional clustering exist? As compared to rest of the states in India, consumer prices in the southern states, Kerala, Karnataka, Andhra Pradesh and Tamil Nadu are 12–14 per cent higher. While in the northern states consumer price ratios are very close to one, Assam shows a higher price ratio being geographically located in the eastern end of India. India's western states like Rajasthan and Gujarat show a high price ratio. At this aggregate level, the law of one price is not clearly evident, but some regional trends are observed. The ranking order for primary food is very similar to that of all commodities. This could be because of higher expenditure weight of primary food group. The range of consumer price ratios in primary food is from 1–1.77, with again West Maharashtra as an outlier. Rajasthan pays 23 per cent higher prices for primary food commodities. The mean price is 15 per cent higher than the lowest state and the coefficient of variation in this series is reported as 13 per cent.

In the manufactured goods category Haryana is the lowest consumer price payer, with Tamil Nadu consumers paying around 24 per cent higher prices (Table 1). The mean in this series is 11 per cent higher than the lowest value. The northern states have lower level of consumer prices for both primary and manufactured goods in the range of 1–1.07.

Ideally, the variation in the range of price dispersion is captured through the coefficient of variation (CV). A low or falling CV can be interpreted as increased integration. In this section since we are dealing across commodity groups at one point in time, from Table 1 we can see that the manufactured goods market is much more integrated than the primary food market. CV for manufactured goods is 0.06 and for primary food is 0.13. Table 2 presents a correlation matrix between the consumer price ratios of all

commodities, primary food and manufactured goods. A significant positive correlation is observed between all commodities and primary food (0.97) and between all commodities and manufactured (0.64). Correlation between primary food and manufactured consumer price ratio is 0.45. Although this correlation is not very strong, but it reflects that there is a probability that states with higher prices in primary food will also have higher manufactured prices.

Table 2: Correlation matrix for consumer price ratios, 2004

Product Groups	All Commodities	Primary Food	Manufactured
All Commodities	1.00	0.97**	0.64**
Primary Food		1.00	0.45*
Manufactured			1.00

**: Correlation significant at 0.01 level; *: Correlation significant at 0.05 level.

In Table 3, states have been classified into groups on the basis of relative price levels. The states which fall in the range closest (1–1.05) to the lowest consumer price states are categorized as low and the states which have consumer price ratios more than 15 per cent higher than the lowest price state are categorized as very high. The other two groups, medium and high, fall between these two ranges. For 'all commodities' group, Bihar, West and East Uttar Pradesh, Chattisgarh, Haryana, Jharkhand, Orissa and Punjab have price ratios closer to unity. These states fall in very low or medium category of price level for primary and manufactured goods, except for Punjab and Haryana. Assam, Rajasthan and west Maharashtra, have highest relative prices for all commodities and also in primary and manufactured category. Kerala, Karnataka and Andhra Pradesh, which suffer the highest relative price levels in primary food, also have high relative prices for all commodities. Except for a few states, the rest of the states show different relative price levels across different product categories or products.

Table 3: Relative consumer price level among states, 2004

S.No.	Commodity groups	Relative Price Level			
		Low	**Medium**	**High**	**Very High**
1.	**All commodities**	Bihar W. Uttar Pradesh E. Uttar Pradesh Chattisgarh Haryana Jharkhand Orissa Punjab	Madhya Pradesh Delhi E. Maharashtra West Bengal	Andhra Pradesh Kerala Tamil Nadu Karnataka Gujarat	Assam Rajasthan W. Maharashtra
2.	**Primary Food**	Bihar W. Uttar Pradesh Chattisgarh	Jharkhand E. Uttar Pradesh Madhya Pradesh Orissa	Punjab Haryana Tamil Nadu Delhi West Bengal Gujarat E. Maharashtra	Andhra Pradesh Kerala Karnataka Assam Rajasthan W. Maharashtra
3.	**Manufactured**	Haryana E. Uttar Pradesh	W. Uttar Pradesh E. Maharashtra Punjab Bihar Kerala Orissa Chattisgarh Jharkhand West Bengal Delhi	Karnataka Andhra Pradesh Madhya Pradesh	Assam W. Maharashtra Rajasthan Gujarat Tamil Nadu

Note: Low: 1–1.05; Medium: 1.06–1.10; High– 1.11–1.15; Very High: >1.15

Percentage of goods that fall under different relative consumer price categories[3] across states are presented in Table 4. The results presented here are consistent with the results presented in Table 3. In West Uttar Pradesh and Bihar nearly 47 per cent of the product markets have consumer price ratios closer to unity, while in Assam and West Maharashtra only 24 per cent of product markets are in this range. Individual product

[3] Distribution of groups into four categories is based on the range of consumer price ratios for a particular product or product group. In table 3 the groups price ranged between 1-1.77 thus the categories had the low range as >1.5. While, in table 4 the price ratio for some products ranged between 1-7.01, thus in proportion to table 3, table 4 groups are defined

markets show a different trend. State market movement towards one price is not clearly evident.

Table 4: Per cent of goods under different consumer price ratio groups, 2004

State	Relative Price Level			
	Low	Medium	High	Very High
W. Uttar Pradesh	47.6	27.0	15.1	10.3
Bihar	47.5	29.7	14.9	7.9
Jharkand	43.4	31.9	15.9	8.9
Punjab	42.6	30.7	13.9	12.9
Madhya Pradesh	41.6	30.1	16.8	11.5
Orissa	39.3	26.5	18.0	16.2
Haryana	38.9	36.3	13.3	11.5
E. Uttar Pradesh	38.7	32.3	16.1	12.9
Delhi	38.1	28.8	17.8	15.3
Kerala	37.5	35.6	15.4	11.5
Chattisgarh	36.1	40.7	16.7	6.5
Karnataka	35.5	34.8	12.1	17.7
Gujarat	35.3	34.5	16.4	13.8
Andhra Pradesh	33.3	36.9	16.3	13.5
Rajasthan	32.0	32.8	21.9	13.3
Tamil Nadu	31.3	35.8	18.7	14.2
E. Maharashtra	31.0	38.0	20.2	10.9
West Bengal	30.9	42.3	16.3	10.6
W. Maharashtra	24.5	32.0	23.1	19.7
Assam	24.2	31.6	26.3	17.9

Note: Low:1–1.25; Medium:1.25–1.75; High:1.75–2.25; Very High: >2.25

Re-classification of groups

In order to understand a pattern of consumer prices between states for major commodity groups we tried to reclassify the groups. Manufactured food products were removed from manufactured and added into primary food. Thus the newly formed groups were total food and manufactured without food. Consumer price ratios for these revised groups and correlation matrix is presented in Appendix 4 and 5.

We investigated whether the pure manufacturing sector shows much difference, if the food products are separated out? It is observed that the consumer price ratio range has not varied much. The mean of the price ratio has marginally shifted from 1.11 to 1.12. The coefficient of variation also showed the same level of integration as the earlier manufactured category. Even for total food category, the mean and CV have not shown much change in comparison to primary food. But a closer look at the states level has shown significant changes for some of the states. For Orissa and Kerala relatively food prices declined while in manufacturing it increased. In Karnataka and Rajasthan manufactured price ratios declined with very marginal change in food sector. Bihar, Uttar Pradesh and West Bengal showed higher relative prices for manufactured goods. Manufactured food rendered the total food price level higher in Gujarat, Madhya Pradesh and Tamil Nadu and cheaper in Haryana and West Bengal. In others states much change was observed.

The correlation matrix in Appendix 5 shows a positive, significant high correlation between, primary food and total food, manufactured and manufactured-without-food as expected. Between other categories this correlation is weak and not very different from the earlier categories.

Do Agricultural states or industrial states have cheaper products?

It is hypothesized that the states with higher share of agriculture in state GDP will have cheaper primary food prices and similarly if share in manufacture is high for a state then the manufactured product prices should be low. Regressions were run to find linkages in the primary food and manufactured goods with agriculture and manufacturing share in state GDP. The correlations between these variables were not found significant (Appendix 6).

Other factors[4] like urbanization, per capita state GDP, wage rate, and infrastructure index were also analysed but none of these showed any significant correlation with consumer prices of food and manufactured product groups. Although as expected urbanization is significantly highly correlated with per capita state GDP (0.94), and exhibited negative high correlation with agriculture share in state GDP (–0.67). Infrastructural index is also correlated positively with per capita state GDP (Appendix 6).

The initial test of the methodology on this consumer price data does not provide much insight into specific trends in the consumer price level behaviour across states. Transportation cost, retail margins and real estate prices could not be investigated due to data constraints. All other factors could not give a possible explanation for the pattern of consumer price ratios. Further investigation was undertaken with select commodity consumer prices at two points in time 1994 and 2004.

5.1.2 Selected Commodities, All Centres: 1994 versus 2004

As before, the consumer price ratios are computed for both 1994 and 2004. State prices represent the average of all the centres that fall in the states' geographical area.

Table 5 reports the ratios for the selected goods (Appendix 1b) in the major states of India for two sample years—1994 and 2004 for all the centres (Appendix 2b). All commodities are classified into sub groups of primary food and manufactured products. State assigned the value one has the minimum consumer price relative to all other states. For all commodities the consumer price ratio ranged from 1–1.20 in 1994 and this range has

[4] These factors are in terms of ratios to the lowest of the state in the sample. Urbanization is defined as percentage of urban population according to Census, 2001. Per capita state GDP is at constant price 1993-94, for 2002-03. Wage rate is the nominal registered manufacturing industrial worker's wage from Annual survey of industries, 2001. Infrastructure index is across states for 1999. All these pertain to latest data available.

Table 5: Consumer prices in states relative to lowest prices in the sample products for 1994 and 2004

State	All Commodities		Primary food		Manufactured	
	1994	2004	1994	2004	1994	2004
Andhra Pradesh	1.00	1.01	1.07	1.05	1.04	1.01
Assam	1.18	1.04	1.18	1.06	1.30	1.05
Bihar	1.08	1.00	1.13	1.00	1.14	1.04
Chhattisgarh	1.03	1.06	1.00	1.11	1.17	1.06
Gujarat	1.17	1.04	1.25	1.07	1.21	1.06
Haryana	1.04	1.04	1.16	1.10	1.03	1.03
Jharkhand	1.10	1.04	1.13	1.10	1.18	1.01
Karnataka	1.05	1.03	1.20	1.09	1.03	1.00
Kerala	1.03	1.03	1.10	1.06	1.07	1.04
Madhya Pradesh	1.09	1.02	1.15	1.04	1.15	1.04
East MH	1.03	1.05	1.08	1.10	1.09	1.03
West MH	1.16	1.01	1.37	1.03	1.07	1.03
Orissa	1.15	1.02	1.25	1.08	1.18	1.01
Punjab	1.10	1.02	1.22	1.07	1.10	1.00
Rajasthan	1.20	1.04	1.28	1.08	1.26	1.04
Tamil Nadu	1.02	1.03	1.06	1.05	1.08	1.04
Central and East UP	1.05	1.05	1.22	1.08	1.00	1.07
West UP	1.02	1.04	1.13	1.06	1.02	1.06
West Bengal	1.15	1.04	1.15	1.06	1.28	1.06
Delhi	1.12	1.00	1.28	1.02	1.10	1.03
Summary Statistics						
No. of Observations	20	20	20	20	20	20
Min	1.00	1.00	1.00	1.00	1.00	1.00
Max	1.20	1.06	1.37	1.11	1.30	1.07
Mean	1.09	1.03	1.17	1.06	1.12	1.03
Median	1.08	1.03	1.15	1.07	1.10	1.04
SD	0.06	0.02	0.09	0.03	0.09	0.02
CV	0.06	0.02	0.07	0.03	0.08	0.02

assigned the value one has the minimum consumer price relative to all other states. For all commodities the consumer price ratio ranged from 1–1.20 in 1994 and this range has narrowed down to 1–1.06 in 2004. In a decade's time the sample mean has declined from 1.09 to 1.03. If we take CV as the measure of integration among states then, a high level of integration is visible in last ten years. The CV of all the commodities was 0.06 in 1994 which declined to 0.02 in 2004. States which had consumer price ratios 10–20 per cent higher than the minimum price state in 1994 had also integrated with other

states in 2004. Even the sub group and disaggregated product classifications showed similar trends. Primary food in 1994 had consumer price ratios in the range of 1–1.37 which declined to 1–11 in 2004. The pattern for manufacture goods is similar. CV has declined from 0.07 and 0.08 in 1994 to 0.03 and 0.02 in 2004 for primary food and manufactured products respectively. There is very clear evidence that, across India, states are moving towards one price.

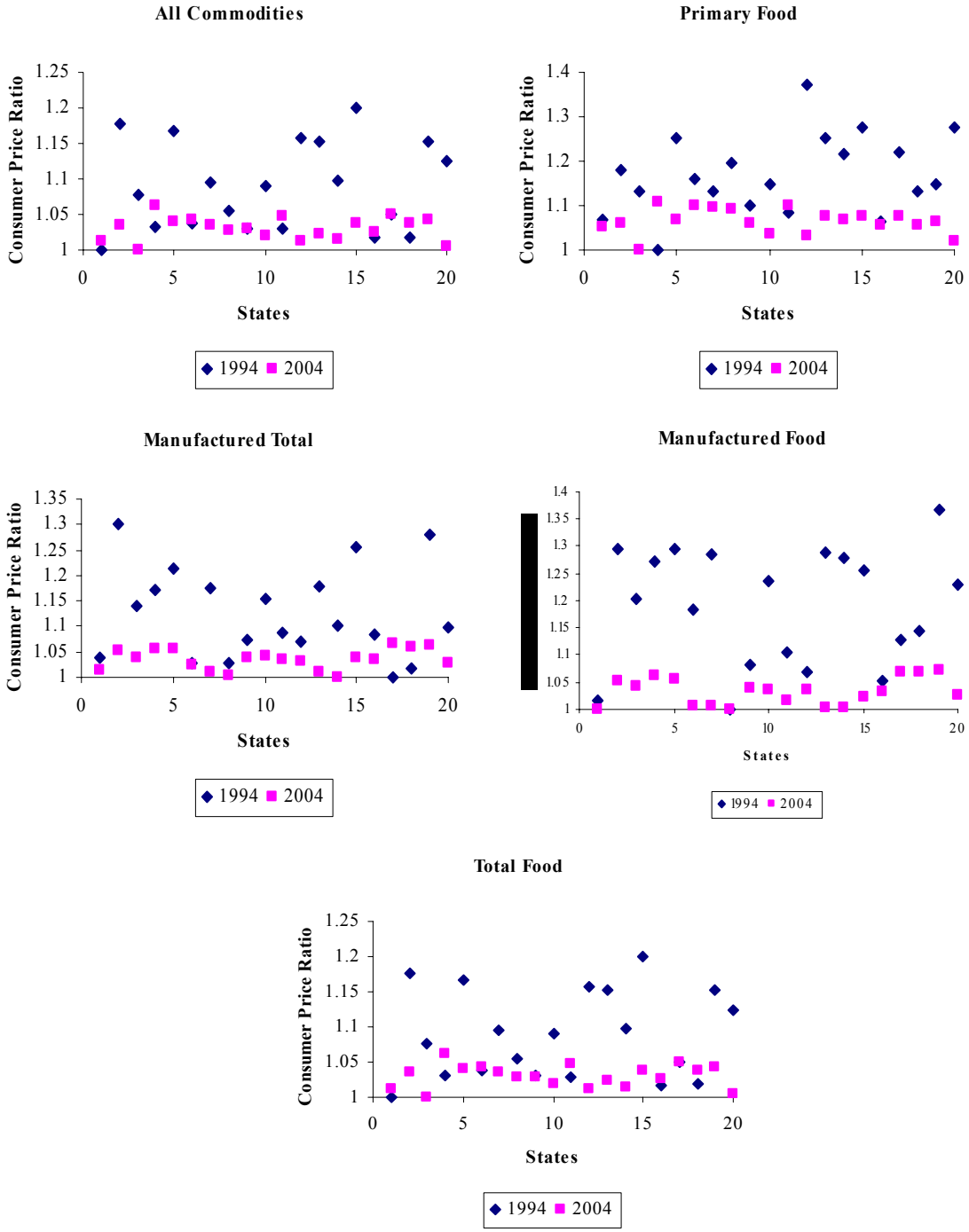
Re classification of groups

Re-classification of groups undertaken for closer scrutiny is illustrated in Appendix 7. Manufactured food products were separated and added to primary food to form total food category. It was observed that manufactured food had a range of 1–1.37 of consumer price ratio in 1994 which has sharply narrowed down to 1–1.07. This is in tune with other commodity groups. Overall, the markets integrated even further with re-categorization of goods. The CV has shown a decline in all sub categories. This is evidence of the fact that the states are virtually moving towards one price.

Scatter diagram for all the groups and re-groups is provided in Figure 1. This very clearly show how across states, consumer prices were dispersed away from each other in 1994 whereas in 2004 the states have integrated in a narrow range.

The differences in consumer prices ratios across states are mainly due to variations in costs of transportation. Thus by definition Indian market economy is getting spatially integrated. Consumer prices are the final prices paid by consumers, reflecting both the cost of a good as it leaves the factory (the ex factory cost) and the cost of bringing it to the market. Although both these costs play an important role in determining the living standard, the role played in integration is different in each component (Bradford and Lawrence 2004). Thus, higher consumer price ratio in a few states can be explained by

Figure 1: Scatter diagram for commodity groups across states between 1994 and 2004



higher costs of transportation and differentiated fuel costs[5] (Appendix 8). We don't have primary data on the cost of transportation of each commodity across states hence we cannot benefit from a deeper insight into prices net of this cost. Reforms in this area should aim at deregulating prices of commercial energy resources. This will help to avoid distorting market based pricing.

5.2 Market Integration for commodity markets

At a disaggregated level, consumer price ratios were computed across all centres for different commodity markets. Commodity specific statistical descriptive are analysed and presented in Table 6 for both 1994 and 2004. 'Centres' represents the number of centres which have reported sale of these individual commodities. Maximum value represents the value at the centre which has the maximum value of consumer price ratio among all the centres in relation to the minimum value 1. Mean value is the average value reported by all centres and CV is the coefficient of variation which is also an indicator of market integration. The summary statistics of these variables for all the commodities indicate that whereas in 1994 the range of the commodity market consumer prices was between 1.11–6.46, in 2004 it has narrowed down to 1.11–2.21. The mean of CV nearly halved between the two periods, also the overall CV showed a decline from 0.58 in 1994 to 0.46 in 2004.

Nearly all the centres reported the consumption of all commodities in 2004, while consumption level was quite low for some commodities in 1994. This supports the fact that in a decade's time commodity markets network has been strengthened. CV has shown uniform decline across all the commodities and their subgroups between the two

[5] Fuel is the third major group besides primary food and manufactured products, as per the WPI classification. The consumer price ratios for this group ranged from 1-2.17 in 2004, with mean around 1.54 (Appendix 8). The coefficient of variation is as high as 0.16. While analysing consumer prices, this group was not included in all commodities, because many goods in this group have government regulated prices.

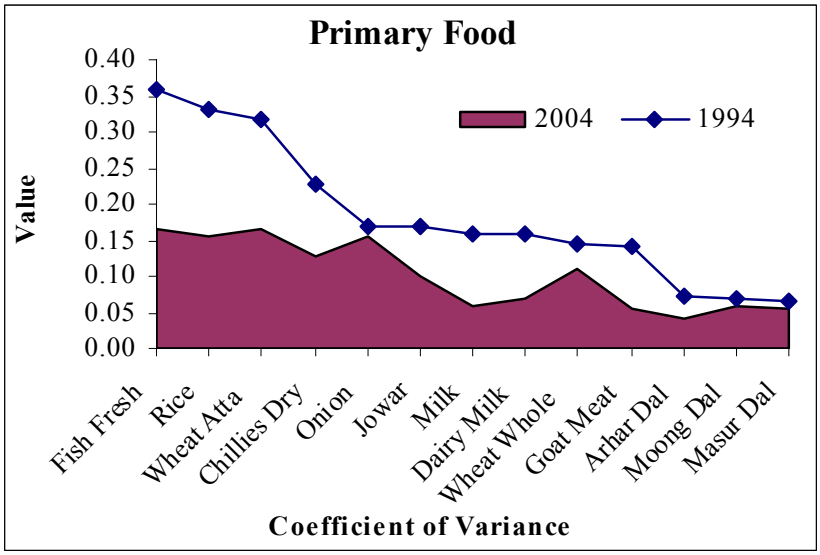
points of time offering strong evidence of market integration in India. This is also illustrated in Figure 2 for the primary food and manufactured food.

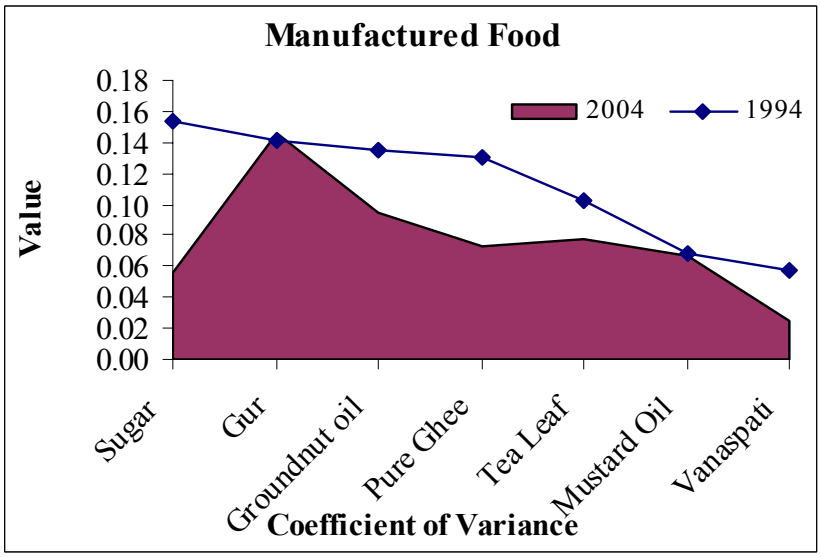
Table 6: Comparison of commodity market integration across centres between 1994 and 2004.

Commodity Markets	1994				2004			
	Centers	Maximum	Mean	CV	Centers	Maximum	Mean	CV
Primary food								
Rice	67	4.24	1.67	0.33	67	1.81	1.31	0.16
Wheat Whole	58	1.66	1.27	0.14	67	1.60	1.30	0.11
Wheat Atta	38	6.46	4.64	0.32	67	2.12	1.67	0.17
Jowar	15	1.90	1.40	0.17	58	1.47	1.22	0.10
Arhar Dal	67	1.30	1.12	0.07	67	1.17	1.08	0.04
Moong Dal	66	1.43	1.19	0.07	67	1.28	1.09	0.06
Masur Dal	51	1.34	1.21	0.07	67	1.24	1.12	0.06
Goat Meat	67	1.78	1.36	0.14	67	1.30	1.16	0.06
Fish Fresh	65	5.33	2.29	0.36	67	1.91	1.48	0.17
Milk	65	2.48	1.67	0.16	67	1.27	1.13	0.06
Dairy Milk	34	2.20	1.66	0.16	67	1.30	1.15	0.07
Onion	67	2.15	1.51	0.17	67	1.99	1.41	0.15
Chillies Dry	67	2.73	1.57	0.23	67	1.79	1.34	0.13
Manufactured food								
Groundnut oil	43	1.81	1.22	0.14	67	1.49	1.13	0.09
Mustard Oil	42	1.35	1.17	0.07	67	1.37	1.15	0.07
Vanaspati	57	1.26	1.09	0.06	67	1.11	1.06	0.03
Pure Ghee	61	1.96	1.37	0.13	67	1.37	1.14	0.07
Sugar	67	1.68	1.21	0.15	67	1.31	1.17	0.06
Gur	67	1.88	1.38	0.14	67	1.77	1.39	0.15
Tea Leaf	67	1.91	1.55	0.10	67	1.38	1.15	0.08
Manufactured Chemicals								
Toilet Soap	67	1.11	1.08	0.01	67	1.16	1.09	0.04
Washing Soap	67	2.85	1.60	0.22	67	1.35	1.12	0.08
Fuel								
Fire Wood	62	4.94	3.09	0.27	67	1.50	1.28	0.10
Kerosene Oil	67	1.30	1.10	0.05	67	1.45	1.24	0.08
Summary Statistics								
Minimum		1.11	1.08	0.01		1.11	1.06	0.03
Maximum		6.46	4.64	0.36		2.21	1.67	0.17
Mean		2.38	1.60	0.16		1.48	1.22	0.09
CV		0.59	0.48	0.58		0.18	0.12	0.46

Note: CV: Coefficient of Variance

Figure 2: Commodity market integration between 1994 and 2004 for primary food and manufactured food.





Increasing commercialization, development of communication and transport facilities and expansion of market network has led to increased integration of goods market in India. Some indicators which can support the results discussed above are presented in Table 7. The railways as well as the road transportation have shown an increase in volumes of freight. Railways food grains traffic and earnings have nearly doubled. As an indicator of improved road transport, it is observed that the number of goods LCVs and trucks registered have also increased in last decade.

Table 7: Indicators of improved transportation

Indicators	1994	2002–03
Railways		
Foodgrains traffic ('000 tonnes)	26680	44320
Earnings from goods traffic (Rs crore)	12557	27618
Roadways		
Goods LCVs registered (Nos)	141585	956058
Trucks registered (Nos)	1650105	2088918

Source: CMIE: Feb 2003, March 2003 and Department of Transport, GOI

The above results show that in India's domestic economy there is evidence of market integration across states and centres as well as among the commodity markets. Price variations are accounted for by high transportation cost, distribution margins etc. Even with these price differentials commodity markets and state markets are showing spatial market integration in the economy. If further policy initiatives are taken, then the economy will move closer to complete market integration. Some of these policy issues are discussed in next section.

6. Policy Issues

Knowledge of market integration is most relevant for the policy of price stabilization. In the food market local seasonality may affect the price of agricultural commodities. Spatial integration of markets will ensure price stability between food deficit and food surplus markets. Government interventions in food markets affect the magnitude of market intervention. Essential Commodities Act, 1955[6] is one such intervention by Government of India to guard the interests of the poor against the vagaries of the market. Some notifications under this act restrict the movement of certain essential goods[7] from the surplus states to deficit states. In order to facilitate free trade and movement of foodgrains, government issued a control order in 2002, which allows flexibility to dealers. The states have to procure prior permission from centres, before issuing any regulations on storage, transport and distribution. But still some products in certain states are being practiced under the Essential Commodities Act. A combination of policies reforms will be of benefit to both farmers and consumers. This Act should be amended for enforcement only as an emergency provision. A central act should be made to ban control on movement within and between states.

To have the whole country as a single unrestricted market there is a need to abolish octroi[8] and all sorts of other indirect taxes and levies on food articles. India's National Agricultural Policy also aims at dismantling restrictions on movement of agricultural commodities across the country and reviewing the structure of taxes on food grains and other commercial crops.

Revival of agricultural commodity futures market in India in early 2000 after the ban in 1960s has helped in integrating the food grains and other agricultural goods markets

[6] This act is being implemented by the state governments and gives them powers to control production, supply and distribution of essential commodities for maintaining or increasing supplies and for securing their equitable distribution and availability at fair prices.
[7] Food grains, edible oils, pulses, kerosene and sugar are some of these essential commodities.
[8] Octroi tax is a tax on entry of goods for use or consumption within areas of the local bodies.

through price discovery and price risk management. Under the National Agricultural Policy, Government of India aims at enlarging the coverage of futures markets to minimize wide fluctuations in commodity prices as also for hedging risks.

Subsidies on goods and public distribution system have distorted prices in the market economy. The aim of providing food subsidies to the poor was to ensure their food security. Thus except for rice and wheat all further attempts to include more and more commodities under the coverage of food subsidies should be resisted. Fair price shops should be permitted to sell all other commodities at full market price to ensure economic viability. State food corporations should be allowed and encouraged to operate in all states. States should be free to set up public or joint venture companies for food procurement, transport and distribution if it is commercially viable (Virmani 2004). The role of private agencies in food procurement activities should be gradually enhanced.

The freight carried by road transport is increasing at a rapid pace. Good roads and lower transportation cost help in reducing the cost of transfer of products from the market where the product is produced to other markets. This will help in integration of product markets. Development of better and cheaper railway network for freight will help in integrating markets. The most important policy distortion is the skewed tariff policy which overcharges freight movement in order to subsidize passenger traffic. Thus there is need to rebalance the rail tariff to improve the fare freight ratio.

Foreign direct investment in retailing could lead to lowering of prices and movement towards market integration. Food retailers would be free to sell other agro-based and rural industrial products. Through competition, economies of scale and improved efficiency in the supply chain, product prices would lower, especially in food and grocery sector (Mukherjee and Patel 2005).

There is a need for tariff rationalization in the power sector. The policy initiatives should focus on to provide universal access of commercial fuel at affordable prices. This will help in bring down the transportation cost. Real estate prices affect the price structure in retail market. Rentals are a major cost to retailers and thus play a major role in determining the retail margins. Thus, even competitive real estate prices would help in market integration.

REFERENCES

Alexander, Carol and John Wyeth, 1994. 'Co-integration and Market Integration: An Application to the Indonesian Rice Market', *Journal of Development Studies*. January 1994; 30(2): 303–34.

Baulch, Bob, 1997. 'Transfer Costs, Spatial Arbitrage, and Testing for Food Market Integration'. *American Journal of Agricultural Economics*. May 1997; 79(2): 477–87.

Bradford, Scott and Robert Z. Lawrence, 2004. *Has Globalization Gone Far Enough? The Costs of Fragmented Markets*. Institute for International Economics, Washington, DC. February 2004.

Goletti, Francesco, Raisuddin Ahmed, and Naser Farid, 1995. 'Structural Determinants of Market Integration: The Case of Rice Markets in Bangladesh'. *Developing Economies*. June 1995; 33(2): 185–202.

GOI (undated), *Indian Labour Journal*, various issues, (a monthly publication), Labour Bureau, Ministry of Labour, Government of India.

Knetler, Michael M and Penelope K. Goldberey. 1996. 'Goods Prices and Exchange Rates: What have We Learned?', NBER Working Paper 5862. Cambridge, MA: National Bureau of Economic Research.

Knetter, Michael M and Matthew J. Slaughter. 1999. 'Measuring-Product Market Integration'. NBER Working Paper 6969. Cambridge, MA: National Bureau of Economic Research.

Meyer, Jochen. 2004. 'Measuring Market Integration in the Presence of Transaction Costs—A Threshold Vector Error Correction Approach'. *Agricultural Economics*. Special Issue December 2004; 31(2–3): 327–34.

Monke, Eric and Todd Petzel, 1984. 'Market Integration: An Application to International Trade in Cotton'. *American Journal of Agricultural Economics*. 66(4), November: 481–7.

Mukherjee, Arpita and Nitisha Patel, 2005. *FDI in Retail Sector: India*. ICRIER and Department of Consumer Affairs, GOI. Published by Academic Foundation, New Delhi.

Palaskas, Theodosios B and Barbara Harriss White, , 1993. 'Testing Market Integration: New Approaches with Case Material from the West Bengal Food Economy', *Journal of Development Studies*. October 1993; 30(1): 1–57.

Piero, Conforti. 2004. 'Price transmission in selected agricultural markets', FAO Commodity and Trade Policy Research Working Paper no. 7. March 2004.

Ravallion, Martin, 1986. 'Testing Market Integration'. *American Journal of Agricultural Economics*. February 1986; 68(1): 102–09.

Virmani, Arvind, 2004. *Accelerating growth and Poverty Reduction: A Policy Framework for India's Development*. Academic Foundation, New Delhi.

APPENDIXES

Appendix 1a: Classification of products into groups

I. PRIMARY FOOD ARTICLES

A. Food Grains (Cereals and Pulses)

B. Fruits and Vegetables

C. Milk

D. Egg, Meat & Fish

E. Condiments & Spices

F. Other food articles

II. FUEL POWER LIGHT & LUBRICANTS

A Coal Mining

B. Firewood

C. Kerosene Oil

D. Electricity

III MANUFACTURED PRODUCTS

A. Manufactured Food Products

a. Dairy Products

b. Grain Mill Products

c. Bakery Products

d. Sugar & Gur

e. Salt

f. Edible Oils

g. Tea and Coffee Processing

h. Other Manufactured Food Products

B. Beverages, Tobacco & Tobacco Products

a. Wine Industries

b. Soft Drinks & Carbonated Water

c. Manufacture of Bidi, Cigarettes, Tobacco & Zarda

C. Textiles

a. Cotton Textiles

b. *Man Made Textiles*

c. *Woollen Textiles*

d. *Manufactured Textile*

e. *Bedding Textile*

D. Printing & Publishing of Newspapers, Periodicals etc.

E. Chemical & Chemical Products

a. *Drugs & Medicines*

b. *Perfumes, Cosmetics, Toiletries etc.*

c. *Soap & Detergents*

F. Bicycle

G. Small household products

H. Footwear

I. Radio and Transistor

J. Watch

K. Metal furniture

L Household utensils

M. Household electrical products

N. Bulb

O. Petrol

P. Cooking Gas

Appendix 1b: Classification of products into groups used for 1994 and 2004: Selected commodities.

I	**Primary Food Articles**
A	Rice
B	Wheat Whole
C	Wheat Atta
D	Jowar
E	Arhar Dal
F	Moong Dal
G	Masur Dal
H	Goat Meat/Mutton
I	Fish Fresh
J	Milk
K	Dairy Milk
L	Onion
M	Chillies Dry
II	**Fuel, power light and lubricants**
A	Fire Wood
B	Soft coke
C	Kerosene Oil
III	**Manufactured Products**
A	***Manufactured Food Products***
a	Groundnut oil
b	Mustard Oil
c	Vanaspati
d	Pure Ghee
e	Sugar
f	Gur
g	Tea Leaf
B	***Chemical and Chemical Products***
a	Toilet Soap
b	Washing Soap

Appendix 2a: Centres selected in major states on basis of population and State gross domestic product ranking

S.No.	State	Centre
1	Andhra Pradesh	Guntur, Hyderabad, Visakhapatnam
2	Assam	Guwahati
3	Bihar	Monghyr
4	Chhattisgarh	Bhillai
5	Gujarat	Ahmedabad, Surat
6	Haryana	Yamunanagar
7	Jharkhand	Ranchi-Hatia
8	Karnataka	Bangalore, Belgaum
9	Kerala	Thiruvananthapuram
10	Madhya Pradesh	Indore
11	Maharastra	
	East	*Nagpur, Sholapur*
	West	*Mumbai, Nasik, Pune*
12	Orissa	Rourkela
13	Punjab	Amritsar
14	Rajasthan	Ajmer, Jaipur
15	Tamil Nadu	Chennai, Coimbatore, Salem
16	Uttar Pradesh	
	Central and East	*Kanpur, Varanasi*
	West	*Agra, Saharanpur*
17	West Bengal	Durgapur, Haldia, Kolkata
18	Delhi	Delhi

Appendix 2b: Centres in major states used for 1994 and 2004: Selected commodities scenario.

S.no.	State	Centres
1	Andhra Pradesh	Gudur, Guntur, Hyderabad, Vishakhapatanam, Warrangal
2	Assam	D.D Tinsukia, Guwahati, Labac Silchar, Mariani Jorhat, Rangapara Tezpur
3	Bihar	Monghyr
4	Chhattisgarh	Bhilai
5	Gujarat	Ahmedabad, Bhavanagar, Rajkot, Surat, Vadodra
6	Haryana	Faridabad, Yamunanagar
7	Jharkhand	Jamshedpur, Jharia, Kodarma, Noamundi, Ranchi-Hatia
8	Karnataka	Bangalore, Belgaum, Hubli Dharwar, Mercara
9	Kerala	Alwaye, Mundakayam, Quilon, Thiruvanathapuram
10	Madhya Pradesh	Balaghat, Bhopal, Indore, Jabalpur
11	Maharashtra	
	East	*Nagpur, Solapur*
	West	*Mumbai, Nasik, Pune*
12	Orissa	Barbil, Rourkela
13	Punjab	Amritsar, Ludhiana
14	Rajasthan	Ajmer, Jaipur
15	Tamil Nadu	Chennai, Coimbatore, Coonoor, Madurai, Salem, Tiruchirapally
16	Uttar Pradesh	
	Central and East	*Kanpur, Varanasi*
	West	*Agra, Ghaziabad, Saharanpur*
17	West Bengal	Asansol, Darjeeling, Durgapur, Haldia, Howrah, Jalpaiguri, Kolkata, Raniganj
18	Delhi	Delhi

Appendix 3: Products included in the Sample

Rice	Dairy Milk-Standard	Onion green
Wheat	Powder Milk	Green Coriander
Wheat Atta	Curd	Ambadi
Jower	Pure Ghee	Pickle
Gram	Butter	Banana
Bajra	Salt	Mango
Barley	Turmeric	Coconut
Maize	Onion	Lemon
Ragi	Chilles-dry	Orange
Tapioca	Chilles-green	Apple
Rice Products	Tamarind	Chiku
Chira/Muri	Garlic	Grapes
Maida	Ginger	Mosambi
Suji	Coriander	Guava
Satoo	Jira	Papaya
Sago	Pepper	Kaju
Bread	Methi	Sugar
Arhar dal	Mustard Seed	Gur
Gram dal	Asfoetida	Sugar-desi
Moong dal	Mixed Spices	Tea leaf
Urd Dal	Potato	Coffee Powder
Masur Dal	Raddish	Snack-Saltish
Pea dal	Carrot	Snack-Sweet
Gram whole	Arum	Hot drink-Tea
Pea whole	Turnip	Hot drink-Coffee
Urd whole	Beet Root	Cold drink/Aerated Water
Moong whole	Brinjal	Green Coconut
Rajmah	Cauliflower	Squash
Kabligram	Cabbaage	Biscuit
Khesari dal	Pumpkin	Cocoa Products
Besan	Bitter gourd	Cake
Palm Oil	Lady's finger	Groundnut
Gingelly Oil	Gourd	Parched gram
Kardi Oil	Tomato	Pan leaf
Coconut Oil	French Bean	Pan finished
Vanaspati	Peas	Supari
Mustard Oil	Gowar Phali	Katha
Lineseed Oil	Barbati	Lime
Rapeseed Oil	Parwal	Zarda/Kimam
Oil Seeds (Groundnut)	Torai/Jhinga	Bidi
Goat Meat/Mutton	Cucumber	Cigarette
Beef	Green Banana	Cigar/Cheroot
Pork	Tinda	Smoking Tobacco
Buffalo meat	Mango green	Chewing Tobacco
Poultry	Palak	Leaf Tobacco
Fish-fresh	Methi	Country Liquor

Fish dry	Tooth Brush	Refrigerator
Eggs-Hen	Blade	Bucket Plastic
(Cont.)	Ornaments - Plastic	Washing Soap
Eggs-Duck	Ornaments - Glass	Washing Soda
Milk	Watch	Detergent Powder
Dairy Milk-Tonned	Bhaji	Neel/Blue
Saree-cotton	Face Cream (Snow)	Soap chips
Saree-Synthetic	Fountain Pen	Vim
Saree-Silk	Talcum Powder	Refined Liquor
Trouser cloth-Cotton	Soap Nut	Pressure Cooker
Trouser cloth-Synthetic	Comb	Kerosene stove
Trouser Cloth-Woolen	Neam Stick	Lock
Shirting Cloth-Cotton	Poi/Lal sag	Electric Bulb
Shirting Cloth-Synthetic	Totakura	Bed-sheet
Blouse-Rubia	Gogukura	Mosquito Net
Blouse cloth-Synthetic	Kadam sag	Blanket
Chhintz-Cotton	Umbrella	Wool
Long cloth	Scent Perfume	Sweater
Mulmul	Flower/garland	Beer
Ladies suiting cotton	Brief case/Hand bag	Toddy, Neera, Handia
Ladies suiting-Terycot	Cot	Dhoti cotton
Lungi	Sofa	Dhoti Terycot
Gamcha	Chair Steel	Mattress
Frock cloth	Chair wood	Socks
Towel	Table-steel	Durrie
Shawl-Woolen	Almirah-wooden	Underwear
Pyjama cloth	Almirah-steel	Shoes
Petticoat cloth	Box/Trunk	Chappal
Ganji/Banian	Suit-case	Sandal
Chadder/Angvastram	Utensil-steel	Slipper
Medicine	Utensil-Aluminium	Bicycle
School/College books	Utensil - Brass	
Stationery	Utensil-Copper	
Newspaper	Utensil - Earthenware	
Periodicals/Journals	Chinaware	
Radio	Utensil-Bell metal	
Transister	Glass-ware	
Tape Recorder	Bucket galvanised	
Television	Broom	
Photographic Expenses	Mat	
Toys	Boot Polish	
Hair Oil	Electric Fan	
Toilet Soap	Electric Iron	
Face Powder	Timepiece/Clock	
Tooth Paste	Sewing Machine	
Tooth Powder	Mixer/Grinder	

Appendix 4: Consumer prices in states relative to lowest price in the sample for revised grouping, 2004.

State	All commodities	Primary Food	Total Food	Manufactured	Manufactured without food
Bihar	1.00	1.00	1.00	1.09	1.15
West Uttar Pradesh	1.01	1.03	1.03	1.06	1.04
East Uttar Pradesh	1.02	1.07	1.07	1.03	1.07
Chattisgarh	1.03	1.04	1.07	1.10	1.08
Haryana	1.03	1.11	1.09	1.00	1.00
Jharkhand	1.04	1.06	1.07	1.10	1.10
Orissa	1.04	1.08	1.04	1.09	1.17
Punjab	1.05	1.11	1.09	1.07	1.10
Madhya Pradesh	1.07	1.08	1.11	1.14	1.12
Delhi	1.07	1.12	1.12	1.10	1.09
East Maharashtra	1.08	1.15	1.14	1.07	1.04
West Bengal	1.09	1.15	1.12	1.10	1.15
Andhra Pradesh	1.12	1.17	1.16	1.14	1.15
Kerala	1.12	1.21	1.16	1.09	1.13
Tamil Nadu	1.13	1.12	1.16	1.24	1.23
Karnataka	1.14	1.22	1.21	1.11	1.07
Gujarat	1.14	1.15	1.19	1.22	1.20
Assam	1.16	1.23	1.21	1.16	1.18
Rajasthan	1.18	1.23	1.25	1.20	1.16
West Maharashtra	1.47	1.77	1.60	1.20	1.21
Summary Statistics					
No. of Observations	20	20	20	20	20
Minimum	1.00	1.00	1.00	1.00	1.00
Maximum	1.47	1.77	1.60	1.24	1.23
Mean	1.10	1.15	1.14	1.11	1.12
Median	1.07	1.12	1.12	1.10	1.13
SD	0.10	0.16	0.12	0.06	0.06
CV	0.09	0.13	0.11	0.06	0.05

Note: Data are expenditure-weighted average ratios of states consumer prices for goods to the lowest price in the sample.
In this table the states are arranged in order of ranking by all commodities.
Lowest price state is ranked as 1.

Appendix 5: Correlation matrix for consumer price ratios for revised grouping, 2004

Product Groups	All Commodities	Primary Food	Manufactured	Total Food	Manufactured without food
All Commodities	1.00	0.97**	0.64**	0.99**	0.55*
Primary Food		1.00	0.45*	0.98**	0.41
Manufactured			1.00	0.58**	0.85**
Total Food				1.00	0.46*
Manufactured without food					1.00

**: Correlation significant at 0.01 level; *: Correlation significant at 0.05 level.

Appendix 6: Correlation matrix for consumer price ratios and other economic variables ratios, 2004

Product Groups	Primary Food	Manufac -tured	Urbanizat -ion	Pksgdp	Agriculture Share	Manufac -tured Share	Wage Rate	Infrastruc -ture Index
Primary Food	1.00	0.31	0.19	0.28	-0.28	-0.26	-0.08	0.05
Manufactured		1.00	0.11	-0.01	-0.38	0.17	-0.20	-0.19
Urbanization			1.00	0.94**	-0.67**	-0.13	0.01	055*
Pksgdp				1.00	-0.56**	-0.12	-0.01	0.70**
Agriculture Share					1.00	0.15	-0.35	-0.12
Manufactured Share						1.00	0.13	-0.06
Wage Rate							1.00	-0.03
Infrastructure Index								1.00

**: Correlation significant at 0.01 level; *: Correlation significant at 0.05 level.

Appendix 7: Consumer prices in states relative to lowest prices in the sample products for 1994 and 2004

State	All Commodities		Primary food		Manufactured		Manufactured food		Total Food	
	1994	2004	1994	2004	1994	2004	1994	2004	1994	2004
Andhra Pradesh	1.00	1.01	1.07	1.05	1.04	1.01	1.02	1.00	1.00	1.01
Assam	1.18	1.04	1.18	1.06	1.30	1.05	1.29	1.05	1.18	1.04
Bihar	1.08	1.00	1.13	1.00	1.14	1.04	1.20	1.04	1.08	1.00
Chhattisgarh	1.03	1.06	1.00	1.11	1.17	1.06	1.27	1.06	1.03	1.06
Gujarat	1.17	1.04	1.25	1.07	1.21	1.06	1.30	1.05	1.17	1.04
Haryana	1.04	1.04	1.16	1.10	1.03	1.03	1.18	1.01	1.04	1.04
Jharkhand	1.10	1.04	1.13	1.10	1.18	1.01	1.29	1.01	1.10	1.04
Karnataka	1.05	1.03	1.20	1.09	1.03	1.00	1.00	1.00	1.05	1.03
Kerala	1.03	1.03	1.10	1.06	1.07	1.04	1.08	1.04	1.03	1.03
Madhya Pradesh	1.09	1.02	1.15	1.04	1.15	1.04	1.24	1.04	1.09	1.02
East MH	1.03	1.05	1.08	1.10	1.09	1.03	1.11	1.02	1.03	1.05
West MH	1.16	1.01	1.37	1.03	1.07	1.03	1.07	1.04	1.16	1.01
Orissa	1.15	1.02	1.25	1.08	1.18	1.01	1.29	1.00	1.15	1.02
Punjab	1.10	1.02	1.22	1.07	1.10	1.00	1.28	1.00	1.10	1.02
Rajasthan	1.20	1.04	1.28	1.08	1.26	1.04	1.26	1.02	1.20	1.04
Tamil Nadu	1.02	1.03	1.06	1.05	1.08	1.04	1.05	1.03	1.02	1.03
Central and East UP	1.05	1.05	1.22	1.08	1.00	1.07	1.13	1.07	1.05	1.05
West UP	1.02	1.04	1.13	1.06	1.02	1.06	1.15	1.07	1.02	1.04
West Bengal	1.15	1.04	1.15	1.06	1.28	1.06	1.37	1.07	1.15	1.04
Delhi	1.12	1.00	1.28	1.02	1.10	1.03	1.23	1.03	1.12	1.00
Summary Statistics										
No. of Observations	20	20	20	20	20	20	20	20	20	20
Min	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max	1.20	1.06	1.37	1.11	1.30	1.07	1.37	1.07	1.20	1.06
Mean	1.09	1.03	1.17	1.06	1.12	1.03	1.19	1.03	1.09	1.03
Median	1.08	1.03	1.15	1.07	1.10	1.04	1.22	1.03	1.08	1.03
SD	0.06	0.02	0.09	0.03	0.09	0.02	0.11	0.02	0.06	0.02
CV	0.06	0.02	0.07	0.03	0.08	0.02	0.09	0.02	0.06	0.02

Appendix 8: Relative Consumer prices ratios in states for fuel, power light & lubricants, 2004.

Product	Fuel, Power Light & Lubricants
Haryana	1.00
Orissa	1.16
Assam	1.34
Kerala	1.36
Chattisgarh	1.41
E. Maharashtra	1.45
West Bengal	1.47
Tamil Nadu	1.48
Jharkhand	1.50
W. Uttar Pradesh	1.52
Rajasthan	1.53
Madhya Pradesh	1.53
Andhra Pradesh	1.54
E. Uttar Pradesh	1.57
Karnataka	1.63
Bihar	1.72
Punjab	1.74
W. Maharashtra	1.76
Gujarat	1.86
Delhi	2.17
Summary Statistics	
No. of Observations	20
Minimum	1.00
Maximum	2.17
Mean	1.54
Median	1.53
SD	0.24
CV	0.16

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