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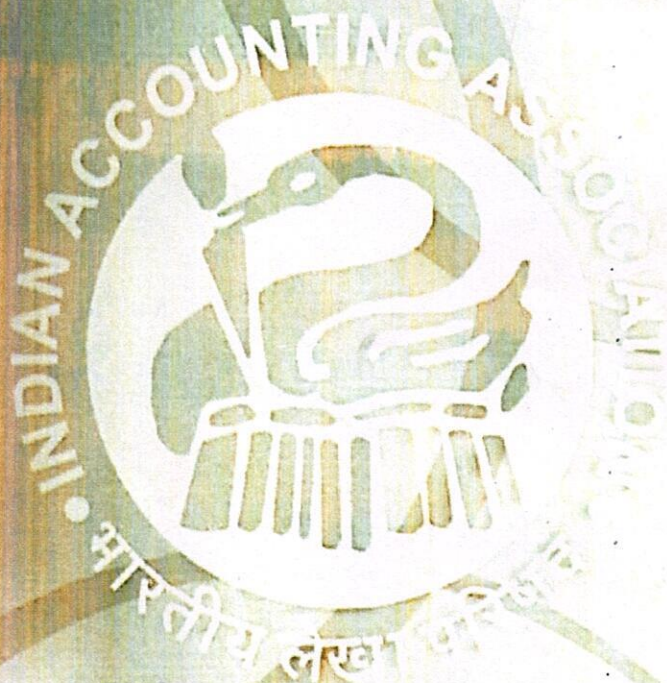
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LINKAGES AMONG STOCK MARKETS: BRICS COUNTRIES

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ABSTRACT

The purpose of the study is to look into the short-run and long-run relationships between Indian stock market (Nifty) and stock indices of BRICS countries. Monthly closing stock market indices of India (Nifty) and that of the Brazil (IBOVESPA), Russia (RTSIndex), China (SSE Composite) and South Africa (FTSE) for the period of April, 2009 to March, 2014 are taken as sample.

The study is tested with Cross correlation, Unit root test, Granger causality test and Johansen cointegration test to seek the relationship, stationarity, directional causality and either short or long run equilibrium between the Nifty and the selected indices of BRICS stock markets. The result obtained by the econometric tools shows that the correlation between the Nifty and the other selected indices is significant, the data are stationary at their level and its first difference (ADF and PP), both unidirectional and bidirectional causality occurs and the long term relationship is found between Nifty and selected indices.

Key Words: Stock Indices, BRICS, Cointegration, Causality

INTRODUCTION

The globalization of the world stock markets is the most noteworthy development that has occurred during the last decade. Various factors contributed to this including: the advancement of technology and remote access which have been utilized in security trading, the emergence of new international financial institutions offering financial services regardless of geographical jurisdictions, trends of liberalization and the removal of restrictions used to be imposed on foreign ownership, and the movement towards regional integration of that stock exchanges, clearing and settlements organizations, and other financial institutions. Along with various measures, opening up of the home market for the foreign investors is one of the important steps taken by the Indian Government that may lead the Indian stock market to be strongly integrated with the stock market of the rest of the world.

The globalization phenomenon may be blessing, since many experts believe that globalization may improve market efficiency, lower its risk due to the possibility of diversification, and use arbitrage in a relevant way. On the other hand, it may increase pricing volatility and trading instability, due to the high correlation between leading - major stock markets (BRICS) and other markets as well as to the fact that the irrational trading in one market may move to other markets as witnessed in the last two decades.

IMPORTANCE OF BRICS NATIONS

In the past few decades, some large economies such as Brazil, Russia, India and China, (BRICs) have acquired a vital role in the world economy as producers of goods and services, receivers of capital, and as potential consumer markets. The BRICs economies have been identified as some of the fastest growing countries and the engines of the global recovery process, which underscores the changed role of these economies. Even in the G-20 countries' forum, BRICs are playing a formidable role in shaping the macroeconomic policy after the recent financial crisis. At present, these four countries encompass over 40 per cent of the global population and a share in world GDP (in PPP terms) that increased from 16 per cent in 2000 to nearly 27 per cent in 2011, and is expected to rise significantly in the near future. If one compares the GDP in PPP terms for 2011, four economies figure among the G-20 top ten, with China, India, Russia and Brazil in 2nd, 4th, 6th and 8th place respectively. In terms of contribution to growth of PPP-adjusted global GDP of the world, these four economies accounted for 55 per cent during 2000–11, and their contribution is expected to rise in the coming years.

According to an estimate by Goldman Sachs, the four original BRICs countries are expected to represent 47 per cent of global GDP by 2050, which would dramatically change the list of the world's 10 largest economies. An important change that we may expect over the medium to long term is that the top 10 countries in terms of GDP may be different from the top 10 countries in terms of per capita GDP. The inherent strength of the BRICs emanates from strong domestic demand-based economies in the case of India and Brazil and the significant outward linkages of China and Russia.

LITERATURE REVIEW

Bailey & Stulz (1990) applied simple correlation technique to find interrelationship among US and Pacific basin stock market and found that the correlation differed in terms of daily, weekly and monthly time series data.

Arshanapalli & Doukas (1996) applied Johansen cointegration technique on daily data belonging to different Asian markets and found that there was no long term relationship among the Asian stock market.

Ghosh (1999) in contrary to Arshanapalli & Doukas (1996) found that some of the Asian market showed a long run equilibrium relationship with the world's major stock market.

Floros (2005) found a long term relationship among the stock prices of US, Japan and UK. He also observed that through Granger causality test some of the stock indices have shown bidirectional effect and some other showed unidirectional effect.

Amanulla & Kamaiah (1995) examined the long run equilibrium between the RBI stock price indices of Bombay, Calcutta, Madras, Delhi and Ahmedbad. They found that there existed long run equilibrium. Nath & Verma (2003) tested the cointegration between India and other selected countries with daily price indices and found that no cointegration

existed among India, Taiwan and Singapore for the period January 1994 to November 2002. Jayanthi & Pandiyan (2008) tested the cointegration between the stock price indices of India, Malaysia, Taiwan, China, South Korea, US, UK, Germany, Singapore, Hong Kong and Japan. The study period was from April 2000 to March 2007 and they found that no correlation and cointegration among the selected stock price indices.

Chakravarty & Ghosh (2011) made an attempt to find the relationship among the indices of Sensex 30, S&P 100 and FTSE 100 through Granger causality test and found that unidirectional causality occurred for S&P100 and FTSE 100 from Sensex.

Sen (2011) made an attempt to investigate the relationship between Sensex and some selected Stock Price Indices of the Asia Pacific region and found that the correlation among the selected Stock Price Indices were highly correlated and significant. Granger causality test revealed the unidirectional effect from the Asian tigers to Sensex and Johansen cointegration test clearly showed that there existed a long run relationship between Sensex and stock indices of the major Asian Pacific countries.

It is worth mentioning that the present study is carried out as an extension of the study of Sen (2011) with the time interval from January 2000 to June 2013 to find out the relationship among the selected market indices in amid strident recessionary trends.

OBJECTIVES OF THE STUDY

1. To test the stationarity of the BRICS Stock Market Indices
2. To examine directional effect among the BRICS Stock indices
3. To understand the effect of Long term relationship among the BRICS market.

METHODOLOGY

This study is conducted in an empirical format by using secondary data gathered from monthly stock market indices of India (Sensex) and that of the Brazil (IBOVESPA), Russia (RTSIndex), China (SSE Composite) and South Africa (FTSE).

DATA

Monthly time series data of the above-mentioned indices have been used for the purpose of empirical investigation covering the study period from April, 2009 to March 2014. The data for these indices were collected from the website www.Finance-yahoo.com. The following standard statistical and economic tools have been applied for empirical investigation.

- Cross Correlation,
- Unit root test,
- Granger causality test, and
- Johansen cointegration test.

Cross-Correlation

Cross-Correlation is a useful statistical tool to measure the co movement of variables and the lead-lag relationship between them.

Using the following formula, pair-wise cross-correlations between Sensex and other prices indices have been computed

$$r = \frac{\sum_i (x_i - \bar{x})(y_{i-d} - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2} \sqrt{\sum_i (y_{i-d} - \bar{y})^2}} \quad (A1)$$

Where r is greater than, equal or less than zero.

From the cross-correlations, it would be clear whether Nifty is correlated to other selected stock price indices in different times (monthly) lags.

Unit Root Test

Before using the time series data for further investigation, all the time series data must be tested for stationarity. Mean, Variance and covariance of such stationary time series data do not change with the time shift. If the data is non-stationary, then regression results using such data would be spurious, as the usual t test would not be applicable to test the significance of coefficients.

To test the stationarity, the unit root test has been applied on the time series index data. In this regard, the Phillips-Perron unit root test has been preferred against ADF test, as the latter is considered the low power test. In Phillips-Perrson test, non-parametric statistical methods are used to take care of the serial correlation in the error term (μt) of the following equation.

$$\nabla Y_t = \nabla Y_{t-1} + u_t$$

The test is based on the null hypothesis $H_0: Y_t$ is not I(0). If the computed PP statistics are less than the critical value, the Y_t is non-stationary.

Granger Causality Test

Granger causality test has carried out to observe the direction of the short-run relationship between the sensex and other indices. To test for Granger causality between two stock price indices Y_t and X_t , the following two equations have been estimated.

$$Y_t = \sum_{i=1}^m \alpha_i Y_{t-i} + \sum_{i=1}^m \beta_i X_{t-i} + it_i$$

$$X_t = \sum_{i=1}^m \gamma_i Y_{t-i} + \sum_{i=1}^m \delta_i X_{t-i} + e_t$$

Where Y_t and X_t are the first difference of time series variable. Therefore, F-test has been conducted for joint insignificance of the coefficients. The null hypothesis of such test Y_t does not Granger cause X_t and vice versa. A rejection of the null hypothesis indicates the existence of Granger causality; for each of the stock indices, two Granger causality tests have been performed to investigate whether Y Granger causes X or X Granger causes Y or both or there is no causal relationship between the variables.

Johansen cointegration test

The condition for testing Johansen cointegration test for anytime series data is that the data should be non stationary at their level i.e. the natural logarithm of time series data should be non stationary and the first difference in the data should be stationary. If the return indices of different markets are correlated, the value may raise or fall. On the other hand, if the time series data are cointegrated, then the series in the long run will come to equilibrium point.

EMPIRICAL RESULTS AND ANALYSIS

Descriptive statistics results

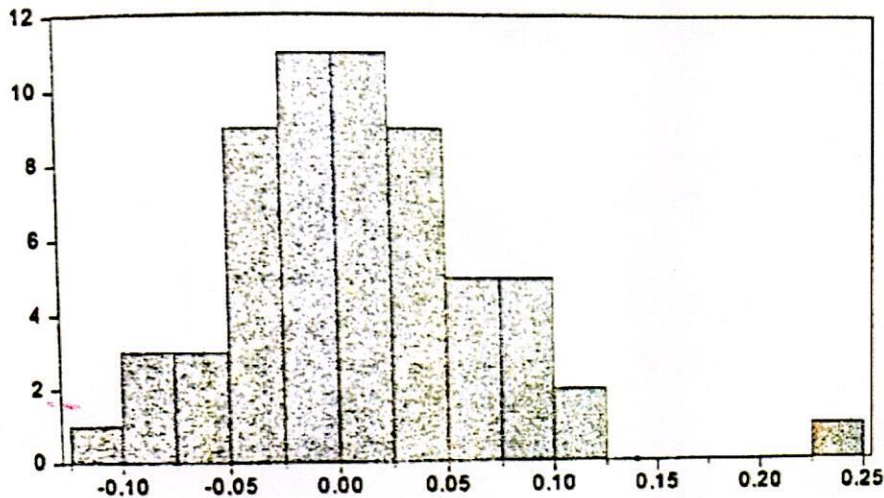
figure 1 to 5 revealed that the variables considered in the scope of the analysis are examined, the average values of variables were found to be Nifty (0.011316), BOVESPA (0.001169), SSE (-0.0028), RTSINDEX (0.0065) and FTSE (0.0142), standard deviation values are found to be Nifty (0.06075), BOVESPA (0.054), SSE (0.068), RTSINDEX (0.0882) and FTSE (0.038), When average values of the variables are considered in terms of the case that data do not have normal distribution and that variables are not distributed normally in full, but are distributed very close to normal distribution as the median values of variables are very close to average values.

Regarding whether series are distributed normally or not; skewness, kurtosis and Jarque-Bera statistics were considered. If kurtosis value of relevant variables is bigger than three, it indicates that series is sharp, if it is smaller than three, it indicates that series is oblate. In consideration of skewness values, if skewness value is equal to zero, it indicates that series has normal distribution, if the skewness value is bigger than zero; it means that series is skew in the positive direction, if skewness value is smaller than zero; it indicates that series is skew in negative direction.

Following values were found: skewness value of Nifty variable 0.8622, kurtosis value (5.32), Jarque-Bera value (20.95), skewness value of BOVESPA (0.142), kurtosis value (2.831), Jarque-Bera value (0.27), skewness value of SSE(-0.5356), kurtosis value (4.5619), Jarque-Bera value (8.968), skewness value of RTSINDEX(-0.2595), kurtosis value (4.5022), Jarque-Bera value (6.3152) and skewness value of FTSE(0.2547), kurtosis value (2.488), Jarque-Bera value (1.303).

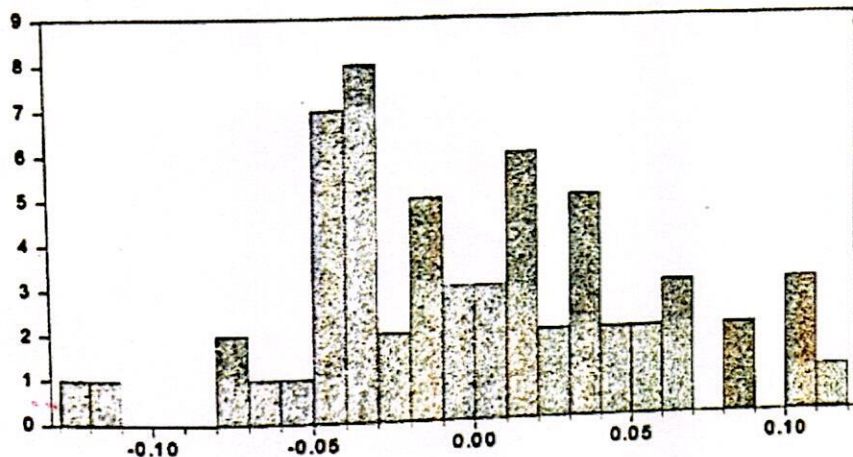
It has been found that Nifty variable is skew (inclined) and sharp in the positive direction, BOVESPA variable is skew (inclined) and oblate in positive direction and SSE variable is skew (inclined) and sharp in negative direction, RTSINDEX variable is skew (inclined) and sharp in negative direction and FTSE variable is skew (inclined) and oblate in positive direction.

Figure: 1



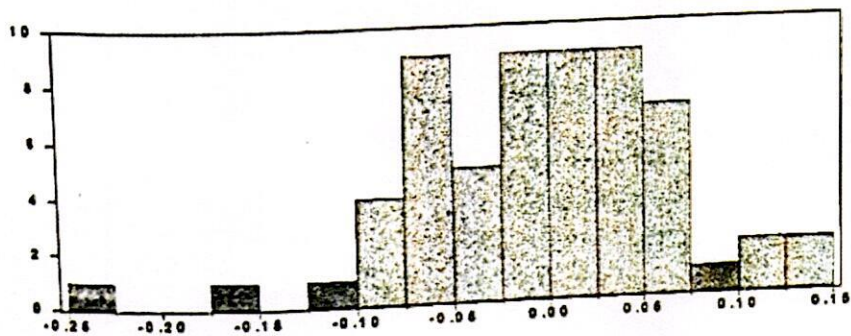
Series: NIFTY	
Sample 1 61	
Observations 60	
Mean	0.011316
Median	0.005571
Maximum	0.247376
Minimum	-0.108108
Std. Dev.	0.080756
Skewness	0.862211
Kurtosis	5.325072
Jarque-Bera	20.84897
Probability	0.000028

Figure: 2



Series: BOVESPA	
Sample 1 61	
Observations 60	
Mean	0.001169
Median	-0.002305
Maximum	0.117722
Minimum	-0.126210
Std. Dev.	0.053658
Skewness	0.142132
Kurtosis	2.831104
Jarque-Bera	0.273330
Probability	0.872262

Figure: 3



Series: SSE	
Sample 1 61	
Observations 60	
Mean	-0.002763
Median	-0.001903
Maximum	0.142343
Minimum	-0.248061
Std. Dev.	0.068460
Skewness	-0.535630
Kurtosis	4.561922
Jarque-Bera	6.968002
Probability	0.011288

Linkages Among Stock Markets: BRICS Countries

Table 4: Cross- Correlation between S&P CNX Nifty to other Selected Indices

Lag	IBOVERSPA	RTSINDEX	SSE	FTSE
-5	-0.0244	0.0314	-0.1287	0.0900*
-4	-0.05	-0.121	0.1351	-0.0771
-3	-0.1017	-0.1596	-0.0743	-0.005
-2	0.0436	0.1787*	-0.1654	0.1412*
-1	0.0854*	0.1002*	0.1663*	-0.2074
0	-0.1014	-0.364	-0.0734	0.0521*
1	0.6662*	0.6234*	0.2570*	-0.0004
2	-0.0814	0.0691*	0.1537*	-0.0849
3	-0.1392	-0.19	-0.0024	0.0915*
4	0.1027*	-0.1879	-0.0905	0.1121*
5	0.1237*	0.0543*	0.2350*	-0.0263

Note: *significant at 1% level

Source: Computed Data

The pair-wise cross correlation co-efficient between Nifty and other indices are presented in table 4. It that there is a positive correlation between the Nifty and other selected indices at 1% level of significance.

The pair wise Granger causality test is shown (Table-5) that no causality exists between

- | | |
|--------------------------|---------------------------|
| (i) RTSINDEX and BOVESPA | (ii) NIFTY and BOVESPA |
| (iii) BOVESPA and NIFTY | (iv) SSE and BOVESPA |
| (v) BOVESPA and SSE | (vi) FTSE and BOVESPA |
| (vii) BOVESPA and FTSE | (viii) NIFTY and RTSINDEX |
| (ix) RTSINDEX and NIFTY | (x) SSE and RTSINDEX |
| (xi) RTSINDEX and SSE | (xii) FTSE and RTSINDEX |
| (xiii) RTSINDEX and FTSE | (xiv) SSE and NIFTY |
| (xv) FTSE and NIFTY | (xvi) NIFTY and FTSE and |
| (xvii) SSE and FTSE. | |

The only Bidirectional causality exists between

- (i) BOVESPA and RTSINDEX
- (ii) NIFTY and SSE and
- (ii) FTSE and SSE.

It is important to note that the pronouncement of causality between the selected variables does not mean that movement in one variable actually causes movements in another variable. To a certain extent, causality basically entails in order of movements in the time series.

Table 5 : Granger Causality Test-Results

Null Hypothesis	F-Stat.	P-Value	Decision
RTSINDEX does not Granger Cause BOVESPA	2.08192	0.1348	No Causality
BOVESPA does not Granger Cause RTSINDEX	3.47199	0.0383	Bi-directional
NIFTY does not Granger Cause BOVESPA	19.4874	5.00E-07	No Causality
BOVESPA does not Granger Cause NIFTY	2.71817	0.0754	No Causality
SSE does not Granger Cause BOVESPA	1.54488	0.2228	No Causality
BOVESPA does not Granger Cause SSE	2.36276	0.104	No Causality
FTSE does not Granger Cause BOVESPA	26.1302	1.00E-08	No Causality
BOVESPA does not Granger Cause FTSE	0.05678	0.9449	No Causality
NIFTY does not Granger Cause RTSINDEX	14.5548	1.00E-05	No Causality
RTSINDEX does not Granger Cause NIFTY	1.84631	0.168	No Causality
SSE does not Granger Cause RTSINDEX	0.06349	0.9386	No Causality
RTSINDEX does not Granger Cause SSE	3.09227	0.0537	No Causality
FTSE does not Granger Cause RTSINDEX	17.6885	1.00E-06	No Causality
RTSINDEX does not Granger Cause FTSE	0.81435	0.4485	No Causality
SSE does not Granger Cause NIFTY	2.40146	0.1006	No Causality
NIFTY does not Granger Cause SSE	4.06017	0.023	Bi-directional
FTSE does not Granger Cause NIFTY	2.05702	0.1379	No Causality
NIFTY does not Granger Cause FTSE	1.64957	0.2018	No Causality
FTSE does not Granger Cause SSE	8.39016	0.0007	Bi-directional
SSE does not Granger Cause FTSE	0.41982	0.6594	No Causality

The result obtained in the table 6 through Johansen cointegration test revealed that trace statistics is significant at 5% level in cases and it leads to conclude that there is long run equilibrium between the Nifty and other selected indices of the stock market. Therefore, this suggests that there will belong run relationship among the BRICS economics.

Table 6: Johansen Cointegration Test Results (Lags Interval: 1 to 4)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.508015	119.8398	69.81889	0.0000
At most 1 *	0.383041	80.11860	47.85613	0.0000
At most 2 *	0.341966	53.07321	29.79707	0.0000
At most 3 *	0.260582	29.63730	15.49471	0.0002
At most 4 *	0.203355	12.73137	3.841466	0.0004

Note: Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michells (1999) p-value

CONCLUSION

The study revealed certain facts that there is positive correlation between Nifty and other selected indices (BRCS) during the study period April, 2009 to March 2014. Further it is worth noted that both unidirectional and bidirectional causality effect took place among the selected indices. The result obtained through cointegration test proved that long run equilibrium exists between the Nifty and other selected market indices. Due to this cointegration prices indifferent markets cannot move away far from each other and therefore the investor community cannot get abnormal gain due to the price differences among the markets.

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Size and Age of Npas and Their Implications for Financial Exclusion

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Among the institutional sources of credit, the cooperatives have been relatively more stable sources of financing the agriculture. But the recovery of loans has become the strenuous problem. The problem of mounting NPAs not only jeopardizes the interests of the defaulters but also of the regular members, auditors, and the very cooperative banking itself. There is no gainsaying the fact that a safe, sound and solid kind of credit structure depends to a considerable extent on the speedy recovery of funds advanced to the borrowers. The cooperative credit is no exception to this rule. The real test of its future strength lies in the record of the realization of loans. But there has been sluggishness in the recovery of loans in the cooperative credit agencies as well as in the societies financed by the commercial banks. This has made the RBI to give a call for a proper climate to tackle the problem of mounting NPAs which are smothering the progress of the cooperative movement. It has also exhorted the various cooperative organizations to make concerted efforts to reduce NPAs. The magnitude of NPAs have a direct impact on banks' profitability as legally they are not allowed to book income on such accounts and at the same time banks are forced to make provision on such assets as per the RBI guidelines. The rapid hike in NPAs of banks is a matter of great alarm and anxiety to the government since it causes obstacles in the free flow of credit jeopardizing the health of the banking system and the economy ending up in doldrums.

The chief objective of the paper is to discuss the size and age of NPAs in the study area. The financial exclusion is measured in terms of increasing level of dependence on informal sources of credit, high interest burden, worsening financial

situation, mounting poverty and mounting indebtedness. Towards this end, samples of 500 who are financially excluded from the formal financial institutions were selected for the purpose of the study from the three regions of Andhra Pradesh. Bhaimsa and Rebbana Mandals of Adilabad district of Telangana, Adoni, Bandi Atmakur mandals of Kurnool district of Rayalaseema and Sullurupeta and Vinjamur Mandals of Nellore Districts of Andhra Pradesh, mostly by resorting to the method of stratified random sampling. The stratification is done on the basis of size of the land holding and social status.

RESULTS AND ANALYSIS

Table-1

Size of the loan borrowed

Rs in thousands	Frequency	Percent	Cumulative Percent
Up to 25	260	52.0	52.0
25-50	110	22.0	74.0
50-75	80	16.0	90.0
Above 75	50	10.0	100.0
Total	500	100.0	

Source: Primary data

Table-1 refers to the distribution of the sample farmers by the size of the loan borrowed from various banks. It is observed that 52 percent of the sample farmers have borrowed an average of up to 25000 rupees followed by 25000-50000 rupees of loan by 22 percent of the sample farmers, 50000-75000 rupees of loan by 16 percent of sample farmers and above 75000 rupees of loan by 10 percent of the sample farmers.

Table-2
Extent of repayment

Extent of repayment (%)	Frequency	Percent	Cumulative Percent
40	275	55.0	55.0
40-50	145	29.0	84.0
50-60	80	16.0	100.0
Total	500	100.0	

Source: Primary data

Table-2 refers to the distribution of the sample farmers by the extent of loan repayment. It is observed that 55 percent of the sample farmers have made the repayment of the loan to the extent of 40 followed by 29 percent made repayment to the extent of 40-50 percent of their loan and 16 percent have made repayment to the extent of 50-60 percent of the loan.

Table-3
Extent of NPAs

Extent of NPAs (%)	Frequency	Percent	Cumulative Percent
Up to 20	290	58.0	58.0
20-40	140	28.0	86.0
Above 40	70	14.0	100.0
Total	500	100.0	

Source: Primary data

Table-3 refers to the distribution of the sample farmers by the extent of NPAs. It is observed that the extent of NPAs is up to 20 percent in case of 58 percent of sample farmers, and the same is 20-40 percent of their borrowings in case of 28 percent of the sample farmers and above 40 percent in case of 14 percent of the sample farmers.

Table-4
Period of NPAs

Period of NPAs (Years)	Frequency	Percent	Cumulative Percent
one	295	59.0	59.0
Two	150	30.0	89.0
More than two	55	11.0	100.0
Total	500	100.0	

Source: Primary data

Table-4 refers to the distribution of the sample farmers by the period of NPAs. It is observed that the period of NPAs one year in case of 59 percent of sample farmers, and the same is two years in case of 30 percent of the sample farmers and more than two years in case of 11 percent of the sample farmers.

Table-5
Type of Bank

Type of Bank	Frequency	Percent	Cumulative Percent
Cooperative bank	265	53.0	53.0
Commercial bank	170	34.0	87.0
Others	65	13.0	100.0
Total	500	100.0	

Source: Primary data

Table-5 refers to the distribution of the sample farmers by the type of bank from which they have borrowed. It is observed that 53 percent of the sample farmers have borrowed from cooperative banks, 34 percent have borrowed from commercial banks and 13 percent from other banks.

Table-6

**Financial exclusion attributable to NPAs-
increasing level of dependence on informal
sources of credit**

Response	Frequency	Percent	Cumulative Percent
Yes	350	70.0	70.0
No	150	30.0	100.0
Total	500	100.0	

Source: Primary data

Table-6 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on increasing level of dependence on informal sources of credit. It is observed that 70 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of increasing level of dependence on informal sources of credit and 30 percent of the sample street children did not subscribe to this view.

Table-7

**Financial exclusion attributable to NPAs-
high interest burden**

Response	Frequency	Percent	Cumulative Percent
Yes	300	60.0	60.0
No	200	40.0	100.0
Total	500	100.0	

Source: Primary data

Table-7 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on high interest burden. It is observed that 60 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of high interest burden and 40 percent of the sample farmers did not subscribe to this view.

Table-8

**Financial exclusion attributable to NPAs-
worsening financial situation**

Response	Frequency	Percent	Cumulative Percent
Yes	400	80.0	80.0
No	100	20.0	100.0
Total	500	100.0	

Source: Primary data

Table-8 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on worsening financial situation. It is observed that 80 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of worsening financial situation and 20 percent of the sample farmers did not subscribe to this view.

Table-9

**Financial exclusion attributable to NPAs-
mounting indebtedness**

Response	Frequency	Percent	Cumulative Percent
Yes	250	50.0	50.0
No	250	50.0	100.0
Total	500	100.0	

Source: Primary data

Table-9 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on mounting indebtedness. It is observed that 50 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of mounting indebtedness and 50 percent of the sample farmers did not subscribe to this view.

Table-10

Financial exclusion attributable to NPAs-mounting poverty

Response	Frequency	Percent	Cumulative Percent
Yes	450	90.0	90.0
No	50	10.0	100.0
Total	500	100.0	

Source: Primary data

Table-10 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on mounting poverty. It is observed that 90 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of mounting poverty and 10 percent of the sample farmers did not subscribe to this view.

Table-11

Size of the farmer and size of the loan borrowed

Size of the farmer	Size of the loan borrowed (Rs in thousands)				Total
	Up to 25	25-50	50-75	Above 75	
Marginal	30	5	25	5	65
	46.2%	7.7%	38.3%	7.7%	100.0%
	11.5%	4.5%	31.3%	10.0%	13.0%
Small	155	75	30	40	300
	51.7%	25.0%	10.0%	13.3%	100.0%
	59.6%	68.2%	37.5%	80.0%	60.0%
Medium	50	25	20	5	100
	50.0%	25.0%	20.0%	5.0%	100.0%
	19.2%	22.7%	25.0%	10.0%	20.0%
Big	25	5	5		35
	71.4%	14.3%	14.3%		100.0%
	9.6%	4.5%	6.3%		7.0%
Total	260	110	80	50	500
	52.0%	22.0%	16.0%	10.0%	100.0%
	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square=49.673, df=9, =0.000, r=-0.101

Source: Primary data

Table-11 refers to the distribution of the sample farmers by their farm size and by their loan size. The correlation between the size of the farmer and loan size is found to be negative($r=-0.101$). The rejection of the null hypothesis with level of significance=0.05 and degree of freedom=9 implies that the relationship between the size of the sample farmers and their loan size is found to be statistically dependent.

Table-12

Size of the farmer and extent of repayment

Size of the farmer	Extent of repayment (%)			Total
	40%	40-50	50-60	
Marginal	50	15		65
	76.9%	23.1%		100.0%
	18.2%	10.3%		13.0%
Small	140	95	65	300
	46.7%	31.7%	21.7%	100.0%
	50.9%	65.5%	81.3%	60.0%
Medium	60	25	15	100
	60.0%	25.0%	15.0%	100.0%
	21.8%	17.2%	18.8%	20.0%
Big	25	10		35
	71.4%	28.6%		100.0%
	9.1%	6.9%		7.0%
Total	275	145	80	500
	55.0%	29.0%	16.0%	100.0%
	100.0%	100.0%	100.0%	100.0%

Chi-Square=35.799, df=6, =0.000, r=0.004

Source: Primary data

Table-12 refers to the distribution of the sample farmers by their farm size and by the extent of repayment of their loan. The correlation between the size of the farmer and the extent of repayment of their loan is found to be positive($r=0.004$). The rejection of the null hypothesis with level of significance=0.05 and degree of freedom=6 implies

that the relationship between the size of the sample farmers and the extent of repayment of their loan is found to be statistically dependent.

Table-13

Size of the farmer and extent of NPAs

Size of the farmer	Extent of NPAs (%)			Total
	Up to 20	20-40	Above 40	
Marginal	40	10	15	65
	61.5%	15.4%	23.1%	100.0%
	13.8%	7.1%	21.4%	13.0%
Small	170	80	50	300
	56.7%	26.7%	16.7%	100.0%
	58.6%	57.1%	71.4%	60.0%
Medium	55	45		100
	55.0%	45.0%		100.0%
	19.0%	32.1%		20.0%
Big	25	5	5	35
	71.4%	14.3%	14.3%	100.0%
	8.6%	3.6%	7.1%	7.0%
Total	290	140	70	500
	58.0%	28.0%	14.0%	100.0%
	100.0%	100.0%	100.0%	100.0%

Chi-Square=37.384, df=6, =0.000, r=-0.056

Source: Primary data

Table-13 refers to the distribution of the sample farmers by their farm size and by the extent of repayment of their loan. The correlation between the size of the farmer and the extent of repayment of their loan is found to be positive (r=0.004). The rejection of the null hypothesis with level of significance=0.05 and degree of freedom=6 implies that the relationship between the size of the sample farmers and the extent of repayment of their loan is found to be statistically dependent.

Table-14

Size of the farmer and period of NPAs

Size of the farmer	Period of NPAs			Total
	one	Two	More than two	
Marginal	50	10	5	65
	76.9%	15.4%	7.7%	100.0%
	16.9%	6.7%	9.1%	13.0%
Small	145	120	35	300
	48.3%	40.0%	11.7%	100.0%
	49.2%	80.0%	63.6%	60.0%
Medium	80	10	10	100
	80.0%	10.0%	10.0%	100.0%
	27.1%	6.7%	18.2%	20.0%
Big	20	10	5	35
	57.1%	28.6%	14.3%	100.0%
	6.8%	6.7%	9.1%	7.0%
Total	295	150	55	500
	59.0%	30.0%	11.0%	100.0%
	100.0%	100.0%	100.0%	100.0%

Chi-Square=46.007, df=6, =0.000, r=-0.046

Source: Primary data

Table-14 refers to the distribution of the sample farmers by their farm size and by the period of NPAs. The correlation between the size of the farmer and the period of NPAs is found to be negative (r=-0.046). The rejection of the null hypothesis with level of significance=0.05 and degree of freedom=6 implies that the relationship between the size of the sample farmers and the period of NPAs is found to be statistically dependent.

It is concluded that 52 percent of the sample farmers have borrowed an average of up to 25000 rupees, 55 percent of the sample farmers have made the repayment of the loan to the extent of 40 percent of the loan, the extent of NPAs is up to 20 percent in case of 58 percent of sample farmers, the period of NPAs one year in case of 59 percent of sample farmers. 70 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of increasing level of

dependence on informal sources of credit. 60 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of high interest burden. 80 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of worsening financial situation. 50 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of mounting indebtedness. 90 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of mounting poverty.

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Size and Age of Npas and Their Implications for Financial Exclusion

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Among the institutional sources of credit, the cooperatives have been relatively more stable sources of financing the agriculture. But the recovery of loans has become the strenuous problem. The problem of mounting NPAs not only jeopardizes the interests of the defaulters but also of the regular members, auditors, and the very cooperative banking itself. There is no gainsaying the fact that a safe, sound and solid kind of credit structure depends to a considerable extent on the speedy recovery of funds advanced to the borrowers. The cooperative credit is no exception to this rule. The real test of its future strength lies in the record of the realization of loans. But there has been sluggishness in the recovery of loans in the cooperative credit agencies as well as in the societies financed by the commercial banks. This has made the RBI to give a call for a proper climate to tackle the problem of mounting NPAs which are smothering the progress of the cooperative movement. It has also exhorted the various cooperative organizations to make concerted efforts to reduce NPAs. The magnitude of NPAs have a direct impact on banks' profitability as legally they are not allowed to book income on such accounts and at the same time banks are forced to make provision on such assets as per the RBI guidelines. The rapid hike in NPAs of banks is a matter of great alarm and anxiety to the government since it causes obstacles in the free flow of credit jeopardizing the health of the banking system and the economy ending up in doldrums.

The chief objective of the paper is to discuss the size and age of NPAs in the study area. The financial exclusion is measured in terms of increasing level of dependence on informal sources of credit, high interest burden, worsening financial

situation, mounting poverty and mounting indebtedness. Towards this end, samples of 500 who are financially excluded from the formal financial institutions were selected for the purpose of the study from the three regions of Andhra Pradesh. Bhaimsa and Rebbana Mandals of Adilabad district of Telangana, Adoni, Bandi Atmakur mandals of Kurnool district of Rayalaseema and Sullurupeta and Vinjamur Mandals of Nellore Districts of Andhra Pradesh, mostly by resorting to the method of stratified random sampling. The stratification is done on the basis of size of the land holding and social status.

RESULTS AND ANALYSIS

Table-1

Size of the loan borrowed

Rs in thousands	Frequency	Percent	Cumulative Percent
Up to 25	260	52.0	52.0
25-50	110	22.0	74.0
50-75	80	16.0	90.0
Above 75	50	10.0	100.0
Total	500	100.0	

Source: Primary data

Table-1 refers to the distribution of the sample farmers by the size of the loan borrowed from various banks. It is observed that 52 percent of the sample farmers have borrowed an average of up to 25000 rupees followed by 25000-50000 rupees of loan by 22 percent of the sample farmers, 50000-75000 rupees of loan by 16 percent of sample farmers and above 75000 rupees of loan by 10 percent of the sample farmers.

Table-2
Extent of repayment

Extent of repayment (%)	Frequency	Percent	Cumulative Percent
40	275	55.0	55.0
40-50	145	29.0	84.0
50-60	80	16.0	100.0
Total	500	100.0	

Source: Primary data

Table-2 refers to the distribution of the sample farmers by the extent of loan repayment. It is observed that 55 percent of the sample farmers have made the repayment of the loan to the extent of 40 followed by 29 percent made repayment to the extent of 40-50 percent of their loan and 16 percent have made repayment to the extent of 50-60 percent of the loan.

Table-3
Extent of NPAs

Extent of NPAs (%)	Frequency	Percent	Cumulative Percent
Up to 20	290	58.0	58.0
20-40	140	28.0	86.0
Above 40	70	14.0	100.0
Total	500	100.0	

Source: Primary data

Table-3 refers to the distribution of the sample farmers by the extent of NPAs. It is observed that the extent of NPAs is up to 20 percent in case of 58 percent of sample farmers, and the same is 20-40 percent of their borrowings in case of 28 percent of the sample farmers and above 40 percent in case of 14 percent of the sample farmers.

Table-4
Period of NPAs

Period of NPAs (Years)	Frequency	Percent	Cumulative Percent
one	295	59.0	59.0
Two	150	30.0	89.0
More than two	55	11.0	100.0
Total	500	100.0	

Source: Primary data

Table-4 refers to the distribution of the sample farmers by the period of NPAs. It is observed that the period of NPAs one year in case of 59 percent of sample farmers, and the same is two years in case of 30 percent of the sample farmers and more than two years in case of 11 percent of the sample farmers.

Table-5
Type of Bank

Type of Bank	Frequency	Percent	Cumulative Percent
Cooperative bank	265	53.0	53.0
Commercial bank	170	34.0	87.0
Others	65	13.0	100.0
Total	500	100.0	

Source: Primary data

Table-5 refers to the distribution of the sample farmers by the type of bank from which they have borrowed. It is observed that 53 percent of the sample farmers have borrowed from cooperative banks, 34 percent have borrowed from commercial banks and 13 percent from other banks.

Table-6

Financial exclusion attributable to NPAs-
increasing level of dependence on informal
sources of credit

Response	Frequency	Percent	Cumulative Percent
Yes	350	70.0	70.0
No	150	30.0	100.0
Total	500	100.0	

Source: Primary data

Table-6 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on increasing level of dependence on informal sources of credit. It is observed that 70 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of increasing level of dependence on informal sources of credit and 30 percent of the sample street children did not subscribe to this view.

Table-7

Financial exclusion attributable to NPAs-
high interest burden

Response	Frequency	Percent	Cumulative Percent
Yes	300	60.0	60.0
No	200	40.0	100.0
Total	500	100.0	

Source: Primary data

Table-7 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on high interest burden. It is observed that 60 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of high interest burden and 40 percent of the sample farmers did not subscribe to this view.

Table-8

Financial exclusion attributable to NPAs-
worsening financial situation

Response	Frequency	Percent	Cumulative Percent
Yes	400	80.0	80.0
No	100	20.0	100.0
Total	500	100.0	

Source: Primary data

Table-8 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on worsening financial situation. It is observed that 80 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of worsening financial situation and 20 percent of the sample farmers did not subscribe to this view.

Table-9

Financial exclusion attributable to NPAs-
mounting indebtedness

Response	Frequency	Percent	Cumulative Percent
Yes	250	50.0	50.0
No	250	50.0	100.0
Total	500	100.0	

Source: Primary data

Table-9 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on mounting indebtedness. It is observed that 50 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of mounting indebtedness and 50 percent of the sample farmers did not subscribe to this view.

Table-10
Financial exclusion attributable to NPAs- mounting poverty

Response	Frequency	Percent	Cumulative Percent
Yes	450	90.0	90.0
No	50	10.0	100.0
Total	500	100.0	

Source: Primary data

Table-10 refers to the distribution of the sample farmers by their response about financial exclusion attributable to NPAs with a focus on mounting poverty. It is observed that 90 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of mounting poverty and 10 percent of the sample farmers did not subscribe to this view.

Table-11
Size of the farmer and size of the loan borrowed

Size of the farmer	Size of the loan borrowed (Rs in thousands)				Total
	Up to 25	25-50	50-75	Above 75	
Marginal	30	5	25	5	65
	46.2%	7.7%	38.5%	7.7%	100.0%
	11.5%	4.5%	31.3%	10.0%	13.0%
Small	155	75	30	40	300
	51.7%	25.0%	10.0%	13.3%	100.0%
	59.6%	68.2%	37.5%	80.0%	60.0%
Medium	50	25	20	5	100
	50.0%	25.0%	20.0%	5.0%	100.0%
	19.2%	22.7%	25.0%	10.0%	20.0%
Big	25	5	5		35
	71.4%	14.3%	14.3%		100.0%
	9.6%	4.5%	6.3%		7.0%
Total	260	110	80	50	500
	52.0%	22.0%	16.0%	10.0%	100.0%
	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square=49.673, df=9, =0.000, r=-0.101
Source: Primary data

Table-11 refers to the distribution of the sample farmers by their farm size and by their loan size. The correlation between the size of the farmer and loan size is found to be negative($r=-0.101$). The rejection of the null hypothesis with level of significance=0.05 and degree of freedom=9 implies that the relationship between the size of the sample farmers and their loan size is found to be statistically dependent.

Table-12
Size of the farmer and extent of repayment

Size of the farmer	Extent of repayment (%)			Total
	40%	40-50	50-60	
Marginal	50	15		65
	76.9%	23.1%		100.0%
	18.2%	10.3%		13.0%
Small	140	95	65	300
	46.7%	31.7%	21.7%	100.0%
	50.9%	65.5%	81.3%	60.0%
Medium	60	25	15	100
	60.0%	25.0%	15.0%	100.0%
	21.8%	17.2%	18.8%	20.0%
Big	25	10		35
	71.4%	28.6%		100.0%
	9.1%	6.9%		7.0%
Total	275	145	80	500
	55.0%	29.0%	16.0%	100.0%
	100.0%	100.0%	100.0%	100.0%

Chi-Square=35.799, df=6, =0.000, r=0.004

Source: Primary data

Table-12 refers to the distribution of the sample farmers by their farm size and by the extent of repayment of their loan. The correlation between the size of the farmer and the extent of repayment of their loan is found to be positive($r=0.004$). The rejection of the null hypothesis with level of significance=0.05 and degree of freedom=6 implies

that the relationship between the size of the sample farmers and the extent of repayment of their loan is found to be statistically dependent.

Table-13

Size of the farmer and extent of NPAs

Size of the farmer	Extent of NPAs (%)			Total
	Up to 20	20-40	Above 40	
Marginal	40	10	15	65
	61.5%	15.4%	23.1%	100.0%
	13.8%	7.1%	21.4%	13.0%
Small	170	80	50	300
	56.7%	26.7%	16.7%	100.0%
	58.6%	57.1%	71.4%	60.0%
Medium	55	45		100
	55.0%	45.0%		100.0%
	19.0%	32.1%		20.0%
Big	25	5	5	35
	71.4%	14.3%	14.3%	100.0%
	8.6%	3.6%	7.1%	7.0%
Total	290	140	70	500
	58.0%	28.0%	14.0%	100.0%
	100.0%	100.0%	100.0%	100.0%

Chi-Square=37.384, df=6, =0.000, r=-0.056

Source: Primary data

Table-13 refers to the distribution of the sample farmers by their farm size and by the extent of repayment of their loan. The correlation between the size of the farmer and the extent of repayment of their loan is found to be positive (r=0.004). The rejection of the null hypothesis with level of significance=0.05 and degree of freedom=6 implies that the relationship between the size of the sample farmers and the extent of repayment of their loan is found to be statistically dependent.

Table-14

Size of the farmer and period of NPAs

Size of the farmer	Period of NPAs			Total
	one	Two	More than two	
Marginal	50	10	5	65
	76.9%	15.4%	7.7%	100.0%
	16.9%	6.7%	9.1%	13.0%
Small	145	120	35	300
	48.3%	40.0%	11.7%	100.0%
	49.2%	80.0%	63.6%	60.0%
Medium	80	10	10	100
	80.0%	10.0%	10.0%	100.0%
	27.1%	6.7%	18.2%	20.0%
Big	20	10	5	35
	57.1%	28.6%	14.3%	100.0%
	6.8%	6.7%	9.1%	7.0%
Total	295	150	55	500
	59.0%	30.0%	11.0%	100.0%
	100.0%	100.0%	100.0%	100.0%

Chi-Square=46.007, df=6, =0.000, r=-0.046

Source: Primary data

Table-14 refers to the distribution of the sample farmers by their farm size and by the period of NPAs. The correlation between the size of the farmer and the period of NPAs is found to be negative (r=-0.046). The rejection of the null hypothesis with level of significance=0.05 and degree of freedom=6 implies that the relationship between the size of the sample farmers and the period of NPAs is found to be statistically dependent.

It is concluded that 52 percent of the sample farmers have borrowed an average of up to 25000 rupees, 55 percent of the sample farmers have made the repayment of the loan to the extent of 40 percent of the loan, the extent of NPAs is up to 20 percent in case of 58 percent of sample farmers, the period of NPAs one year in case of 59 percent of sample farmers. 70 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of increasing level of

dependence on informal sources of credit. 60 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of high interest burden. 80 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of worsening financial situation. 50 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of mounting indebtedness. 90 percent of the sample farmers have opined that due to their NPAs, they are subjected to financial exclusion in terms of mounting poverty.

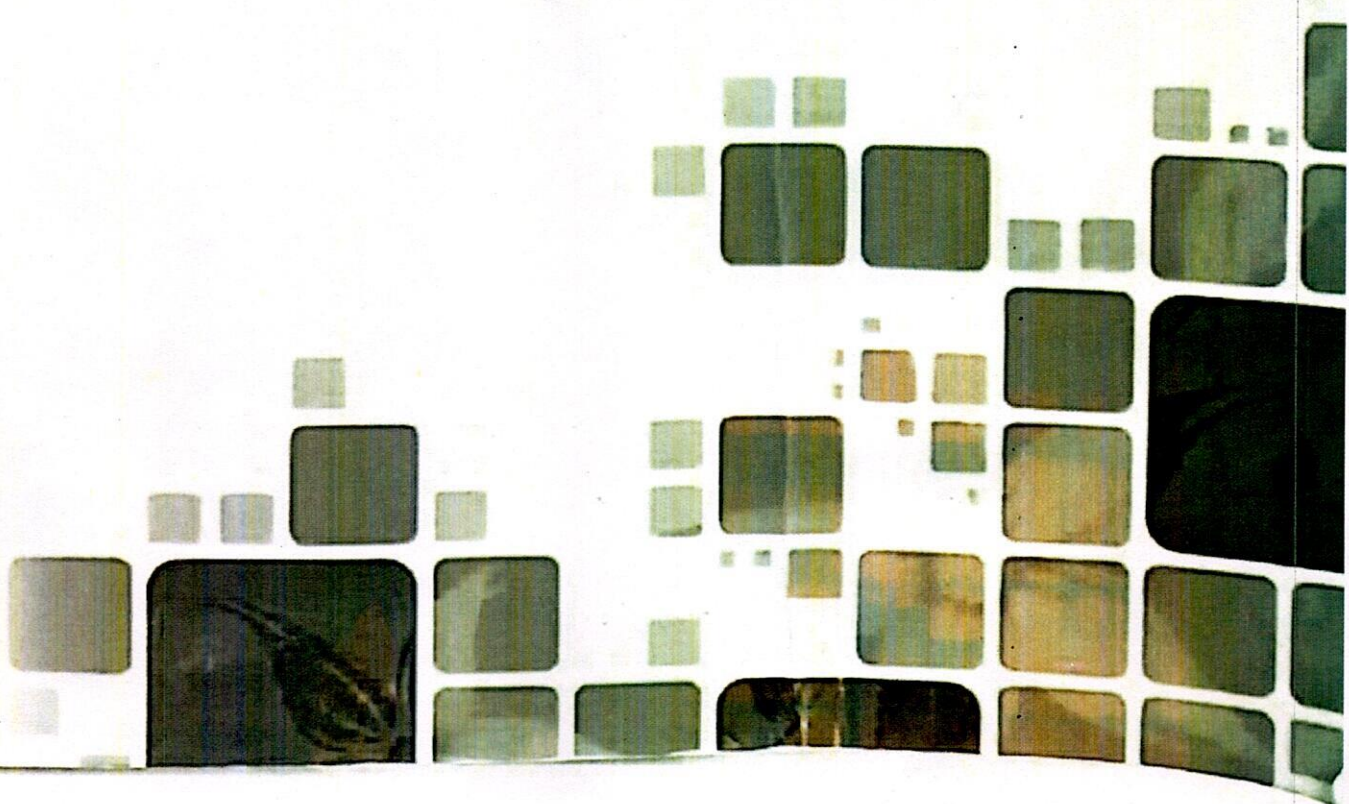
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Socio Economic Background of Mutual Funds Investors and its Relationship with Buying Factors and Attitudes

K. Mallikarjuna Rao*

Abstract

A mutual fund is an investment company that pools the resources from a large number of investors, who share common investment goals, and then diversifies its investment into the securities of different industrial sectors and companies in order to realize potential returns with reasonable safety. In the era of globalization, rapid price fluctuations are occurring in financial assets like equity shares, bonds and also in physical assets like real estate, gold silver etc. Therefore, an individual investor finds it difficult to keep track of ownership of his assets, investments, brokerage dues and bank transaction, etc. Thus, mutual funds have emerged as a better alternative investment avenue. This study focuses on the significance of socio economic factors such as gender, age, education, occupation, marital status, annual income, annual savings and family size over elements of investment in mutual funds in semi urban and rural area of Rayalaseema region of Andhra Pradesh. It also highlights that there is significant relationship between factors influencing investment in mutual fund schemes, source of information, experience in mutual fund investments and, the attitudes towards safety of the various investment avenues and socioeconomic factors.

Key words: Mutual funds, Socio economic factors, Rayalaseema region, Investment avenues

Introduction

Mutual funds are the most suitable investment for a common man as it offers an opportunity to invest in a diversified, professionally managed portfolio at a relatively low cost. Anybody with an investible surplus of a few hundred rupees can invest in mutual funds. Changes in the economic scenario, falling interest rates of bank deposits, volatile nature of capital market and recent bitter experience of

investors in making direct investment in capital market instruments led to the increasing importance of mutual funds. They have been playing a significant role in financial inter-mediation, development of capital markets and growth of the financial sector as a whole. The active involvement of mutual funds in economic development can be seen by their dominant presence in the money and capital market.

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Mutual fund industry started in India with the establishment of Unit Trust of India (1964), which was the only player in the industry up to 1987. In 1987, the government allowed public sector banks and financial institutions to join the fray. From 1993 onwards the industry was open for private sector and foreign players who started setting up mutual funds in India since then.

Review of Literature

Saha and Rama Murthy (1994) identified that return, liquidity, safety and capital appreciation played an important role in the preference of the schemes by investors. The study suggested that, fund managers could adopt portfolio selection techniques to make more informed judgments rather than making investments on an intuition basis.

Rajeshwari and Rama Moorthy (2001) studied the financial behaviour and factors influencing fund/scheme selection of retail investors. The survey revealed that the most preferred investment vehicle is bank deposits and that the scheme selection decision is made by the respondents themselves. Newspapers and magazines, brokers and agents, television, suggestions from friends and direct mail in that order are the other sources influencing the choice of a mutual fund scheme.

Vyas (2012) evaluated the forms of investment, mode of investment preferred by investors. He has also examined the investor's knowledge of risk and

preference over switching of funds by using Chi-Square test, Pearson's correlation, mean and median. The study found that it has a significant relationship between occupation of investors and mode of investment. Majority of the investors have the knowledge of risk factors in mutual funds.

Sharma (2012) attempted to examine the reasons responsible for lesser recognition of mutual fund as a prime investment option.

Jani, Patel & Jain (2012) studied how different demographical factors have influenced the perception of customers. Majority of consumers of valsad city have positive perception towards mutual fund. The demographic factors (i.e. age, gender, income, education etc.) have influence on investors' perception.

Prasad and Srinivas (2012) in their study identified that the selection of mutual fund schemes by the investor are affected by different factors. The identified factors are infrastructure, reputation of fund, flexibility, transparency, additional facilities, and brand name. The Overall Mean Score value towards financial instruments (8.638 per cent) is greater in all financial instruments except shares and gold.

Rathnamani (2013) observed that many investors prefer to invest in mutual funds in order to have high return at low level of risk, safety and liquidity. In the demographic profile most of the investors are willing to invest only 10 per cent in

their annual personal income; around 39 per cent investors belong to age group of 31 to 40 years. Investors showed willingness to take moderate and low level risk. The study concluded that most of the investors belong to moderate investment style.

Jani & Jain (2014) in their study attempted to examine the buying behaviour of rural investors for financial assets specifically focused on mutual fund. The study found that there is significant impact of demographical factors like age, gender, occupation, education and income on the decision making process of buying the mutual funds.

Khitoliya (2014) in his study conducted in Delhi found that only 49 per cent of respondents were aware of mutual funds despite the fact that 60 percent of respondents were post- graduates and 34 per cent were graduates from a metropolitan city. Of the 95 respondents who are aware of mutual funds only 57 had invested in mutual funds.

Chaturvedi, Singh and Singh (2014) concluded that investors are seen to primarily invest in the mutual fund without knowing the entire working of the investment. The customers normally tend to invest in those areas where they have faith and hence building of faith is very important.

Gaglani and Rao (2014) conducted a study on the impact of various demographic factors on investors' attitude towards investment in mutual fund in

Nagpur district of Maharashtra state. The study revealed that demographic factors - age, gender, qualification, income and occupation have significant influence on the investors' attitude towards mutual funds investment.

Rajkumar and Venkatramaraju (2014) in their study analysed whether investors have chosen their funds based on liquidity rather than having chosen them on the basis of the level of safety. The study concluded that investors' preference for liquidity is possible through mutual funds and that open ended funds offer more liquidity.

Sharma and Agrawal (2015) in their research on buying behaviour of mutual fund investors, sources investors rely more while making investment and preferable mode to invest in mutual funds.

Objectives of the study

- To analyze the relationship between the socio economic background of investors of mutual funds and their buying factors.

Research Design and Methodology

The study is based on both primary and secondary data. The primary data has been collected from individual investors through a structured questionnaire. The total sample size is 400 individual investors of semi-urban and rural areas from the four districts of Rayalaseema region - Chittoor, Anantapuram, Kurnool and YSR Kadapa. A sample of 100 individual investors each from the above

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four districts is used for this purpose. The secondary data has been collected from various investment periodicals, such as *Dalal Street*, *Capital Market*, *RBI Bulletin*, *RBI Reports*, the *SEBI Reports* and *SEBI Bulletins*, business newspapers like *Business Standard*,

Business Line, *Economic Times* and *Financial Express* to know the risk and return of various mutual funds. Statistical inferences have been drawn using statistical package for social science (SPSS). ANOVA and Chi-square test are used in the study.

Results and Discussion

Table 1: Socio Economic Profile of Investors in Four Districts

Profile particulars	Total Number of respondents	Ananta-puram	Chittoor	Kurnool	YSR Kadapa
Gender					
Male	346 (86.50)	86 (86.00)	86 (86.00)	90 (90.00)	84 (84.00)
Female	54 (13.50)	14 (14.00)	14 (14.00)	54 (10.00)	16 (16.00)
Age					
Below 30	208 (52.00)	49 (49.00)	51 (51.00)	54 (54.00)	54 (54.00)
31-40	119 (29.80)	27 (27.80)	33 (33.00)	34 (34.00)	25 (25.00)
41-50	38 (9.50)	12 (12.00)	9 (9.00)	6 (6.00)	11 (11.00)
51-60	27 (6.80)	09 (9.00)	4 (4.00)	6 (6.00)	8 (8.00)
(Above 60)	8 (2.00)	3 (3.00)	3 (3.00)	0 (0.00)	2 (2.00)

Level of Education					
Below Graduate	42 (10.50)	7 (7.00)	16 (16.00)	12 (12.00)	7 (7.00)
Under Graduate	224 (56.00)	51 (51.00)	55 (55.00)	65 (65.00)	53 (53.00)
Post-Graduate	110 (27.50)	32 (32.00)	28 (28.00)	20 (20.0)	30 (30.00)
Professional	15 (3.80)	6 (6.000)	1 (1.00)	2 (2.00)	6 (6.00)
Any other	9 (2.30)	4 (4.00)	0 (0.00)	6 (6.00)	4 (4.00)
Marital Status					
Married	298 (74.50)	79 (79.00)	68 (68.00)	72 (72.00)	79 (79.00)
Single	102 (25.50)	21 (21.00)	32 (32.00)	28 (28.00)	21 (21.00)
Occupation					
Agriculture	43 (10.80)	9 (9.00)	13 (13.00)	12 (10.80)	9 (9.00)
Salaried	79 (19.80)	21 (21.00)	14 (14.00)	20 (19.80)	24 (24.00)
Business	181 (45.30)	42 (42.00)	53 (53.00)	46 (46.00)	40 (40.00)
Professionals	71 (17.80)	21 (21.00)	13 (13.00)	19 (19.00)	18 (18.00)
Retired	26 (6.50)	7 (7.00)	7 (7.00)	3 (3.00)	9 (9.00)

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Annual income (in Rs.) Up to 2,00,000	181 (45.30)	43 (43.00)	38 (38.00)	50 (50.00)	50 (50.00)
2,00,001- 3,00,000	115 (28.80)	23 (23.00)	36 (36)	34 (34.00)	22 (22.00)
3,00,001- 4,00,000	61 (15.30)	14 (14.00)	21 (21)	14 (14.00)	12 (12.00)
4,00,001- 5,00,000	15 (3.80)	4 (4.00)	5 (5.00)	2 (2.00)	4 (4.00)
5,00,001- 6,00,000	17 (4.30)	9 (9.00)	0 (0.00)	0 (0.00)	8 (8.00)
Above 6,00,000	11 (2.80)	7 (7.00)	0 (0.00)	0 (0.00)	4 (4.00)
Annual Savings Up to 1,00,000	289 (72.30)	65 (65.00)	73 (73.00)	80 (80.00)	71 (71.00)
1,00,001- 1,50,000	80 (20.00)	19 (19.00)	25 (25.00)	20 (20.00)	16 (16.00)
1,50,001- 2,00,000	20 (5.00)	10 (10.00)	2 (2.00)	0 (5.00)	8 (8.00)
2,00,001- 2,50,000	7 (1.80)	4 (4.00)	0 (0.00)	0 (0.00)	3 (3.00)
2,50,001- 3,00,000	4 (1.00)	2 (2.00)	0 (0.00)	0 (0.00)	2 (2.00)

Source: Computed from primary data

Note: Figures in parenthesis denote percentages

The socio economic characteristics of 400 respondents of Rayalaseema region in Table 1 shows that most of the respondents are males (86.5 per cent) and the respondents who are married constitute 74.5 per cent and unmarried are 25.5 per cent. 52 per cent of mutual funds investors are in the age group of below 30 years, followed by 29.8 per cent from 31-40 years and 9.5 per cent from 41-50 years of age. Thus, most of the respondents are found to be relatively young. The educational level of the respondents shows that 56 per cent are undergraduates, 27.5 per cent are postgraduates and 10.5 per cent are below under- graduates.

The dominant occupational background of the respondents is: business group (45.3 per cent), followed by 19.8 per cent from salaried group, and professionals are 17.8 per cent. The annual income among respondents are up to Rs. 2,00,000 (45.3 per cent); 2,00,001 to 3,00,000 (28.8

per cent); and family size of the respondents is found to be 3 to 4 members in a family.

The relationship between various socio economic factors and investment patterns is analysed with the help of Chi-square test.

Factors Influencing Investment in Mutual Fund Schemes

Table 2 shows the factors influencing investment in mutual funds by the respondents from four districts of Rayalaseema region. Out of 400 respondents, 74.3 per cent of the respondents invested in mutual funds due to good returns, followed by safety of investment (58 per cent). Respondents felt that their investment in mutual funds was safe and not risky. The other reason for investing in mutual funds was capital appreciation (46 per cent). Only 33 per cent of the respondents prefer mutual funds due to diversification benefit provided by them.

Table 2: Factors Influencing Investment in Mutual Fund Schemes

Districts	Safety		Liquidity		Flexibility		Good Return		Capital appreciation		Professional Management		Tax benefits		Diversification	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Anantapuram	48 (48.0)	52 (52.0)	61 (61.0)	39 (39.0)	65 (65.0)	35 (35.0)	30 (30.0)	70 (70.0)	52 (52.0)	48 (48.0)	57 (57.0)	43 (43.0)	54 (54.0)	46 (46.0)	68 (68.0)	32 (32.0)
Chittoor	43 (43.0)	57 (57.0)	57 (57.0)	43 (43.0)	59 (59.0)	41 (41.0)	22 (22.0)	78 (78.0)	59 (59.0)	41 (41.0)	51 (51.0)	49 (49.0)	55 (55.0)	45 (45.0)	64 (64.0)	36 (36.0)
Kumool	38 (38.0)	62 (62.0)	55 (55.0)	45 (45.0)	63 (63.0)	37 (37.0)	22 (22.0)	78 (78.0)	54 (54.0)	46 (46.0)	60 (60.0)	40 (40.0)	54 (54.0)	46 (46.0)	70 (70.0)	30 (30.0)
YSR Kadapa	39 (39.0)	61 (61.0)	61 (61.0)	39 (39.0)	68 (68.0)	32 (32.0)	29 (29.0)	71 (71.0)	51 (51.0)	49 (49.0)	58 (58.0)	42 (42.0)	57 (57.0)	43 (43.0)	66 (66.0)	34 (34.0)
Total	168 (42.0)	232 (58.0)	234 (58.5)	166 (41.5)	255 (63.8)	145 (36.3)	103 (25.8)	297 (74.3)	216 (54.0)	184 (46.0)	226 (56.5)	174 (43.5)	220 (55.0)	180 (45.0)	268 (67.0)	132 (33.0)

Source: Computed from primary data

Note: Figures in parenthesis denote percentages

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Table 3: Relationship between Socio Economic Factors and the Factors that Influence Investment in Mutual Funds

Socio economic factors	F value	Sig. Value	Sig or not sig
Gender	0.24	0.887	Not significant
Age	2.912	0.021	Significant
Marital status	1.684	0.195	Not significant
Education	8.672	0.000	Significant
Occupation	7.001	0.000	Significant
Annual income	6.026	0.000	Significant
Annual savings	5.295	0.000	Significant
Family size	3.227	0.013	Significant

ANOVA test has been applied to find if there is any significant relationship between socio economic factors of the investors and factors influencing investment in mutual funds. It is clear, from Table 3, that except for gender and marital status of the investors, other socio economic factors have a significant relationship with the investor's attitude with regard to the factors that influence investment in mutual funds.

Experience in Mutual Fund Investments

Experience of investors in investment is an important factor for successful investing. The experience of investors in the field of investment brings out changes in investment attitude and their preference towards investment avenues and the extent of diversification in investment. Lengthy years of experience helps investors understand the complex behaviour of the market and to implement suitable strategy for investment. The level of experience is confined to less than one year, 2 to 5 years, 6 to 10 years, 11 to 15 years and more than 15 years (Table 4).

Table 4: Experience in Mutual Fund Investment (District-wise)

Districts	Experience in Mutual Fund Investments					Total
	1 year and below	2 to 5 years	6 to 10 years	11 to 15 years	15 years or more	
Anantapuram	35 (35.0)	39 (39.0)	14 (14.0)	5 (5.0)	7 (7.0)	100 (100.0)
Chittoor	32 (32.0)	50 (50.0)	17 (17.0)	0 (0.0)	1 (1.0)	100 (100.0)
Kurnool	40 (40.0)	46 (46.0)	13 (13.0)	1 (1.0)	0 (0.0)	100 (100.0)
YSR Kadapa	38 (38.0)	38 (38.0)	11 (11.0)	6 (6.0)	7 (7.0)	100 (100.0)
Total	145 (36.3)	173 (43.3)	55 (13.8)	12 (3.0)	15 (3.8)	400 (100.0)

Source: Computed from primary data

The years of experience among the investors of Rayalaseema region are two to five years, and below one year which constitute 43.3 and 36.3 per cent. The numbers of investors who have six to ten

years of experience are 13.8 per cent to the total. One significant observation from the table is that only 3 per cent of investors have 11 to 15 years of experience in investing in mutual funds.

Table 5: Relationship between the Socio Economic Factors and Experience in Mutual Fund Investment

Socio economic factor	F value	DF	Table value	Sign. value	Sig or not sig
Gender	25.054	4	9.49	4.000	Significant
Age	60.082	16	26.3	0.000	Significant
Marital status	16.100	4	9.49	0.003	Significant
Education	59.749	16	26.3	0.000	Significant
Occupation	51.791	16	26.3	0.000	Significant
Annual income	128.061	20	31.4	0.000	Significant
Annual savings	45.368	16	26.3	0.000	Significant
Family size	28.232	16	26.3	0.030	Significant

Chi-Square Test, at 5% significance level, has been applied on the data collected to find whether these socio economic factors have significant relationship with the period of investment. The result of the test is given in Table 5. The test clearly revealed that all the socio economic factors have significant relationship with the period of investment.

Source of Information on Mutual Funds

The sources from where one can acquire awareness would also be a crucial element in the process of investment decision making. The degree of information may vary from source to source. Brokers/Agents, Prospectus,

Advertisements, Annual reports, Newspapers, Magazines and Friends & Relatives are identified as different sources to create awareness on mutual funds.

Table 6 reveals that the sources of information on mutual funds were almost similar for respondents of all four districts of Rayalaseema region. Out of 400 respondents, 229 (57.3 per cent) got the information from newspapers, 196 respondents (49 per cent) from brokers/agents, 136 respondents got the information from magazines, and only 58 respondents collected the information from prospectus (14.5 per cent).

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Table 6: Source of Information on Mutual Funds

Districts	Brokers/ Agents		Prospectus		Advertise ments		Annual Reports		Newspapers		Magazines		Friends and Relatives	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Anantapuram	57	43	89	11	83	17	73	27	46	54	60	40	79	21
	57.0%	43.0%	89.0%	11.0%	83.0%	17.0%	73.0%	27.0%	46.0%	54.0%	60.0%	40.0%	79.0%	21.0%
Chittoor	46	54	79	21	81	19	67	33	40	60	70	30	79	21
	46.0%	54.0%	79.0%	21.0%	81.0%	19.0%	67.0%	33.0%	40.0%	60.0%	70.0%	30.0%	79.0%	21.0%
Kurnool	47	53	84	16	86	14	76	24	41	59	73	27	86	14
	47.0%	53.0%	84.0%	16.0%	86.0%	14.0%	76.0%	24.0%	41.0%	59.0%	73.0%	27.0%	86.0%	14.0%
YSR Kadapa	54	46	90	10	83	17	76	24	44	56	61	39	80	20
	54.0%	46.0%	90.0%	10.0%	83.0%	17.0%	76.0%	24.0%	44.0%	56.0%	61.0%	39.0%	80.0%	20.0%
Total	204	196	342	58	333	67	292	108	171	229	264	136	324	76
	51.0%	49.0%	85.5%	14.5%	83.3%	16.8%	73.0%	27.0%	42.8%	57.3%	66.0%	34.0%	81.0%	19.0%

Source: Computed from primary data

ANOVA test has been applied to find if there is any significant relationship between socio economic factors of the investors and the source of information

on mutual funds. It is clear from Table 7, that all the socio economic factors (except age) have a significant relationship with the source of information on mutual funds.

Table 7: Relationship between Socio Economic Factors and Sources of Information on Mutual Funds

Socio economic factors	F value	Sig. Value	Sig or not sig
Gender	13.503	0	significant
Age	1.533	0.192	Not Significant
Marital status	22.659	0	significant
Education	3.179	0.014	Significant
Occupation	4.333	0.002	Significant
Annual income	3.825	0.002	Significant
Annual savings	4.004	0.003	Significant
Family size	2.949	0.02	Significant

Attitudes towards various Investment Avenues

It is observed from Table 8, that 90.5 per cent of respondents are having positive attitude towards safety of bank deposits, postal deposits (65.25 per cent) and Public

Provident Fund (53 per cent). Another significant observation is that 39.75 per cent respondents are feeling reasonably safe with investment in gold, followed by mutual funds (36 per cent), Public Provident Fund (30.25 per cent), shares (25.5 per cent), Insurance (23.25 per cent)

and Real estate (19.25 per cent). On the other hand, 153 respondents (38.25 per cent) found that investment in real estate is

not safe, followed by shares (26.00 per cent), insurance (12.25 per cent), gold (12.00 per cent) and mutual funds (10.75 per cent).

Table 8: Attitude towards various Investment Avenues

Sl. No	Financial Assets	Absolutely safe	Reasonable safe	Somewhat Safe	Not Safe	Don't Know	Total
1	Saving Bank/Fixed Deposit	362 (90.5)	36 (9.00)	2 (0.5)	0 (0)	0 (0)	400 (100)
2	Gold/Silver	83 (20.75)	159 (39.75)	100 (25.00)	48 (12)	10 (2.5)	400 (100)
3	Shares/Debentures	12 (3.00)	102 (25.50)	158 (39.50)	104 (26.00)	24 (6.00)	400 (100)
4	Postal savings	261 (65.25)	88 (22.00)	26 (6.5)	18 (4.5)	7 (1.75)	400 (100)
5	Mutual funds	93 (23.25)	144 (36.00)	120 (30.00)	43 (10.75)	0 (0.00)	400 (100)
6	Real estate	36 (9.00)	77 (19.25)	100 (25.00)	153 (38.25)	34 (8.5)	400 (100)
7	Insurance	151 (37.75)	93 (23.25)	98 (24.50)	49 (12.25)	9 (2.25)	400 (100)
8	P.P.F/G.P.F	212 (53.00)	121 (30.25)	24 (6)	6 (1.5)	37 (9.25)	400 (100)

Source: Computed from primary data

Note: figures in parenthesis denote percentages

Table 9: Relationship between Socio Economic Factors and Attitude towards various Investment Avenues

Socio economic Factor	F value	Sig. Value	Sig / not sig
Gender	5.064	0.025	significant
Age	0.801	0.525	Not Significant
Marital status	0.433	0.101	Not Significant
Education	6.375	0	Significant
Occupation	0.491	0.742	Not Significant
Annual income	4.342	0	Significant
Annual savings	6.02	0	Significant
Family size	2.949	0.02	Significant

ANOVA Test, at 5% significance level, has been applied on the data collected to find whether these socio economic factors have significant relationship with the attitudes toward various investment Avenues. The test (Table 9) reveals that most of the socio economic factors such as gender, education, annual income, annual savings and family size have a significant relationship with the attitudes toward various investment avenues. On the other hand, socio economic factors like age, marital status and occupation have no significant relationship with the attitude towards various investment Avenues.

Conclusions

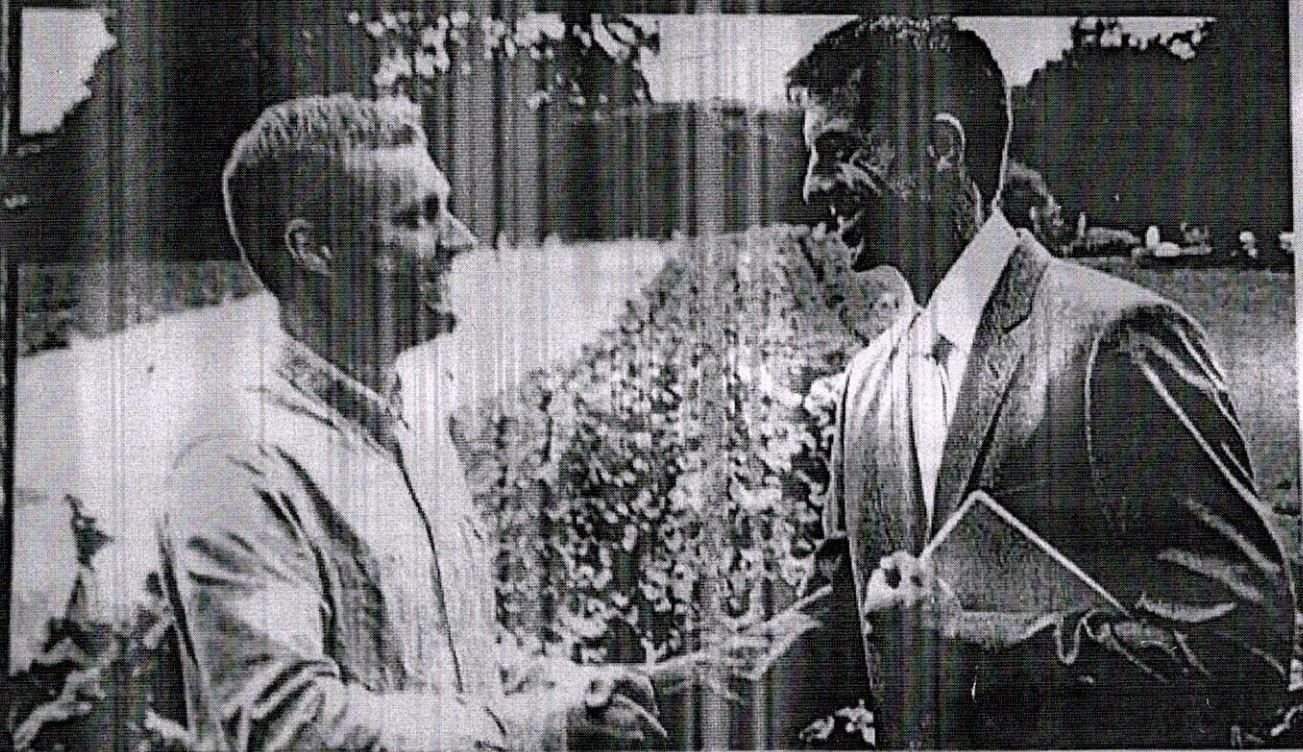
Mutual funds have emerged as an appropriate investment vehicle and a preferred investment destination. Retail/ small investors used to rely more on investment avenues like bank deposits, post office savings etc., which provide liquidity, assured returns and tax benefits.

But these avenues do not offer the benefit of investing in capital market and the real purchasing power of the investors is likely to decline with these investments when the rate of inflation rises. Further, the interest rates on these avenues have been slashed down from time to time with a view to channelize the savings to capital market and thereby regain the confidence of investors which they have lost since 1992 due to stock market crises/ debacle in 1992, 2001 and 2008.

It also revealed that except for gender and marital status of the investors, other socio economic factors have a significant relationship with the investor's attitude with regard to the factors that influence investment in mutual funds. All the socio economic factors have a significant relationship with the period of investment whereas with age, marital status and occupation there is no significant relationship with the attitude towards various investment avenues.

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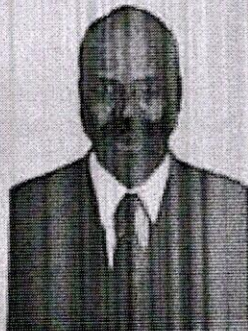
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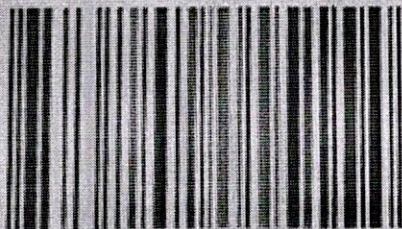
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This book focuses on financial exclusion as well as evaluates on who have access or away from financial institutions for credit in the case of farmers of rural areas. The book explores causes, consequences and how the magnitude of these financial exclusion exist. By focusing the policy options available to the farmers to avail credit the book helps them to be up lifted. The institutional sources being the cooperative banking system is consistently having lion share in financing agricultural sector. It deals with the the nexus between the financial development and economic development and the growth of agriculture sector in the context of credit. The problem of mounting Non Performing Assets is failure of banking system. The problem of mounting Non Performing Assets (NPA's) not only jeopardizes the interest of the defaulters but also the regular members, auditors and the cooperative banking institutions itself. This book discusses farmers socio-economic profile include age, place, social status, economic status, size, type of the family and This book will be a great help to the researchers and teachers of Commerce, Management and Social Sciences.



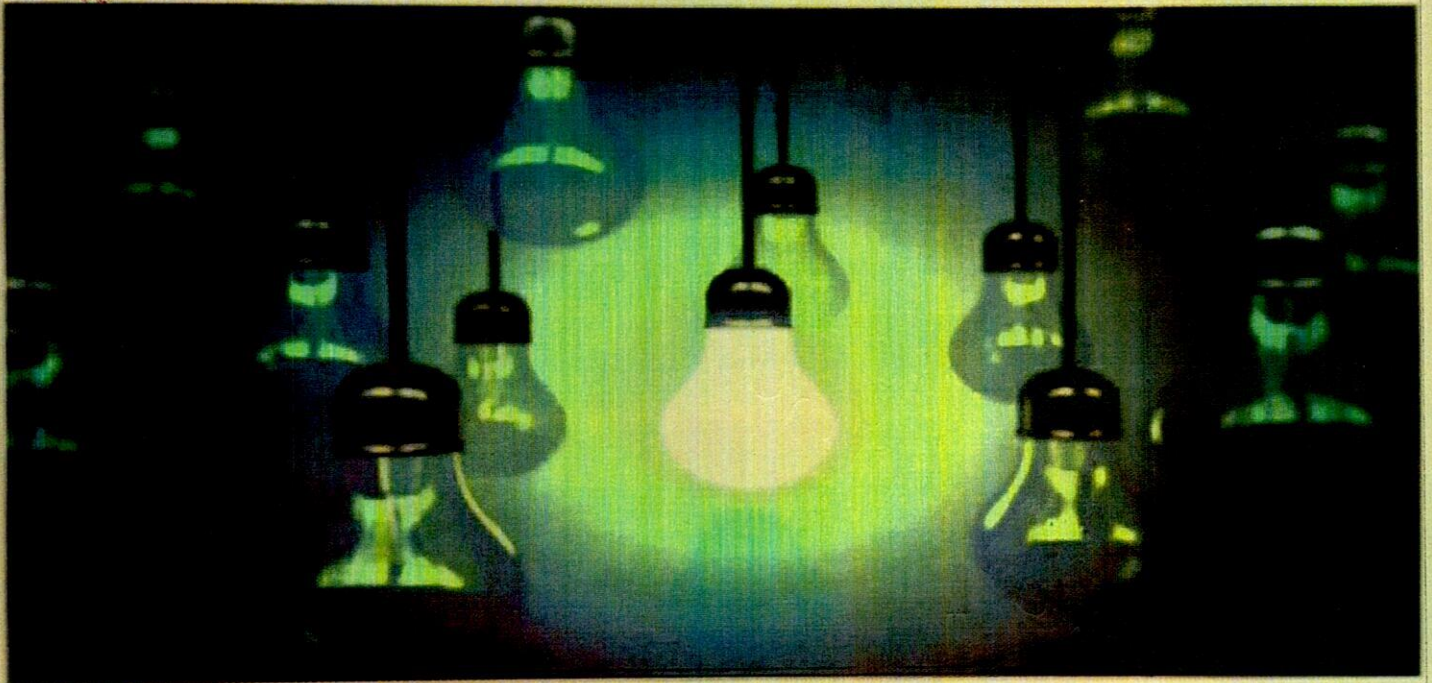
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Dynamics of Price Discovery of Selected Agricultural Commodities in India

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Abstract

The purpose of the study is to investigate the relationship between Spot and Futures of selected commodities Guar Seed, Jeera, Soya bean and Turmeric. The study is used the tests like Augmented Dickey-Fuller (ADF) test, Phillips-Perron test, Kwiatkowski-Phillips-Schmidt-Shin test, Granger Causality test, Johansen co-integration test, Vector error correction Model (VECM) and diagnostic test, to seek the relationship between Guar Seed, Jeera, Soya bean and Turmeric Spot and futures for data between 1st March, 2014 to 31st March 2017. The results derived by the econometric tools reveal that the unit root test, Augmented Dickey Fuller test (ADF), Phillips-Perron (PP) Test, Kwiatkowski-Phillips-Schmidt-Shin test shows that the spot and futures prices were found to be stationary at first difference. The results of Granger causality test reveals that returns of spot price lead to the futures price and vice versa. Johansen's co-integration test and Vector Error Correction Model (VECM) proved that there is a relation between spot and futures prices of the selected commodities for the study period.

Key words: Causal Relationship and Granger causality test

Introduction:

The Indian agricultural production system has undergone profound changes over the few decades due to adoption of green revolution technologies coupled with price support policy of the Government of India. After independence, various policy initiatives undertaken by GOI for protecting agriculture sector affected the growth in agricultural commodities markets adversely. The Essential Commodities Act 1955 envisaged price and movement protection applicable to various agricultural commodities, particularly food grains such as paddy, wheat, coarse grains and pulses to protect the interests of producers as well as of consumers. During the process of economic liberalization, it was felt that there is a need to reorient policies and regulations in agricultural commodities. Act 1952 to bring fairness and efficiency in futures trading operations. The National Agriculture Policy announced in July 2000 envisaged external and domestic market reforms by putting in place a mechanism of futures trade/market and dismantling of

all control and regulations in agricultural commodity market. As a result, the Government of India issued notifications on April 1, 2003 and permitted futures trading (except options trading) for a wide range of agricultural commodities.

Futures contracts help in performing two important management functions, i.e. price discovery and price risk management for the specific commodity. Price discovery is the process of revealing information about future spot prices through the future markets. It is useful for producers as they get a fair idea about the prices likely to prevail at a future point of time and hence, can allocate their limited available resources among various competing commodities for optimizing their profits.

It also provides food processors and consumers an idea about prices at which the specific commodity would be available at a future point of time. Although futures trading in a large number of agricultural commodities were re-introduced in India in the year 2003, government is always skeptical about its efficiency and likely

impact on the price movement of agricultural commodities. The influence of one market on the other and role of each market segment in price discovery is the central question in market microstructure design and has become an increasingly important research issue among academicians, regulators and practitioners alike as it provides an idea about the market efficiency, volatility, hedging effectiveness and arbitrage opportunities, if any. The essence of the price discovery function hinges on whether new information is reflected first in changes of future prices or changes of spot prices. Hence, there exists lead-lag relationship between spot and futures market by information dissemination. All the information available in the market place is immediately incorporated in the prices of assets in an efficient market. So, new information disseminating into the market should be reflected immediately in spot and futures prices simultaneously. This will lead to perfect positive contemporaneous co movement between the prices of those markets and there will be no systematic lagged response and therefore no arbitrage opportunity

Review of Literature

Kumar and Sunil (2004) examined the price discovery in six Indian commodity exchanges for five commodities. They used the daily futures and spot price and also engaged the ratio of standard deviations of spot and future rates for empirical testing of ability of futures markets to incorporate information efficiently. The study concluded that inability of future market to fully incorporate information and confirmed inefficiency of future market. However, the paper also concluded that the Indian agricultural commodities future markets are not yet mature and efficient.

Kushankur Dey, Debasish Maitra (2012) in their study on "Price Discovery in Indian Commodity Futures Market: An Empirical Exercise", found that there was a unidirectional causality from Futures to Spot prices in the pepper Futures market.

Jabir Ali, Kriti Bardhan Gupta (2011) observed the long-term relationship between Futures and Spot Prices for the selected Agricultural Commodities are Maize, Chickpea, Black Lentil, Pepper, Castor Seed, Soybean and Sugar. The study found that there was also a short-term relationship between them and the Futures markets had ability to predict spot prices for Chickpea, Castor Seed, Soybean and Sugar. The study also concluded that there was a bi-directional relationship in the short run among the Maize, Black Lentil and Pepper.

R. Salvadi and P. Ramasundaram (2008) in their study entitled "Whether Commodity Futures Market in Agriculture is Efficient in Price Discovery? - An Economics Analysis" examined. The results showed the inefficiency of agricultural commodity futures market in terms of price discovery due to the non integration of futures and the spot market. The study also revealed that the implementation of Government driven policy measures to raise the commodity futures market as a vibrant segment for price risk management in Indian Agriculture sector.

Kumar, Singh and Pandey (2008), studied the hedging effectiveness of futures contract on a financial asset and commodities in Indian markets by applying different time series models and is found that there is presence of necessary co-integration between the spot and derivatives markets and also that both stock market and commodity derivatives markets in India provide a reasonably high level of hedging effectiveness.

Jabir and Kriti (2007), the study on analysis on the effectiveness of commodity futures market through regression analysis by taking both spot and future prices of commodities showed high level of volatility in both spot and futures prices of commodities. Positive coefficients for agricultural commodities in dissimilar equations supported the effectiveness of commodity market in hedging the price risk.

Raizada and Sahi (2006), studied the efficiency of Indian futures market and observed that the wheat futures market is even weak-form inefficient and fails to play the role of spot price discovery. Spot market has found to capture the market information faster and therefore expected to play the leading role. This inefficiency of the futures market may be attributed to the lack of necessary data to truly capture the actual lead-lag relationship between the spot and futures market. It is also suggested that the trading volume in commodity futures market, along with other factors, have a significant impact on country's inflationary pressure.

Objective of the Study

- To test the stationary of the selected agricultural commodities in Spot and Futures Markets
- To examine directional effect among the selected commodities of Spot and Futures
- To examine the relationship between the selected commodities of Spot and Futures movement of NCDEX in India.

Data and Methodology

The present study is aimed towards analysing the dynamics of price discovery

Unit Root Tests

Augmented Dickey-Fuller (ADF) Test

The standard DF test is carried out by estimating the following Equation after subtracting y_{t-1} from both sides of the equation:

$$\Delta y_t = \alpha y_{t-1} + \gamma \Delta d + \epsilon_t,$$

where $\alpha = \tau - 1$. The null and alternative hypotheses may be written as,

$$H_0: \alpha = 0$$

$$H_1: \alpha < 0$$

The Phillips – Perron test

The Phillips – Perron test is carried out by estimating the following equation

$$\nabla y_t = \nabla y_{t-1} + u_t$$

Where y_t is the time series data under consideration.

The **KPPS (1992) Test** is based on the residuals (ϵ_t) from an ordinary least square regression of the variable of interest on the exogenous variable(s) as follows:

$$Y_t = X_t' \beta + \epsilon_t \quad (2)$$

between Spot and Futures of Guar Seed, Jeera, Soya bean and Turmeric commodities. The frequency of data is kept at daily level and time span of the study is between 1st March, 2014 to 31st March 2017. The results from daily data are more precise and are better able to capture the dynamics between Spot and Futures of Guar Seed, Jeera, Soya bean and Turmeric commodities. Both the price series have been collected from the website of National Commodity and Derivative Exchange (NCDEX). In this study, the techniques used for analysis are panel unit root test which is Augmented DickeyFuller (ADF) test or Phillips-Perron (PP) test, KPPS Test, Johansen Co-integration test and Regression Model pertaining to analyzing the relationship between Spot and Future Markets of Price discovery of commodities market.

Following Econometric Models were Used for Analysis

- Unit root test,
- Granger causality test, and
- Johansen co-integration test
- Vector error correction Model (VECM)
- Diagnostic test

where Y_t is the variable of interest (endogenous variable(s)). The Lagrange Multiplier (LM) statistic used in the test as follows:
 $LM = T^{-2} \sum_{t=1}^T S(t)^2 / f_0$
 where T is the sample size, $S(t)$ is the partial sum of residuals which is calculated as

$$S(t) = \sum_{i=1}^t S_i r_i$$

Here e_t is the estimated residual from (3.1). f_0 is an estimator of the residual spectrum at frequency zero. This statistic has to be compared with KPSS et al. (1992) critical values.

Granger causality test

The test was carried out to identify the directional effect of selected indices. To test for Granger causality, the following two equations were estimated.

$$Y_t = \sum_{i=1}^m \alpha_i Y_{t-i} + \sum_{i=1}^m \beta_i X_{t-i} + u_t$$

$$X_t = \sum_{i=1}^m \gamma_i Y_{t-i} + \sum_{i=1}^m \delta_i X_{t-i} + e_t$$

Johansen cointegration test

The condition for testing Johansen cointegration test for any time series data is that the data should be non stationary at their level i.e. the natural logarithm of time series data should be non stationary and the first difference in the data should be stationary. If the return indices of different markets are correlated, the value may rise or fall. On the other hand, if the time series data are co-integrated, then the series in the long run will come to equilibrium point.

Empirical Results

Table 1: Out of Descriptive statistics of Selected commodities for the period from 01-04-2014 to 31-3-2017

Statistical Measures	Guar Seed		Jeera		Soya Bean		Turmeric	
	Spot	Futures	Spot	Futures	Spot	Futures	Spot	Futures
Mean	4085.26	4106.58	15620.02	15216.59	3582.26	3625.06	7598.94	7746.79
Median	3800.00	3807.00	16417.93	15955.00	3482.00	3645.00	7591.65	7488.00
Maximum	6740.00	6265.00	19585.70	20380.00	4832.00	4863.00	9823.80	10706.00
Minimum	2982.70	3005.00	10246.90	10340.00	2855.00	2862.00	5708.70	5870.00
Std.Dev.	842.72	845.068	2606.40	2533.34	414.28	431.275	965.038	1047.77
Skewness	0.64614	0.74157	-0.72453	-0.36662	0.66096	0.41340	0.04889	0.6295
Kurtosis	2.20031	2.26958	2.24538	2.099386	2.9226	2.70820	2.60631	2.70657
Jarque-Bera	68.4189	80.9709	80.0765	40.4627	52.6040	23.0624	4.57333	46.4501
Probability	0.0000	0.00000	0.00000	0.00000	0.00000	0.00000	0.10161	0.00000

The variables considered in the scope of the study are examined in the table 1 reveals that the average values of variables are found to be Spot prices of Guar Seed (4085.26), and Futures prices of Guar Seed (4106.58), standard deviation values are found as Spot prices of Guar Seed (842.72), and Futures prices of Guar Seed (845.068), Spot prices of

Jeera (15620.02), and Futures prices of Jeera (15216.59), standard deviation values are found as Spot prices of Jeera (2606.40), and Futures prices of Jeera (2533.34), Spot prices of Soya Bean (3582.26), and Futures prices of Soya Bean (3625.06), standard deviation values are found as Spot prices of Soya bean (414.28), and Futures prices of Soya Bean

(431.27) and Spot prices of Turmeric (7591.65), and Futures prices of Turmeric (7488.00), standard deviation values are found as Spot prices of Turmeric (965.04), and Futures prices of Turmeric (1047.77). When average values of the variables are considered in terms of the data very close to normal distribution as the median values of variables are very close to average values.

Regarding whether series are distributed normally or not, skewness, kurtosis and Jarque-Bera statistics were considered. If kurtosis value of relevant variables is bigger than three, it indicates that series is sharp, if it is smaller than three, it indicates that series is oblate. In consideration of skewness values, if skewness value is equal to zero, it indicates that series has normal distribution, if the skewness value is bigger than zero; it means that series is skew in the positive direction, if skewness value is smaller than zero; it indicates that series is skew in the negative direction.

Following values were found: skewness value of Spot price of Guard Seed (0.64614), kurtosis value (2.2003), Jarque-Bera value (68.4189) and skewness value of price of Guard Seed futures (0.74157), kurtosis value (2.2696), Jarque-Bera value (80.9709). Skewness value of Spot price of Jeera (-0.7245), kurtosis value

(2.2454), Jarque-Bera value (80.076) and skewness value of price of Jeera futures (-0.3666), kurtosis value (2.09939), Jarque-Bera value (40.463). Skewness value of Spot price of Soya Bean (0.66096), kurtosis value (2.9226), Jarque-Bera value (52.604) and skewness value of price of Soya Bean futures (0.413400), kurtosis value (2.7082), Jarque-Bera value (23.0624). Skewness value of Spot price of Turmeric (0.04889), kurtosis value (2.6063), Jarque-Bera value (4.5733) and skewness value of price of Turmeric futures (0.6295), kurtosis value (2.7066), Jarque-Bera value (46.4501). It has been found that Spot and Future price of selected commodities are oblate and except Jeera other three commodities are in the positive direction.

Tables 2 presents the results of the unit root test of augmented Dickey Fuller Test, Phillips-Perron (P-P) Test and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. The variables of Spot and Futures Price of selected five Commodities non-stationary at their level and stationary at first differencing I(1). The results indicate that the null hypothesis of a unit root cannot be accepted for the given variable as none of the ADF value, PP value and KPSS test is smaller than the critical t-value at 5% level of significance.

Table 2: Unit Root Test Results of selected Commodities Gaur Seed, Jeera, Soya bean and Turmeric at NCDEX

Series		ADF unit root test - statistic		Phillips-Perron test		KPSS	
		With intercept	critical values at 5% level = -2.88	With intercept	critical values at 5% level = -2.88	With intercept	critical values at 5% level = -2.88
Daily spot closing price of Gaur Seed	At level	-1.84523	Not Stationary	-1.6612	Not Stationary	2.45267	Not Stationary
	At 1 st	-25.751 (0.000)	Stationary	-26.080	Stationary	0.071782	Stationary
Daily Future closing price of Gaur Seed	At level	-1.85668	Not Stationary	-1.8692	Not Stationary	2.33761	Not Stationary
	At 1 st	-26.237	Stationary	-26.251	Stationary	0.074496	Stationary
Daily spot	At	-1.92021	Not	-1.9140	Not	2.20063	Not

closing price of Jeera	level		Stationary		Stationary		Stationary
	At 1 st	-12.6010	Stationary	-25.731	Stationary	0.20915	Stationary
Daily Future closing price of Jeera	At level	-1.8233	Not Stationary	-1.8259	Not Stationary	1.96220	Not Stationary
	At 1 st	-26.6242	Stationary	-26.624	Stationary	0.08265	Stationary
Daily spot closing price of Soya bean	At level	-1.7623	Not Stationary	-1.7465	Not Stationary	0.06596	Not Stationary
	At 1 st	-26.8374	Stationary	-26.837	Stationary	0.07450	Stationary
Daily Future closing price of Soya bean	At level	-1.8216	Not Stationary	-1.9093	Not Stationary	0.71949	Not Stationary
	At 1 st	-17.8566	Stationary	-23.084	Stationary	0.095801	Stationary
Daily spot closing price of Turmeric	At level	-1.4243	Not Stationary	-1.6204	Not Stationary	0.082061	Not Stationary
	At 1 st	-21.3031	Stationary	-21.795	Stationary	0.29279	Stationary
Daily Future closing price of Turmeric	At level	-1.96248	Not Stationary	-2.1088	Not Stationary	0.58529	Not Stationary
	At 1 st	-23.5276	stationary	-23.528	stationary	0.15906	Stationary

Granger Causality Test

Table 3 shows the results of Pairwise granger causality test between Spot and Futures price of four selected commodities i.e., Guar Seed, Jeera, Soya bean and Turmeric. It is revealed from the test that the F-value of Guar Seed is 16.7546 and the probability value is 8.E-08 (0.08 per cent), which suggests that spot returns granger causes the futures returns at 5 per cent level of significance. The F-value of Jeera Spot is 8.50127 and the probability value is 0.0002 per cent, which also suggests that spot returns granger causes the spot price at 5 per cent level of significance. The F-value of Soya bean 9.22211 and the probability value is 0.0001 per cent, which suggests that spot returns granger causes the futures price at 5 per cent level of significance and the F-value of Turmeric is 4.74626 and the probability value is 0.0090 per cent, which further suggests that spot returns granger causes the Spot price at 5 per cent level of significance. It is also observed that F-statistics value is 1.54623 (Jeera) and 2.71052 (Soya bean) its probability values are 0.2138 and 0.0672 respectively, which indicate that the futures price do not cause the spot price. Therefore spot price leads future price and vice versa.

Table 3: showing the Granger causality test results of selected commodities

Null Hypothesis:	F-Statistic	Prob.	Decision Causality
Future Price of Gaur Seed not Granger Cause Spot Price of Gaur Seed	16.7546	8.E-08	Causality
Spot Price of Gaur Seed not Granger Cause Future Price of Gaur Seed	3.48427	0.0312	Causality

Future Price of Jeera not Granger Cause Spot Price of Jeera	1.54623	0.2138	No Causality
Spot Price of Jeera not Granger Cause Future Price of Jeera	8.50127	0.0002	Causality
Future Price of Soya Bean not Granger Cause Spot Price of Soya Bean	9.22211	0.0001	Causality
Spot Price of Soya Bean not Granger Cause Future Price of Soya Bean	2.71052	0.0672	No Causality
Future Price of Turmeric not Granger Cause Spot Price of Turmeric	0.09565	0.9088	No Causality
Spot Price of Turmeric not Granger Cause Future Price of Turmeric	4.74626	0.0090	Causality

Source: Computed of Data

Table 4 presents the results of Johansen's (1991) maximum likelihood co-integration test results which examines whether the Spot and Futures price of selected commodities are co-integrated. The result shows that first null hypothesis is 'none' which means that there is no co-integration equation among the variables. The value of the trace-statistics is more than critical value we can reject null hypothesis. Here the value of trace statistics of Guar Seed (40.1551), Jeera (22.0177), Soya Bean (27.4024), Turmeric (15.3402) and critical value at 5 per cent is 15.4947. Thus the trace statistics of the selected commodities are more than the critical value that means we can reject the null hypothesis. Here the probability value is very small that is less than

0.05 so the study rejects the null hypothesis of 'none' ($H_0: r=0$). The second null hypothesis is 'atmost 1'. It means that there is one co-integration model. Here the trace statistics of Guar Seed (3.25839), Soya Bean (3.41286), Turmeric (2.44941) and the critical value is 3.84147 which is more than the trace value which means that the study reject the null hypothesis and that there exists one co-integration model. Again the p-value is 0.000 which is less than 0.05 which indicates the rejected the null hypothesis of both 'none' and 'atmost 1'. Thus the selected commodities of the study have long run equilibrium relationship between them.

Table 4: showing the Johnasen cointegration test result (lags interval: 2)

Co-integration between	Hypothesized No. of CE(s)	Eigen Value	Trace Test			Maximum Eigen Value test		
			Test Sta.	P. Value**	Critical value at 5%	Test Sta.	P. Value**	Critical value at 5%
Daily Spot closing and Daily future closing of Gaur Seed	$H_0: r=0$ (None)	0.058951	40.1551	0.0001	15.4947	42.8967	0.0001	14.2646
	$H_1: r \leq 1$ At Most 1	0.004605	3.25839	0.0000	3.84147	3.25839	0.0000	3.84147
Daily Spot closing and Daily future closing of Jeera	$H_0: r=0$ (None)	0.024410	22.0177	0.0001	15.4947	17.6698	0.0001	14.2646
	$H_1: r \leq 1$ At Most 1	0.006063	4.38011	0.0000	3.84147	4.34801	0.0000	3.84147
Daily Spot closing and Daily future closing of Soya Bean	$H_0: r=0$ (None)	0.032995	27.4024	0.0001	15.4947	23.9895	0.0001	14.2646
	$H_1: r \leq 1$ At Most 1	0.04762	3.41286	0.0000	3.84147	3.41286	0.0000	3.84147
Daily Spot	$H_0: r=0$ (None)	0.019284	15.3402	0.0001	15.4947	12.8908	0.0001	14.2646

Data: Computed of Data

Table 9: Diagnostic Testing of VECM model for Turmeric

Wald Test		Df	Probability
Test Statistic	Value	(1658)	0.0000
F-Statistic	22.43034	1	0.0000
Chi-Square	22.43034		
Residual Diagnostics : Breusch-Godfrey Serial Correlation LM Test			
F-Statistic	2.452596	Prob.F(2987)	0.0869
Obs*R-squared	4.928160	Prob.Chi-Square(2)	0.0851
Heteroskedasticity F Test- Breusch-Pagan-Godfrey			
F-Statistic	0.582061	Prob.F(3,459)	0.7448
Obs*R-squared	3.510911	Prob.Chi-Square(3)	0.7425
Scaled explained SS	148.3694	Prob.Chi-Square	0.0000

Data: Computed of Data

CONCLUSIONS:

The future markets of agricultural commodity depends on the transparency and efficiency of its functioning in terms of price risk management, price discovery, flexible contract specification, controlling unfair speculation, commodity delivery system, coverage, infrastructural support, etc. Empirically the study examines the market which reacts first in agricultural commodity markets in India by assessing the relationship between the spot and future prices of Guar Seed, Jeera, Soya bean and Turmeric traded in NCDEX. The techniques used for analysis are panel unit root test which is Augmented Dickey Fuller (ADF) test or Phillips-Perron (PP) test, KPPS Test, Johansen Co-

integration test and Regression Model pertaining to analyzing the relationship between Spot and Future Markets of Price discovery of commodities market. The frequency of data is kept at daily level and time span of the study is between 1st March, 2014 to 31st March 2017. The unit root test clarified that the selected commodities Spot price and Futures prices are stationary at the first differences. Johansen's co-integration test and Vector Error Correction Model (VECM) showed that there is a relation between Spot and Futures prices of the commodities in the long run period. The results of Granger causality test concluded that prices of spot market lead to the prices of futures market and vice versa.

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