Does a Speculative Trade in Food Commodities Influence Food Price Inflation in India?

Pushparaj Soundararajan and Vidya Suresh

Department of Econometrics, School of Economics, Madurai Kamaraj University, Madurai, Tamilnadu, India., Thiagarajar School of Management, Madurai-625005, Tamilnadu, India.

December 2014

Article *ISSN: 2348-3784*

Does a Speculative Trade in Food Commodities Influence Food Price Inflation in India?

S. Pushparaj and Vidya Suresh

Abstract

Inflation, especially the food inflation has become a major economic challenge for the public policy in the contemporary India. Inflation pressure on food products is caused by interplay of multiple factors. The literature has identified various sources of food price inflation that included institutional factors, market conditions and institutional arrangements. The effect of institutional arrangements like speculative trade in commodity on the inflation is studied in many studies. Yet similar studies have not been attempted in the Indian context though the speculative trade is permitted in commodities from 2003 onwards. This paper analyses the relationship between wholesale food price index and trading on agricultural commodities in Multi-Commodity Exchange of India (MCX) using the monthly data between 2004 and 2014 from CSO and MCX respectively. The researchers have used time series analysis to draw conclusions from the study which indicates that there is no influence of trading on food commodity futures on wholesale price indices. However, the trading in MCX is influenced by fluctuations in wholesale price indices which may have implications for the future of food commodities prices in India.

1. Introduction

In economic terms, inflation is a sustained rise in the general level of prices. Higher degree of inflation is a source of greater uncertainty that would dampen economic performance and distort economic decisions viz., investment and consumption decisions which would eventually undermine economic growth. Inflation by its very nature redistributes income and wealth of all the factors of production in asymmetric proportions. At the individual level, inflation may lower standard of living through increased cost of living and so would erode public faith in the reliability of social and political system. Though price inflation has been discussed commonly at the aggregate level, in the present context, price inflation among food commodities assumes special significance. In this paper, the first section discusses the measurement and causes of food price inflation in India that include the speculative trade in food items. The second section elaborates the methodology adopted to trace the link between the speculative trade and the food price. Third section presents the results and last section provides the conclusion.

Dr. S. Pushparaj, Department of Econometrics, School of Economics, Madurai Kamaraj University, Madurai, Tamilnadu, India. E-Mail: s_pushparaj@hotmail.com Phone: +91 9488678678. (Corresponding Author)

Dr. Vidya Suresh, Thiagarajar School of Management, Madurai-625005, Tamilnadu, India. E-Mail-vidyasuresh@tsm.ac.in Phone: +919750420360

In practice, inflation is measured as a rise in general level of prices of goods and services in an economy over a period of time. Inflation is usually measured as a growth of price indices[1]. A price index reflects the overall change in a set of prices paid by a broad group of consumers or producers. In India three major national indices are used for measuring inflation or price levels. They are (a) The Wholesale Price Index (base 1993-94) which is considered as the headline inflation indicator in India; (b) In addition to Whole Price Index (WPI), there are four different consumer price indices which are used to assess the inflation for different sections of the labor force; and (c) In addition to the above indices, the GDP deflator is available for the economy as a whole for different sectors on a quarterly basis. However, there are two categories of price indices for measuring inflation i.e. consumer prices and wholesale prices. Firstly, the CPI measures price change from the perspective of the retail buyer. It reflects the actual inflation that is borne by the individual or the end user. CPI is designed to measure changes over time in the level of retail prices of selected goods and services on which consumers of a defined group spend their incomes[2]. According to which four series of indices are defined. The four CPIs reflect the effect of price fluctuations of various goods and services consumed by specific segments of population in the country. Central Statistics Office (CSO) of the Ministry of Statistics and Program Implementation has started compiling a new series of CPI from 2012[3]. Old or new, the Consumer Price Index provides a consumer wise price indices but the commodity-wise break up of price index is not provided.

Secondly, the Wholesale Price Index (WPI) is the widely used inflation indicator in India by Government, banks, industry and business circles as it captures price movements in a most comprehensive way. The data is compiled by Central Statistical Organisation database with 2004-05 as a base year. Key monetary and fiscal policy changes are linked to WPI movements and these are used since 1939 besides being published since 1947 regularly. Inflation in India is the percentage change in the value of the Wholesale Price Index (WPI) on a year-on-year basis. WPI is used to measure the variation in the prices of basket of goods and services for a year. The WPI has a basket of 676 items with category wise price indices breakup. The WPI index system includes index numbers for food items. Using this index the food inflation is computed.

---

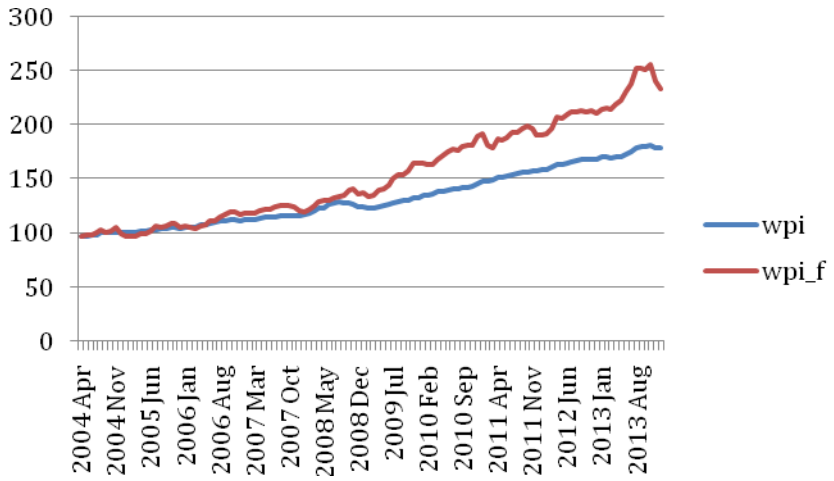
1 For month-wise data, inflation is calculated using the below formula, Inflation= $\frac{(WPI_t - WPI_{t-12})}{WPI_{t-12}} \times 100$

2 The four CPIs include (1) Industrial Workers (IW) (base 2001); (2) Agricultural Labourer (AL) (base 1986-87) ; (3) Rural Labourer (RL) (base 1986-87) ; (4) Urban Non-Manual Employees (UNME) (base 1984-85).

3 The New CPI include (a) CPI for the entire urban population viz CPI (Urban); (b) CPI for the entire rural population viz CPI (Rural) and (c) Consolidated CPI for Urban + Rural will also be compiled based on above two CPIs.

Food price inflation reflects the increase in the prices of major food crops that are traded in the market. The food price rise is having implication for the general price level. The overall price scenario is led by the trend in food item prices as the weight of food item in the item basket considered for the wholesale price index. This trend is captured in Fig1. Trend of wholesale price index of the food items (wpi_f) found to deviate in the upward trajectory vis-a-vis wholesale price index of all items (wpi). Accounting for the higher growth path of food items would hold the key for any effort to contain the overall price growth. Further, mitigating the food inflation assumes special significance in various contexts. Amongst all types of inflation, rise in food prices causes immense distress leading to unrest and protests. The only beneficiary during the inflation of food prices are farmers which again depends on their getting their due and fair share of the inflated food price for their produce. Food inflation during past two decades has gathered attention among policy makers and academicians in India as well as globe. The dynamics of food inflation has changed in recent times and understanding the drivers also has become a matter of concern especially when it has a potential to threaten our collective goal of 'higher, inclusive and sustainable' growth.

Figure: 1 Trends in WPI and WPI_F during the study period (2004 – 2014)



Source: Authors' presentation based on the CSO data on respective price indices.

Interestingly, higher food inflation is realized at a time when there is a record production of food grains and sufficient buffer stocks. However, there remains a concern that better understandings of the factors that drive such spikes is needed in key prices and draw the attention of policy makers to design more effective policies to prevent such future price spikes. With the food inflation has become a major economic challenge for the public policy in India; it becomes a moral economic duty of the contemporary governments in checking the same and maintains it at required level.

1.1 Reasons for food inflation

In the literature, there has been lot of discussion about various causes of inflation in India. It has discussed broad range of reasons that caused inflationary trends. The market agents that caused such movements may be classified into supply, demand and other institutional factors.

The supply factors were held responsible for the price rise in the following studies. RBI (2010) in its annual report 2009-10, has a discussed the price situation in India. The study has noted that the per capita daily net availability of food grains has declined considerably. The study reasoned the supply shortage in food grains as the primary reason for the food price increase during 1990-2010. Chand (2010) studied the nature and causes of food inflation. The study observed that the low growth of food grain production in the preceding years and the drought in 2009 contributed mainly to to a surge in food prices in 2010. World Bank (2010) in its study South Asia Economic Update 2010: Moving Up, Looking East, presented various economic challenges faced by south Asian nations. The study reported that the rise in food prices in India was the result of lagged effects of higher food prices in preceding years in the global markets and a severe drought in 2009. The drought resulted in reduced crop-sown area during July to September 2009. The Kharif (summer crop) season area sown under paddy and oilseeds in 2009 was lower than in 2008. Kharif food grain production in 2009–10 fell by 15 percent, whereas domestic demand for food raised, thus driving food prices higher. Sharma (2011) analyzed the various factors influencing the prices of Onions, an important food crop in India. The study found that rise in prices of onion is due to the decline in Kharif production resulted from unseasonal rains at harvest time.

Some studies have held demand factors responsible for the food price inflation. For instance, Landes (2007) has analysed the various phases of Indian agricultural policy and placed such policies in their context. In this pursuit the study has found that rapid economic growth and urbanization has raised per capita income in the post liberalization period. The faster growth in per capita incomes has stimulated demand growth for fruits, vegetables, fats and oils and animal products. These developments have not attracted sufficient focus on change in agricultural policy and supply response. The study has concluded that this resulted in food inflation in India. Gokarn (2010) studied the food price inflation in the context of changing house hold demand pattern. The study observed that there was an increased demand for key sources of protein namely viz., pulses, milk, eggs, meat and fish across India. Income elasticity of demand for protein rich food, a sign of affluence resulted from the affordability. The supply was not sufficient to cope up with the demand shift which resulted in the food price inflation in India. DBS Group Research (2011) assessed the food inflation scenario. The study has shown that the food inflation was driven to a greater extent by relative change in dietary pattern. A structural shift in dietary pattern was shown to cause a demand shift and food inflation, as there was a mute supply response. RBI (2011) has discussed about the India food inflation trends in its annual report. The report has found that there has been a structural change in food

consumption pattern favoring protein rich food items while the share of cereals in food has declined. The demand shift was largely attributed to rising income level. This amounted to a demand for protein rich items viz., meat, fish, eggs, fruits and vegetables had raised faster than its supply. The structural imbalance of this kind has created food inflation, the study observed. Mohanty (2011) studied the changed in inflation dynamics in India. The study suggested that the persistence of protein inflation has changed the inflation dynamics in the latter half of the 2000s. Protein items inflation was significant and was markedly higher for milk. This inflation was considered as a consequence of rising affluence resulting in the dietary habits and higher demand for protein items, in absence of adequate supply response, and was further accentuated by renewed global food price shock during 2010–11.

The institutional arrangements are also found to cause inflation in some studies. Mitra (2008) studied the crop specific causes for the global food price inflation. The study has found there was a steady rise in the rice eating population in India accompanied by a dramatic rice crop failure in 2002 has left the food stocks depleted. The failure to recover food stocks have lag effects on the supply side and abetted the rice price inflation. Mitra and Josling (2009) has analyzed the implications of agricultural export restrictions. The study discussed the structural problems relating to Public distribution systems like problems of corruption, theft, lack of accessibility of rural population in the context of food security. The study has concluded that the failure of demand management mechanism like PDS in India as primary reason for food price inflation in India. Singh and Blanc (2009) used Monte Carlo simulation technique to examine the impact of trade policy on global rice prices in different policy scenarios. The study analyzed the impact on rice prices given the export/import restrictions. The study had found that the international rice price rises when India imposes trade restriction at the same time the study established that the world rice price stabilized when India allowed free trade. The study has inferred India's intervention in the rice market March 2008 drove up world prices. Iqbal and Van Der Merwe (2010) analysed the various aspects of food crisis and examined the trends in production, procurement and availability of state wise food grains. The study has found that the ineffective and inefficient marketing strategies lack of adequate storage facilities and black marketeering or hording as India is prone to uncertain weather.

Further some of the studies have found that the speculation in commodity futures market as cause of food price inflation in the international context (Cooke and Robles 2009; Robles, Torero and von Braun 2009; Hernandez and Torero 2010). In the Indian context, Sahi (2006) analysed the effect of futures trading on the spot price volatility. The study found the destabilizing effect of futures trading on agricultural commodity markets. It is observed that futures trading volumes were found to have a significant unidirectional causal effect on spot price volatility in major agricultural commodities except raw cotton. IIMB (2008) studied the impact of futures trading in some select agricultural commodities. This study found that that inflation increased in some commodities after

introduction of futures trading. This study found that spot price volatility increased after introduction of futures in case of Wheat and Urad but in case of Gram there was no volatility. Nath and Lingareddy (2008) studied the relationship between the future and spot prices of some select agricultural commodities. They found that the volume of futures trading had positive and significant causal impact on the average level of spot prices in case of wheat and Urad though not in case of gram. Nonetheless, they concluded that while futures trading caused an increase in Urad prices there was ambiguity in case of wheat.

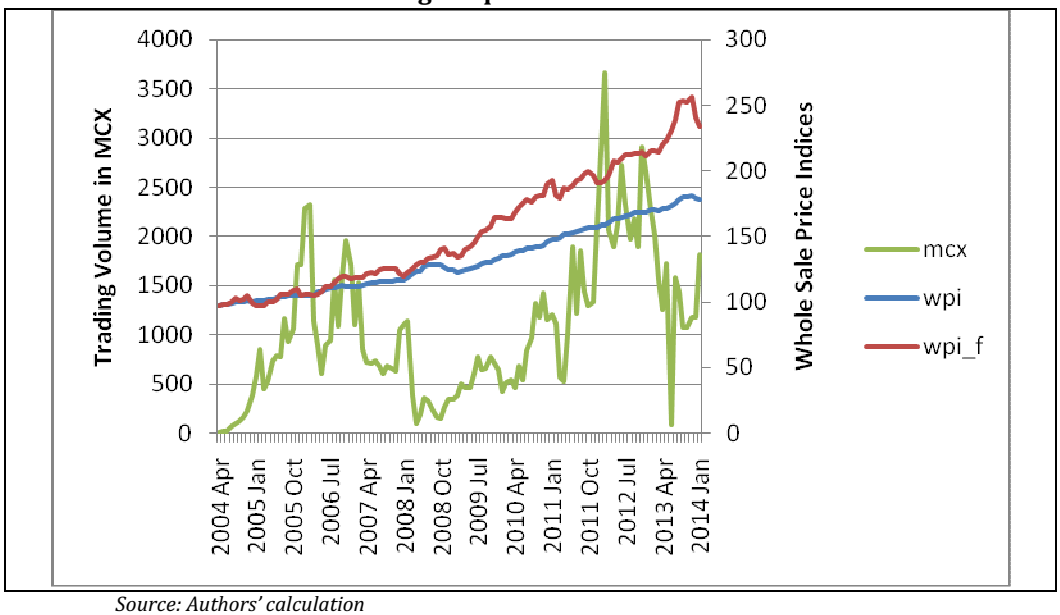
1.2 Commodity futures trade and Inflation

The connection between the inflation and the commodity futures trade has been discussed since 2006. In 2003 onward speculative trade has been permitted in commodities that include food items in multi commodity exchange markets in India. The likelihood of trade impacting volatility of the prices of basic food commodities have increased with emergence of such new institutions. The studies have used commodity-wise analysis of spot prices and their respective futures prices. The studies have used National Commodity Exchange (NCDEX) data on the futures. To contribute to the current debate on inflation a need for a fresh study is felt. This study is undertaken with the help of Multi Commodity Exchange of India Ltd (MCX) data. MCX is an independent commodity exchange based in India. This exchange facilitates for online trading of commodity futures, and also the clearing and settlement of the same. It was established in 2003 and is based in Mumbai, in terms of contracts traded; it was the world's third largest commodity exchange. MCX now reaches out to about 800 cities and towns in India with the help of about 126,000 trading terminals. MCX is India's leading commodity futures exchange with a market share of about 81 per cent in terms of the value of commodity futures contracts. MCX offers trading in the futures of commodities that include metals viz., bullion, ferrous and non-ferrous metals, and agricultural commodities viz., menthe oil, cardamom, potatoes, palm oil etc. Therefore MCX can be taken as a market for speculative trade in agricultural commodities.

The central debate about speculation and food price volatility revolves around the workings of financial 'futures' markets. These markets enable purchasers to 'hedge' against the risk that commodity prices will move unfavorably. Speculators make profit from differential price expectations of different market participants based on varied risk assessments. This price movement provides market information necessary to set more accurate prices (Angel and McCabe, 2010). There is a view that financial speculators play the role mitigating the commodity price fluctuations as speculators buy when prices are low and sell when prices are high (De Schutter, 2010). Most of the studies on this issue concede that higher financial sector engagement in food commodity markets would amplify short term price fluctuations (FAO, IFAD et al, 2011). Yet firm empirical evidences do not confirm that speculation is a determinant of price volatility and so the extent of disagreement remains (FAO, IFAD et al, 2011). In present study, to show the

relationship between the speculative trading volume in the agricultural commodities and the wpi_f, a line graph is presented in Fig 2. The speculative trade is found to be highly volatile while the wpi_f showing a smooth upward trend. However, in 2012 the speculative trade is showing a synchronized trend with some time lags. On the whole, a weak synchronization of the two time series may be observed in that figure. However, validating this observation requires application of appropriate time series methodology.

Fig 2: Trends in WPI_F and MCX trading volume in agricultural items during the period 2004–2014



Source: Authors' calculation

2. Methodology

This paper intends to analyze possible connection between wholesale food price index and trading volume on agricultural commodities in Multi-Commodity Exchange of India (MCX) using the monthly data between April 2004 and January 2014 from CSO and MCX respectively. The agricultural commodities in MCX include viz., menthe oil, cardamom, potatoes, palm oil etc. The study used the following time series techniques to draw meaningful conclusions on the issue.

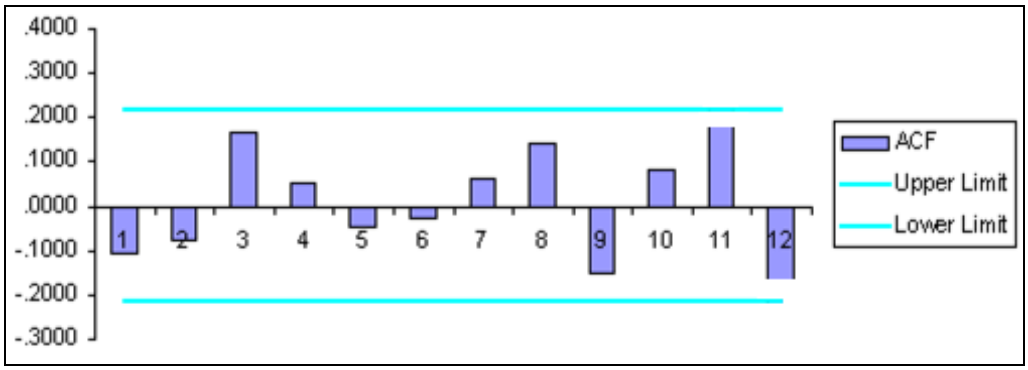
2.1 Tools of analysis

The time series literature has suggested that the traditional statistical analysis may be misleading in the presence of 'non-stationary' phenomenon among time series variables. Consequently, a genuine analysis of relationship between time series variables commences with test for stationarity. Once the stationarity of time series variable is

ensured, the existence of long run relationship between the variables is tested using the test of co-integration.

2.1.1 Tests of Stationarity

A time series is said to be stationary if the statistical property of the time series does not change with time. Two approaches are used to test the stationary aspect of a time series. One is the classical/graphical method based on the correlogram that charts the Auto Correlation Function (ACF) / Partial Autocorrelation (PACF) for different time lags. If the auto correlations of the study variable for different time lags lie within the critical line bands as shown below, then the variable is said to stationary.



This stationarity test is based on the evaluation of graph which needs to be confirmed using formal statistical test. This statistical testing is done using unit roots test. The specifications of Augmented Dickey Fuller (ADF) test in its three variants are used for the analysis.

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{j=1}^{p}(\delta_j \Delta Y_{t-j}) + e_t \qquad \text{(without intercept and trend)}$$

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \sum_{j=1}^{p}(\delta_j \Delta Y_{t-j}) + e_t \qquad \text{(with intercept)}$$

$$\Delta Y_t = \alpha + \beta t + \gamma Y_{t-1} + \sum_{j=1}^{p}(\delta_j \Delta Y_{t-j}) + e_t \qquad \text{(with intercept and trend)}$$

where,

t is the time index,
α is an intercept constant called a drift,
β is the coefficient on a time trend,
γ is the coefficient presenting process root, i.e. the focus of testing,
p is the lag order of the first-differences autoregressive process,
e_t is an independent identically distributes residual term.

If a series is stationary, say Y_t, then the series is said to be integrated of order zero and denoted by $Y_t \sim I(0)$. When the series is non stationary, a its differenced series, say ΔY_t (where, $\Delta Y_t = Y_t - Y_{t-1}$), may be stationary. In that case Y_t is said to be integrated of order 1 and is denoted by $Y_t \sim I(1)$. The order of integration is determined by the number of times the series need to be differenced to make it into a stationary series. This procedure helps to analyse the stationarity tendency of the study variables wpi_f and mcx.

2.1.2 Test of Co-integration

If all the study variables are stationary then the Ordinary Least Square (OLS) regression models may be used to analyse the relationship among them. When all the variables are integrated of order one, the existence of long-run relationship among variables depends on the cointegrated relationship. To test for the co-integration between two variables, say X_t and Y_t, Engel-Granger framework can be used.

$$\Delta y_t = \beta_0 + \Sigma \beta_i \Delta y_{t-i} + \Sigma \gamma_j \Delta x_{t-j} + \varphi z_{t-1} + e_t$$

Here, z_t, the "error-correction term", is got from the OLS residual of the long-run "cointegrating regression", $y_t = \alpha_0 + \alpha_1 x_t + v_t$. If the coefficient φ is negative and significant, then X_t and Y_t is said to be cointegrated. However, if one of the variables are stationary [I(0)], and the other is I(1), the ARDL / Bounds Testing specification of Pesaran and Shin (1999) and Pesaran *et al*. (2001) may be used which is given below:

$$\Delta y_t = \beta_0 + \Sigma \beta_i \Delta y_{t-i} + \Sigma \gamma_j \Delta x_{t-j} + \theta_0 y_{t-1} + \theta_1 x_{t-1} + e_t$$

Here, if θ_0 and θ_1 are jointly zero (wald test) then the test concludes there is no cointegrated relationship between X_t and Y_t exists. Otherwise if the 'joint' is rejected and θ_0 is negative and significant then the test concludes that there exist a cointegrated relationship between X_t and Y_t exists. However, the usual critical values of F may not be used as the series with mixed order of integration and so the critical values for the Wald's test are taken from the Pesaran *et al*. (1999) as suggested in the bounds test methodology. This study used ARDL Add-in for EViews developed by Yashar Tarverdi to implement Bounds test methodology and got calculated F value of Wald's test. This value is compared with critical values got from Pesaran *et al*. (1999). Two critical F values would be provided with the assumption of I(0) and I(1) respectively. If the calculated F value is less than the critical value with I(0) assumption, then it is concluded that there is no cointegrated relationship between X_t and Y_t. If, on the other hand, the calculated F value is greater than the critical value with I(1) assumption, then it is concluded that there is cointegrated relationship between X_t and Y_t. If the calculated F value lies between the critical F values with I(0) and I(1) assumptions, then the inference is inconclusive. For testing the significance of the θ_0 and θ_1 separately, critical values similar to F values are given for t- test also and the decision rule is similar to the inference for F test.

3. Results and Discussions

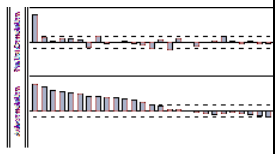
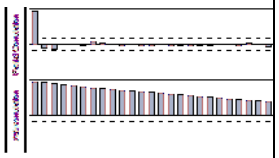
The table 3.1 shows the results of different stationary test of MCX Trading volume and Wholesale Price Index (WPI) of food items. With the correlogram for the variable MCX is not giving a conclusive evidence for stationarity, except for the first variant (without intercept and trend) of ADF, the results of the remaining two variants show that the series does not have unit root. Hence it may be inferred that MCX is I(0). The wpi_f is found to be non-stationary from the correlogram. This result is further confirmed from the ADF results that the t values are not significant in all the three variants. Further, result of correlogram indicates that the differenced wpi_f is stationary and this is confirmed by the ADF test that all statistical measures are significant at 5 per cent level. Hence wpi_f is an I (1) series.

The study variables are mixed bundles as for as the order of integration of variables are concerned. In the presence of mixed series to test the cointegration between MCX and wpi_f, bounds test methodology is applied as suggested in the previous section. Maximum 4 lags are considered for the study of cointegration between MCX and wpi_f with wpi_f as dependent variable. The optimum ARDL model is chosen based on the Akaike Information Criteria(AIC). The result showed that ARDL (4,1) model had the least AIC value. The calculated F value of the wald test is 0.5567.

From the table 3.2 it could be observed that the calculated F value 0.5567 is lower than I(0) values of all the levels of significance (3.7, 3.79 and 5.15), so it is inferred that there is no co-integration exist between WPI_F and MCX. This is confirmed from the t-values of the coefficients of first lag variables wpi_f and MCX, given in table 3.3. The respective t-values 0.837 and 0.076 are positive and is greater than critical t values with I(0) assumption at all levels of significance viz., -2.57, -2.86 and -3.43. Therefore, both the coefficients are insignificant.

Maximum 4 lags are considered for the study of Co-integration between wpi_f and MCX with MCX as dependent variable. The result showed that ARDL (1,2) model had the least AIC value. The calculated F value of the wald test is 5.807. From the table 3.2 it could be observed that the calculated F value 5.807is higher than critical value of F with I(1) assumption at 5 percent level of significance (4.85) , so it is inferred that there is co-integrating relationship exist between MCX and WPI_F. This is confirmed from the t-values of the coefficients of first lag variables MCX and wpi_f, given in table 3.4. The t-value of coefficient of first lag values of MCX is -3.407. The t value is less than critical t values with I(1) assumption at 5 percent level of significance viz., -2.86. Therefore, coefficient of first lag values of MCX is significant and negative. This indicates that in the long run wpi_f determines MCX.

Table 3.1: Results of various stationary tests for the MCX and Food price index in the study period

Variables	Level				First difference				Remarks
	Correlogram	Without intercept & trend	With intercept	With intercept & trend	Correlogram	Without intercept & trend	With intercept	With intercept & trend	
MCX		-1.556 (0.1121)	-3.3888* (0.013)	-3.842* (0.017)					I(0)
WPI_F		3.346 (0.999)	1.072 (0.997)	-2.418 (0.369)		-4.872* (0.000)	-5.951* (0.000)	-6.702 * (0.000)	I(1)

*Source: Authors' Calculation, Note: * - Significance at 5% level*

Table 3.2: Critical values of F and t – tests with I(0) and I(1) assumptions (for K=2)

F value						T value					
90%		95%		99%		90%		95%	99%		
I (0)	I (1)	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
3.7	4.14	3.79	4.85	5.15	6.36	- 2.57	- 3.21	- 2.86	- 2.53	- 3.43	- 4.10

Source: Table –C 1 iii : Case III with unrestricted intercept with No Trend from Pesaran et al. (1999) Page T.2 and T.4 respectively

Table 3.3: Results of ARDL Model (4,1) with D(WPI_F) as dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.043	1.216	0.035	0.972
WPI_F(-1)	0.008	0.01	0.837	0.404
MCX(-1)	0.000	0.000	0.076	0.939
D(WPI_F(-1))	0.278	0.092	3.016	0.003
D(WPI_F(-2))	-0.225	0.109	-2.061	0.042
D(WPI_F(-3))	0.281	0.107	2.632	0.01
D(WPI_F(-4))	-0.439	0.110	-3.981	0.00
D(MCX(-1))	0.000	0.00	-0.194	0.846
R-squared	0.206	Mean dependent var		1.157
Adjusted R-squared	0.153	S.D. dependent var		3.676
S.E. of regression	3.383	Akaike info criterion		5.343
Sum squared resid	-293.907	Schwarz criterion		5.537
Log likelihood	3.898	Hannan-Quinn criter.		5.421
F-statistic	0.001	Durbin-Watson stat		2.092
Prob(F-statistic)	-293.907			

Therefore, this study found that there is no influence of trading on food commodity futures on wholesale price indices. However the trading in MCX is influenced by fluctuations in wholesale price indexes.

4. Conclusion

This paper is intended to explore the link between the speculative trade in food commodities and the food items price inflation as food inflation has become a major economic challenge for the public policy in the contemporary India. Though, many reasons have been attributed for the accelerated food inflation, the possibility of speculation in commodity futures market on food price inflation was not explored in the Indian context. This paper analyzed the possible connection between wholesale food price index and trading on food commodities in Multi-Commodity Exchange of India (MCX) using the monthly data between 2004 and 2014 from CSO and MCX respectively. The study used time series analysis to draw conclusions on the connection between wpi_f

and MCX. Based on the methodology, this study has found that there is no influence of trading on food commodity futures on wholesale price index. However the trading in MCX is influenced by fluctuations in wholesale price indices which may have implications on the future of food commodities prices in India.

Table 3.4: Results of ARDL Model (1,2) with D(MCX) as dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-29965.520	141161.100	-0.212	0.832
MCX(-1)	-0.221	0.065	-3.407	0.001
WPI_F(-1)	1958.626	1063.739	1.841	0.0680
D(MCX(-1))	-0.128	0.095	-1.347	0.181
D(WPI_F(-1))	-12647.030	11044.420	-1.145	0.255
D(WPI_F(-2))	-3956.128	12809.600	-0.309	0.758
R-squared	0.148	Mean dependent var		15668.340
Adjusted R-squared	0.109	S.D. dependent var		435465.900
S.E. of regression	411020.500	Akaike info criterion		28.741
Sum squared resid	0.000	Schwarz criterion		28.885
Log likelihood	-1646.633	Hannan-Quinn criter.		28.799
F-statistic	3.793	Durbin-Watson stat		1.997
Prob(F-statistic)	0.003			

References

Ministry of Consumer Affairs, Food and Public Distribution, Government of India. (2008). Study on the impact of futures trading on agricultural commodity prices: Report of Abhijit Sen Committee.

Baffes, J., & Tassos, H. (2010). Placing the 2006-08 commodity price boom into perspective. *The World Bank Policy Research Working Paper, No 5371.*

Basu, K. (2011). India's food grains policy: An economic theory perspective. *Economic & Political Weekly*, *46*(05), 37-45.

Chand, R. (2005). Whither India's food policy. *Economic & Political Weekly*, *40*(11), 1055-62.

Chandrasekhar, C. P., & Jayati, G. (2008, April 8). Global inflation and India. *The Hindu-Business Line.*

Cooke, B., & Robles, M. (2009). Recent food price movements: A time series analysis. *International Food Policy Research Institute*, *00942.*

Economic Advisory Council to the Prime Minister (EACPM). (2009). Economic Outlook for 2009-10.

Food Ethics Council. (2012). http://www.foodethicscouncil.org/system/files/2012-Ethics%20of%20speculation%20discussion%20paper-March%202012.pdf.

Ministry of Finance, Government of India. (2009). Economic Survey 2008-2009.

Gulati, A. (2010). Accelerating agriculture growth: Moving from farming to value chains. *India's Economy: Performance and Challenges,* New Delhi Oxford University Press, 213-44.

Hernandez, M. A., Robles, M., & Torero, M. (2010). Beyond the numbers: How urban households in Central America responded to the recent global crises. *Issue brief-International Food Policy Research Institute (IFPRI), 67*.

Hoda, A., & Ashok, G. (2007). *WTO negotiations on agriculture and developing countries.* New Delhi Oxford University Press.

IIMB Report. (2008). Impact of futures trading in Wheat, Sugar, Pulses and Guar Seed on farmers: Indian Institute of Management Bangalore and Commissioned by the Forward Markets Commission.

Kumar, R., Pankaj, V., & Gunajit, K. (2010). Food inflation: Contingent and structural factors. *Economic & Political Weekly*, *45*(10), 16-9.

Lokare, S. M. (2007). Commodity derivatives and price risk management: An empirical anecdote from India. Reserve Bank of India Occasional Papers.

Nair, S. R., & Leena, M. E. (2011). Wheat price inflation in recent times: Causes, lessons and new perspectives. *Economic & Political Weekly*, *46*(36), 58-65.

Nath, G. C., & Lingareddy, T. (2008). Commodity derivative market and its impact on spot market. SSRN: http://ssrn.com/abstract=1087904.

Nitesh, R. (2005). Role of commodity exchanges, futures & options - A case study on Soya oil. Occasional paper 46, Department of Economic Analysis and Research, NABARD.

Olivier, D. S. (2011). Food crises: Five priorities for the G20. *The Guardian*, UN Special Rapporteur on the right to food.

Rakshit, M. (2009). India amidst the global crisis. *Economic & Political Weekly*, *44*(13), 94-106.

Robles, M., Torero, M., & Von, B. J. (2009). When speculation matters. *International Food Policy Research Institute, IFPRI Brief 57*.

Sahi, G. S. (2006). Influence of commodity derivatives on volatility of underlying. SSRN:http://ssrn.com/abstract=953594.

Singh, J. B. (2000). Futures markets and price stabilization: Evidence from Indian Hessian market. http://www.sasnet.lu.se/EASASpapers/8JatinderSingh.pdf

Yang, J., Brian, B. R., & David, J. L. (2005). Futures trading activity and commodity cash price volatility. *Journal of Business Finance Accounting, 32(1),* 297-323.