

Impact of Market Reforms on Price Integration: A Study of Wholesale Spice Markets in India

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ABSTRACT

Integration of market prices of commodities across various markets is one of the stated objectives of many agricultural marketing reforms undertaken in the country. Well integrated and efficient agricultural markets can allocate resources optimally and remove inefficiencies along the product value chain, thereby directly affect farmer producer welfare. This study takes an analytical look at the impact of a slew of agricultural market reforms policies focusing on Agricultural Produce Market Committee acts starting from 2002-03. The study analyses the marketing of spices, one of the most tradable commodities with a market oriented production system. The effect of major market reforms in improving the efficiency of wholesale spice markets through reduction in market segmentation is examined using data on monthly price dispersion of major spices across wholesale markets in the country. The study finds that the magnitude of reduction in market segmentation in response to the market reforms is low and varies across domestically traded spice commodities. The persistence of high degree of price dispersion in spice markets creates a significant price wedge between producer prices and consumer prices resulting in higher cost for both farmers and consumers alike. The study highlights the need for strengthening and pursuing the reform agenda for agricultural markets to create a unified market for agricultural commodities in the country.

Keywords: Agricultural markets, spices, reforms, price dispersion, market segmentation

The existence an efficient marketing network for agricultural outputs is one of the pre-requisites for ensuring optimal resource allocation in agricultural sector. The efficient functioning of markets provides profitable prices to the producers and fair prices to the consumers (Suvarna *et al.*, 2015). The role of markets is more important in high value commodities like spices where the production is market oriented and marketed surplus is high. Better price realisation for farmers through competitive markets can result in higher farm incomes and enhanced livelihood security. Majority of farmers engaged in the production being smallholder producers, improvement in markets can promote inclusive growth in the sector. India is the largest producer and consumer of spices in the world. During 2013-14, spices were cultivated in 3.2 million hectares of land with a total production

of 5.8 million tonnes. Though spices are one of the major constituents of agricultural exports from the country, bulk of the spices produced is traded and consumed domestically. Therefore, more than export markets, the performance of domestic markets are more important for the primary producers of spices. Market reforms aimed at improving the performance of regulated markets has remained a key element of agricultural price policy planning (Ghosh, 2013). Presently, markets in agricultural products are regulated under the Agricultural Produce Market Committee (APMC) Act enacted by respective State Governments. This act notifies agricultural commodities produced in the region making it mandatory that the first sale in these notified commodities can be conducted only under the aegis of APMC. There is a consensus that the pace of reforms in agricultural marketing has remained

well below desirable levels. This study examines the market segmentation in spice wholesale markets, where factors like diversity in production environments of various spices, geographical segregation between producing and consuming regions and seasonality of market arrivals affect the process of price discovery. After tracing the evolution and status of market reforms aimed at improving performance of regulated markets in India, the paper examines the impact of market reforms policy in terms of market segmentation in spice wholesale markets across the country drawing conclusions on policy options for enhancing market efficiency in marketing of spices.

Data and methodology

A structural and functional analysis of the changes in mode of functioning of regulated markets since 2003-04 is attempted by tracing the policy milestones and concomitant institutional changes in agricultural marketing. The potential impact of the changes on stakeholders along the spice marketing chain is also discussed.

Market segmentation

A key parameter that indicates the functional efficiency of agricultural markets is the extent of market segmentation in a commodity. Market segmentation reduces overall welfare by preventing gains through competition and efficient resource allocation (GoI, 2016). For the computation of market segmentation, state wise monthly wholesale market prices of eight major spices were obtained from directorate of economics and statistics. Market segmentation was measured as the average of monthly ratios of highest and lowest price of particular commodity across wholesale markets in the country during an year. If the ratio were to be equal to one, this would imply the existence of one common market without segmentation and price dispersion. Eight major spice commodities widely traded in wholesale markets (black pepper, cardamom, chilli, turmeric, ginger, garlic, coriander and cumin) were studied for price dispersion during two periods, 2003-04 and 2013-14. The share of these spices in area and production of total spices during 2013-14 was 93.9 and 91.4 per cent respectively. The choice of base year was determined by the fact that the draft of the Model APMC act was

notified during 2004, which subsequently brought in substantial changes in state level acts regulating wholesale markets. The impact of market reforms on wholesale markets for spices should be manifest in the latter period.

Market segmentation cannot be studied independent of the underlying determinants affecting supply of commodities to the market like area, production and productivity of the crops and the instability in these variables. Data on these parameters was collected from official government publications. The instability of various variables in selected spice commodities were measured using cuddy della instability index.

RESULTS AND DISCUSSION

Evolution of agricultural market reforms

Agricultural marketing remained on the fringes of policy discourse until mid 1960s when the surge in agricultural output ushered in by green revolution made it necessary to develop commensurate marketing infrastructure. The need to create strong pricing incentive through efficient markets to push technology adoption in agriculture was another reason for establishment of wholesale regulated markets (Table 1). The three decades following the initiation of green revolution saw strong growth in the number of regulated markets across the country. From 1976 to 1991 the number of regulated markets grew at a compound growth rate of 3.9 per cent. This phase of market development was mainly aimed at establishment of basic facilities for market aggregation and domestic trade. Though major food grains like paddy and wheat were the initial focus of these markets, a gradual expansion of its activities across major agricultural commodities soon followed. The creation and regulation of wholesale markets was entirely done in the public domain due to lumpiness of investments required, low investment capacity of the private sector and long gestation period for return on capital investments. Creation of wholesale markets and its accessibility to primary producers were key constituents in breaking the extant unorganized and informal marketing systems with its associated exploitative inefficiencies. In India, the terms wholesale markets and regulated markets have become synonyms for all practical purpose. All wholesale markets for

Table 1: Timeline of agricultural market reforms in India

Period	Events	Enabling factors/causes
1960's and 1970's	<ul style="list-style-type: none"> ❑ Fast expansion of wholesale markets ❑ Breaking of monopoly of local middlemen and informal marketing system 	<ul style="list-style-type: none"> ❑ Significant rise in cereal production ❑ Need to provide price incentive to enhance technology adoption ❑ Address exploitation of producer sellers by traders and mercantile capital
1980's	<ul style="list-style-type: none"> ❑ Fast expansion of regulated markets along with diversification of commodities 	<ul style="list-style-type: none"> ❑ Significant demand for easier access to markets ❑ Need to strengthen markets through diversification in portfolio
Early 1990's	<ul style="list-style-type: none"> ❑ Deceleration in growth rate of regulated markets ❑ Institutional inefficiencies become prominent in regulated markets 	<ul style="list-style-type: none"> ❑ Lack of clear policy on agricultural markets ❑ Diversity in marketing cost and charges between markets
Late 1990's	<ul style="list-style-type: none"> ❑ Demand for level playing field in agricultural marketing <i>vis-a-vis</i> public and private sector 	<ul style="list-style-type: none"> ❑ Liberalization of economy and policy stress on privatization ❑ Growth in investment capacity of private sector
2002	<ul style="list-style-type: none"> ❑ Inter-Ministerial Task Force on Agricultural Marketing Reforms 	<ul style="list-style-type: none"> ❑ Diversification of agricultural production and need for commercial market orientation ❑ Need to promote competition in agricultural marketing
2003	<ul style="list-style-type: none"> ❑ Model APMC act prepared by union ministry of agriculture 	<ul style="list-style-type: none"> ❑ Disparity in agricultural markets across states which had to be addressed ❑ Need for marketing institutions attuned to principles of liberalization of agricultural marketing
2003- 2007	<ul style="list-style-type: none"> ❑ Slow pace of implementation of reform elements in state APMC Acts 	<ul style="list-style-type: none"> ❑ Lack of clarity on outcomes of reforms ❑ Fear of redundancy among stakeholders of regulated markets
2007	<ul style="list-style-type: none"> ❑ Model APMC rules drafted by ministry of agriculture 	<ul style="list-style-type: none"> ❑ Need for uniformity in implementation of model act across states
2007 onwards	<ul style="list-style-type: none"> ❑ Gradual implementation of major reform elements of model APMC act in majority of the states 	<ul style="list-style-type: none"> ❑ Acceptance of reforms as a growth driver in agriculture
2015	<ul style="list-style-type: none"> ❑ Proposal for setting up National agricultural market (NAM) 	<ul style="list-style-type: none"> ❑ Need for uniformity in marketing and real time price discovery
2016	<ul style="list-style-type: none"> ❑ Pilot launch of NAM for 21 markets across 8 states 	<ul style="list-style-type: none"> ❑ Create a fully integrated common market at national level

agricultural produce in states that have adopted the Agricultural Produce Market Regulation Act are termed “regulated markets”. Apart from Kerala, Jammu and Kashmir, and Manipur, all other states in India have enacted agricultural marketing legislations. These legislations are collectively referred to as Agricultural Produce Marketing Committee (APMC) Acts. The APMC’s fulfilled their *raison d’être* during nearly three decades following green revolution. APMC’s got rid of several malpractices and imperfections in agricultural

markets, created orderly and transparent marketing conditions, and ensured a fairer deal to farmers selling their produce (Acharya 2004).

By the turn of the millennium, the operations of APMC’s had become restrictive in nature for the evolving commercial orientation of agricultural production and marketing. Lack of avenues for direct marketing, inability to ensure seamless linkage between primary producers and agro-processing industries and lack of competitive trade

information network were some of the visible outcomes from embedded institutionalization of regulated wholesale markets. In order to have vibrant competitive marketing systems the Government had to bring about reforms in existing policies rules and regulations with a view to remove all legal provisions inhibiting free marketing system. In pursuance of this objective an inter-ministerial task force on agricultural marketing was set up in 2002 which recommended the need for reforms in APMC act. Subsequently, the ministry of agriculture drafted a model APMC act incorporating several changes in legal provisions under the act enabling competition and removing inefficiencies. The model act also sought to bring about uniformity among states to move toward a common market across the country.

State governments began responding by amending their respective state APMC acts incorporating provisions under the model act. The Ministry of Agriculture also framed Model APMC Rules and circulated to States/U.Ts during 2007 to facilitate amendments of the existing Rules. Though the pace and extent of implementation varied among states, the model act/rules was successful in channelizing the reforms in agricultural marketing towards uniformity in marketing process. Since 2007, measured by objective criteria of achievements in seven key areas of reforms¹, majority of states had adopted reform elements in their respective APMC acts. For example, 21 states had enabled provisions for direct purchase of the produce from farmers and e trading was allowed by 15 states as on December, 2014 (DAC, 2015). Considering the limitations of state level APMC acts in creating a fully integrated common market at the national level, the Department of Agriculture & Cooperation has taken steps in establishing a National Agriculture Market (NAM) during 2015. This will create a pan-India electronic trading portal which networks the existing APMC *mandis* to create a unified national market for agricultural commodities promoting uniformity, streamlining procedures across markets, removing information asymmetry and promoting real time price discovery.

In the next section, we take a closer look at spices cultivation before examining whether the reforms in agricultural marketing have affected price dispersion of spices in wholesale markets.

Status and trends in spices cultivation

The area under spices increased from 25.2 million hectares in triennium ending 2003-04 to 31.9 million hectares during triennium ending 2013-14. The production also increased across major spices with a net increase of 69.2 per cent for total spices production during the same period. Except for black pepper all the major spice crops witnessed positive growth rate in production, whereas the compound annual growth rate in yield was more than one per cent for all crops except chillies with a CAGR of 0.9 per cent (Table 2). The strong performance in terms of area, production and yield growth rate in spices show the farmer preference for these crops. The value of output from spices has also grown commensurate to the growth in production. Along with the growth rates in key production parameters, the instability of these parameters also play a crucial role in spice economy. Though the instability in total spice area, production and yield are relatively low during the period studied, variation across crops is significant. The growth in output along with instability witnessed in several parameters directly affecting marketed quantity of spices, the role of markets in balancing market demand and supply becomes crucial. It is important to provide an efficient marketing system to link the primary producers and final consumers ensuring effective transfer of price signal across stakeholders and optimizing allocation of resources.

Price dispersion in spices

Inherently spices are highly tradable high value commodity as they can be stored for long periods without affecting their quality. The markets play a decisive role in commodities like spices where, due to specific climatic requirement of various spice crops, production areas are constrained by agro-ecological requirements and consumption areas are widely spread. Spice commodities; therefore have a propensity for higher magnitude of price dispersion in the absence of efficient marketing system. The price dispersion measured as the average of monthly ratios of highest and lowest price of particular commodity across wholesale markets during the selected periods in selected spices is given in Table 2.

The results indicate that market segmentation in spice commodities persist after a decade of initiation

Table 2: Area, production and yield of spices in India

Crops	TE 2013-14			Compound annual growth rate 2003-04 to 2013-14		
	Area (000Ha)	Production (000T)	Yield (Kg/Ha)	Area	Production	Yield
Pepper	125.7 (-48.1)	56.1 (-14.7)	445 (62.7)	-6.8 (9.8)	-2.2 (9.4)	4.9 (20.8)
Ginger	138.7 (38.5)	729.7 (93.6)	5255 (41.1)	3.8 (10.5)	7.5 (19.6)	3.5 (10.9)
Cardamom	94.9 (2.0)	21.34 (30.7)	224 (27.7)	-0.6 (4.7)	1.3 (11.2)	1.8 (8.4)
Turmeric	196.2 (26.9)	902.4 (46.9)	4593 (16.2)	2.9 (5.3)	4.3 (12.4)	1.3 (8.3)
Chilli	771.9 (-1.0)	1467.3 (32.8)	1905 (33.4)	0.8 (5.0)	1.8 (6.9)	0.9 (6.2)
Cumin	900.7 (113.6)	492.8 (204.1)	545 (35.7)	11.4 (15.6)	15.3 (23.9)	3.5 (18.6)
Garlic	246.7 (87.6)	1312.2 (119.4)	5319 (17.7)	6.5 (7.8)	8.2 (10.1)	1.6 (6.5)
Coriander	514.3 (37.9)	433.1 (60.1)	834 (17.7)	3.3 (14.5)	5.2 (22.9)	1.9 (13.7)
Total Spices	3185 (26.5)	5920 (69.2)	1859 (33.8)	2.9 (6.7)	5.3 (8.8)	2.3 (3.5)

The figures in parentheses in columns 2-4 indicate per cent change from base period value for triennium ending 2003-04 and the figures in parentheses under growth rates indicate instability index adjusted for trend.

of market reforms precisely aimed at addressing such issues. The dispersion in wholesale prices indicates that when it comes to price discovery of agricultural commodities, the country is segregated along its various markets. The country is far from the ideal of being a common market. Unit level studies on price dispersion of farm gate prices in of selected agricultural commodities in United States during 2012 hardly exceeds 1.75, which is higher in magnitude than price dispersion of wholesale prices in most of the spice commodities in both the periods².

Table 3: Price dispersion across wholesale markets in spices

Crops	2003-04	2013-14	Per cent change	Price Instability (2003-04 to 2013-14)
Pepper	2.32	1.40	-39.7	19.3
Ginger	10.32	5.83	-43.5	18.6
Cardamom	3.11	1.47	-52.7	19.0
Turmeric	2.65	5.67	114.0	41.5
Chilli	4.40	5.09	15.7	12.6
Cumin	2.15	1.91	-11.2	9.0
Garlic	6.96	5.05	-27.4	44.7
Coriander	2.48	3.09	24.6	25.3
Average	4.29	3.69	-14.0	23.75

The average wholesale price dispersion for the selected spices declined from 4.3 in 2003-04 to 3.7 during 2013-14. Though this is a welcome sign, the magnitude of decline is very small(14 per cent) and

is not uniform across commodities indicating that factors other than agricultural market reforms policy also might have played a role in affecting dispersion of wholesale prices of individual commodities. In case of coriander, chilli and turmeric the price dispersion increased during the period studied. The price instability of monthly wholesale prices of these commodities during this period remained high measured by cuddly della instability index. Except for two commodities (chilli and cumin), the instability index was above 15 for spices studied. The high degree of price instability in wholesale prices combined with lack of information flow across geographically segregated markets could be one of the factors behind persistence of wholesale price dispersion.

The high level of price dispersion in markets creates a significant price wedge between producer prices and consumer prices resulting in higher cost for both farmers and consumers alike. The price spread between farm harvest prices received by primary producers and retail prices for turmeric and chillies indicate a spread of more than 100 per cent, even in major producing states of the commodity. During 2013-14, The price spread in turmeric was 195 per cent in Andhra Pradesh, 209 per cent in Karnataka and 87 per cent in Tamil Nadu whereas in chillies, it was 106, 219 and 175 per cent in Andhra Pradesh, Karnataka and Madhya Pradesh respectively³. There is a need to increase producers share in consumers rupee. With farm sizes getting

smaller, income from agriculture produce can be improved by enabling the farmers to get a share of the value added in marketing by developing and strengthening marketing mechanisms that includes them as partners (Chand, 2012). The persistence of high magnitude of price dispersion in wholesale prices and the existence of substantial price spread between prices received by producers and prices paid by consumers is symptomatic of lack of information flow across markets and market stakeholders both vertically and horizontally.

CONCLUSION AND POLICY PERSPECTIVE

The reforms for rejuvenating agricultural markets can have significant impact on the marketing of the commodities handled by it, and by extension on the stakeholders involved. The wholesale price dispersion in spice commodities, as a measure of market segmentation, has remained significant, indicating the lack of penetration of the reform element across all commodities. The persistence of inefficiencies, that were sought to be addressed through reforms, indicates the need to look at factors that can strengthen and complement the agricultural market reforms. This includes:

- ♦ Promoting alternatives to *mandi* based marketing like creation of crop based farmer producer organizations, which can directly undertake production, aggregation, grading and marketing.
- ♦ Exploring the provisions for contract farming and direct purchasing from producers, as provided in model APMC act, in spice crops where product quality is very important and price fluctuations are more prominent.
- ♦ Create and implement infrastructure to ensure product traceability in spices. This will enable better efficiency in price discovery and lead to horizontal integration.
- ♦ Development of communication infrastructure and networking among major markets can ensure better dissemination of price information and better market integration.
- ♦ Create incentives for encouraging private sector participation and establishment of integrated supply chains for specific products with customized quality parameters.

- ♦ Address instability in supply parameters like yield through dissemination of production technology for mitigating weather aberrations.
- ♦ Strengthen demand forecasting based on national and international factors affecting demand for spice commodities to reduce price instability.

Nearly sixty years after initial comprehensive steps were taken for improving agricultural marketing through regulated markets, the agricultural markets in the India continue to remain segregated in terms of prices. Though the implementation of reforms in the APMC act has not been able to deliver the expected dividends in market integration in spices, complementary efforts in other areas related to agricultural marketing like infrastructure, communication etc. could result in better integration of agricultural markets and a better deal for farmers.

Notes

1. The market reforms agenda focuses on seven key areas of reforms for monitoring the progress of implementation. They are i) Establishment of private market yards/ private markets managed by a person other than a market committee, ii) Establishment of direct purchase of agricultural produce from agriculturist (Direct Purchasing from producer), iii) Promote and permit e-trading, iv) Establishment of farmers/ consumers market managed by a person other than a market committee (Direct sale by the producer), v) Provisions regarding promoting contract farming, vi) Single point levy of market fee and vii) Single registration/ license for trade / transaction in more than one market.
2. The actual price dispersion in wholesale markets could be higher, since the price dispersion is worked out on monthly wholesale market prices at the state level, in which the intra-state market price variations are subsumed. The price dispersion study in US used unit level data on farm harvest prices and dispersion was calculated as ratio between highest (P95) and lowest (P5) price for a crop in the country (GoI, 2016).
3. In case of turmeric and chillies the retail prices are available for 100 gram packets

of powdered product, whereas data on farm harvest prices are prices received per quintal of dry product. The calculation of price spread does not account for price differences arising from scale of accounting (For example, the bulk price of turmeric powder could be lower than that of 100 g pack) and value addition through processing, packaging and marketing services.

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