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Derivative Market in India – A Comparative Study of Stock Index Future and Cash Segment

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Abstract – After the LPG (liberalization, privatization and globalization) policy in 1991, the Government of India had tried to bring many reforms in the financial sector of Indian market. The prime objectives behind these reforms were to make the Indian capital market up to the international standard, improve profitability, improve the legal scenario of capital market, lesser the unfair trade practices and enhance transparency. Many reforms took place like one-line trading in exchanges, opening stock market to foreign investors etc. Among all these reforms a major reform took place in June 2000 in Indian financial market as, at this time period the derivatives introduced in the Indian financial market at two major stock exchanges i.e. BSE & NSE. Due to introduction of derivatives, the Indian cash market got swayed. Derivative market has shown a Marvelous growth both in terms of volume and number of traded contracts.

The present study attempts to discuss the impact of launch of derivatives on cash market and the correlation between the cash segment and derivative segment. A special focus is given to stock index future because it seems to be more dominant in the derivative market. The data has been analyzed by using regression and correlation. This study concludes that the cash market is dependent on the derivative market and both the markets are highly correlated.

Key Words- Cash Segment, Correlation, Derivative Market, Regression and Stock Index Future.

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INTRODUCTION

Derivatives are said to be very versatile financial instruments among all other kinds of instruments. The derivatives help to manage risks, lesser funding costs, improve yields and diversify portfolios. The derivative market has 'changed the face of finance' in the world. In very short span of time the derivative market had shown a rapid growth which shows that how much derivatives are liked by people or investors or risk avoiders. In less than three decades the derivatives which hardly even existed and look at the present scenario today, the derivatives market has multiplied to several times to its initial size.

In India derivatives introduced on two major stock exchanges i.e. BSE & NSE and when the derivatives introduced in India, the cash market got swayed. Derivatives market has shown a Marvelous growth both in terms of volume and number of traded contracts. The derivatives market turn-over has grown from Rs.40.38 billion in 2000-2001 to Rs.386955.27 billion in 2012-2013. Within a short span of twelve years, derivatives trading in India has beaten cash segment in terms of turnover and number of traded contracts, this simply shows its own rapid growth. Due to the dominance of derivative market in global market, it became an integral part of capital markets in developed as well as in emerging market economies like India. In this study the researchers have made an attempt to know how much the cash market is effected or dependent on the derivative market and does both these markets are correlated if, yes then up to what extent.

REVIEW OF LITERATURE

After analyzing all the reviews including national as well as international we can conclude that derivative market affects or influence the cash market. When we talk about the effect of the introduction of derivative market on stock market volatility, there are two views some of the studies have concluded that the stock market volatility is not affected by introduction of derivative market supported by Shembagaraman (2003) and Rahman (2001) but some of the studies have concluded that the stocks market is experiencing changes in their pattern of volatility after the implementation of derivatives supported by Snehal Bandivadekar and Saurabh Ghosh (2003), T. Mallikarjunappa and Afsal E. M. (2008), P.Gahan, J.K. Mantri, J.K. Parida and P.K.

Sanyal (2011), KoustubhKanti Ray, Ajaya Kumar Panda (2007) and Gregory (1996). Dr. Anand Sharma, Dr. Namita Rajput and Dr. Anurag Agnihotri (2011) have concluded that the derivative market and the cash market are highly correlated.

Riddhi Kapadia (2006), Ashutosh Vashishtha and Satish Kumar (2010), Dr. Shree Bhagwat, Ritesh Omre, Deepak Chand (2012), Dr. (Mrs.) Kamlesh Gakhar, Ms. Meetu (2013), A. Baluch and M. Ariff, (2007) and Vinay Mishra and Harshita Bhatnagar (2013) have concluded that the Indian derivative market has achieved tremendous growth over the years, and also have a long history of trading in various derivatives products and there is a fabulous future prospect of derivative market in India.

NEED/ SCOPE OF THE STUDY

As far as derivative market is concerned, a number of comprehensive studies have been carried out to inspect several issues relating to derivatives. Since the introduction of derivatives in India is a recent phenomenon, there has hardly been any attempt to examine the impact of launch of stock index future on cash segment of Indian stock market. As far as we know, there is no published study, which has examined this issue. Hence, it is essential to conduct a comprehensive study to examine various issues concerning the introduction of index futures in the Indian context.

OBJECTIVES OF THE STUDY

1. To access the impact of launch of stock index future on cash segment of Indian stock market.

2. To analyses the relationship in trading turnover of stock index future and cash segment for selected period.

HYPOTHESIS:

Ho1: There is no impact of launch of stock index future on cash segment of Indian stock market.

Ho2: There is no relationship in trading turnover of stock index future and cash segment for selected period.

RESEARCH METHODOLOGY

❖ **SAMPLING DESIGN:**

➢ Sample size- For attaining the different objectives, the sample size has been taken as follows: cash segment and stock index future of Indian stock market and data has been collected of 12 financial years that is from the financial year 2001-02 to 2012-13.

➢ Sample selection criteria: stock index future has been selected as sample as it is the most dominating index under the derivative segment.

❖ **Statistical design:**

➢ Sources of the data: the data has been collected from the secondary source. Data has been collected from Reserve bank of India's web site.

➢ Processing and analysis of data: regression, correlation, different charts and diagrams have been used to analyze the data.

RESULTS AND ANALYSIS

The data consist of turnover of the cash market and derivative market of 12 financial years that is from the financial year 2001-02 to 2012-13. Data is analyzed using correlation and regression for achieving the first and second objective respectively. To know the relationship in the cash and derivative market pearson's correlation coefficient has been used.

Regression in Cash market of NSE and Derivative market (index future) of NSE Monthly Data Analysis

Year	R Square	Year	R Square
2001-02	0.093139	2007-08	0.63132
2002-03	0.057295	2008-09	0.550864
2003-04	0.821465	2009-10	0.236953
2004-05	0.454815	2010-11	0.077484
2005-06	0.511557	2011-12	0.021068
2006-07	0.230138	2012-13	0.181982

On seeing the above table it can be clearly analysed that in each and every year there is some dependency of cash market on derivative market whether it's more or less but dependency exists. In 2002-03, 2010-11 and 2011-12 the degree of dependency of cash market on derivative market is very less (below 10%). This shows that the cash market is less dependent on derivative market but in rest of the years the degree of dependency is very high which shows that the cash market is highly dependent on derivative market.

Annual Data Analysis

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.962796429
R Square	0.926976964
Adjusted R Square	0.919674661
Standard Error	3478.219811
Observations	12

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	5453.7242	1780.061153	3.06378	0.011967	1487.5008	9419.9476
X Variable 1	0.72974619	0.064769017	11.2669	5.27E-07	0.5854318	0.87406055

Interpretation

When we analyse the overall value of R Square (from 2001-02 to 2012-13) between cash market of NSE and derivative market of NSE, we find that the value of R Square is 0.926977 which shows the degree of dependency is 0.926977. Mean in this period the derivative market 92.70% influenced the cash market which shows very high level of dependency of cash market of NSE on derivative market of NSE.

P-value: When we analyse the overall p-value (from 2001-02 to 2012-13), we find that the p-value is 0.011967 means we can reject the null hypothesis and accept the alternate hypothesis.

Regression in Cash market of BSE and Derivative market (index future) of BSE Monthly Data Analysis

Year	R Square	Year	R Square
2001-02	0.230903	2007-08	0.704727
2002-03	0.090341	2008-09	0.446159
2003-04	0.609212	2009-10	0.001155
2004-05	0.032869	2010-11	0.275429
2005-06	0.563933	2011-12	0.016694
2006-07	0.186481	2012-13	0.178788

On seeing the above table it can be clearly analysed that in each and every year there is some dependency of cash market on derivative market whether it's more or less but dependency exists. In 2002-03, 2004-05, 2009-10 and 2011-12 the degree of dependency of cash market on derivative market is very less (below 10%). This shows that the cash market is less dependent on derivative market but in rest of the years the degree of dependency is moderate which shows that the cash market is dependent on derivative market.

Annual Data Analysis

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.335336498
R Square	0.112450567
Adjusted R Square	0.023695624
Standard Error	4077.613292
Observations	12

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	7273.562733	1417.074545	5.132802	0.000442	4116.1239	10431.002
X Variable 1	1.704973108	1.514722178	1.125601	0.286623	-1.670038	5.0799844

Interpretation

When we analyse the overall value of R Square (from 2001-02 to 2012-13) between cash market of BSE and derivative market of BSE, we find that the value of R Square is 0.112451 which shows the degree of dependency is 0.112451. Means the derivative market 11.24% influenced the cash market which shows medium level of dependency of cash market of BSE on derivative market of BSE.

P-value: When we analyse the overall p-value (from 2001-02 to 2012-13), we find that the p-value is 0.000442 means we can reject the null hypothesis and accept the alternate hypothesis.

Regression in Cash market of BSE & NSE and Derivative market (index future) of BSE & NSE Monthly Data Analysis

Year	R Square	Year	R Square
2001-02	0.031287	2007-08	0.632237
2002-03	0.011621	2008-09	0.550216
2003-04	0.851179	2009-10	0.220256
2004-05	0.559636	2010-11	0.024149
2005-06	0.494841	2011-12	0.045024
2006-07	0.199894	2012-13	0.228293

On seeing the above table it can be clearly analysed that in each and every year there is some dependency of cash market on derivative market whether it's more or less but dependency exists. In 2001-02, 2002-03, 2010-11 and 2011-12 the degree of dependency of cash market on derivative market is very less (below 10%). This shows that the cash market is less dependent on derivative market but in rest of the years the degree of dependency is very high which shows that the cash market is highly dependent on derivative market.

Annual Data Analysis

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.956257551
R Square	0.914428505
Adjusted R Square	0.905871355
Standard Error	4885.536615
Observations	12

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	8825.056141	2500.993938	3.52862	0.005459	3252.494404	14397.6179
X Variable1	0.919722428	0.088970588	10.33738	1.17E-06	0.721483606	1.11796125

Interpretation

When we analyses the overall value of R Square (from 2001-02 to 2012-13) between cash market and derivative market, we find that the value of R Square is 0.914429 which shows the degree of dependency is 0.914429. Means the derivative market 19.99% influenced the cash market which shows very high level of dependency of cash market on derivative market.

P-value: When we analyses the overall p-value (from 2001-02 to 2012-13), we find that the p-value is 0.005459 means we can reject the null hypothesis and accept the alternate hypothesis.

Correlation between Cash market of NSE and Derivative market (index future) of NSE

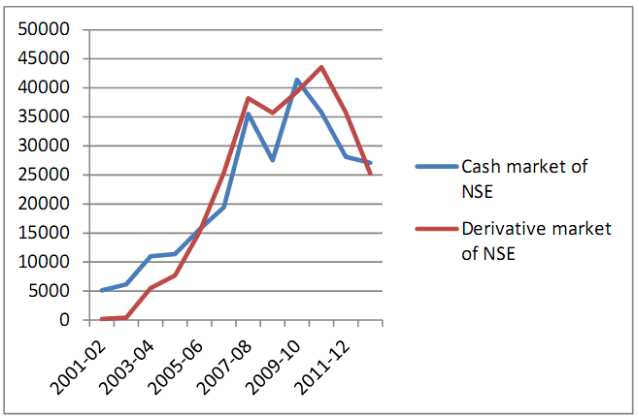
Monthly Data Analysis

Year	Correlation	Degree of Correlation
2001-02	0.305187	moderate positive relationship
2002-03	0.239364	weak positive relationship
2003-04	0.906347	very strong positive relationship
2004-05	0.6744	strong positive relationship
2005-06	0.715232	very strong positive relationship
2006-07	0.479727	strong positive relationship
2007-08	0.794557	very strong positive relationship
2008-09	0.742202	very strong positive relationship
2009-10	0.486778	strong positive relationship
2010-11	0.27836	weak positive relationship
2011-12	0.145147	no or negligible relationship
2012-13	0.426594	strong positive relationship

On seeing the above table, it can be clearly analysed that the degree of correlation may varied but both the segments are correlated with each other. In some years the correlation is high and in some years the correlation is very low like in 2011-12 the correlation is negligible and in 2002-03, 2010-11 the correlation is weak and in 2001-02 the correlation is moderate and in rest of the years the correlation between the cash market and derivative market is high. Every year the correlation is positive which shows that both segment moves in the same direction.

Annual Data Analysis

Karl Pearson's coefficient of correlation(r) = 0.962796



Interpretation- when we analyse the overall relationship (from 2001-02 to 2012-13) between cash market of NSE and derivative market of NSE, we find that the Karl Pearson's coefficient of correlation is 0.962796 which shows that there is a very strong positive relationship between cash market of NSE and

derivative market of NSE. Means the derivative market and the cash market are 96.27% correlated which shows that if, the derivative market moves it will influence the cash market or vice versa. Every year the correlation is positive which shows that both segment moves in the same direction.

Monthly Data Analysis

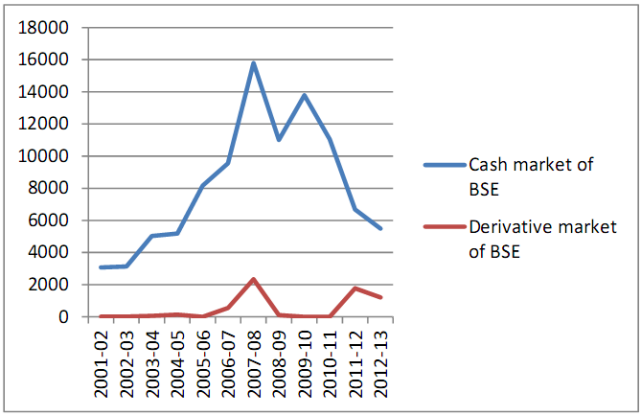
Correlation between Cash market of BSE and Derivative market (index future) of BSE

Year	Correlation	Degree of Correlation
2001-02	0.480524587	strong positive relationship
2002-03	0.300569	moderate positive relationship
2003-04	0.780521	very strong positive relationship
2004-05	0.181298	no or negligible relationship
2005-06	0.750955	very strong positive relationship
2006-07	0.431835	strong positive relationship
2007-08	0.83948	very strong positive relationship
2008-09	0.667951	strong positive relationship
2009-10	0.033992	no or negligible relationship
2010-11	0.524813	strong positive relationship
2011-12	0.129206	no or negligible relationship
2012-13	0.422833	strong positive relationship

On seeing the above table it can be clearly analysed that cash market and derivative market are correlated with each other, the degree of correlation may varied but both the segment are correlated with each other. In some years the correlation is high and in some years the correlation is very low like in 2004-05, 2009-10, 2011-12 the correlation is negligible and in 2002-03 the correlation is moderate and in rest of the years the correlation between the cash market and derivative market is high. Every year the correlation is positive which shows that both segment moves in the same direction. The overall correlation shows the moderate positive relationship between the cash market and derivative market.

Annual Data Analysis

Karl Pearson's coefficient of correlation(r) = 0.335337



Interpretation- when we analyse the overall relationship (from 2001-02 to 2012-13) between cash market of BSE and derivative market of BSE, we find that the Karl Pearson's coefficient of correlation is 0.335337 which shows that there is a moderate positive relationship between cash market of BSE and derivative market of BSE. Means the derivative market and the cash market are 33.53% correlated which shows that if, the derivative market moves it will influence the cash market or vice versa. Here the correlation is positive which shows that both segment moves in the same direction.

Monthly Data Analysis

Correlation between Cash market of BSE & NSE and Derivative market (index future) of BSE & NSE

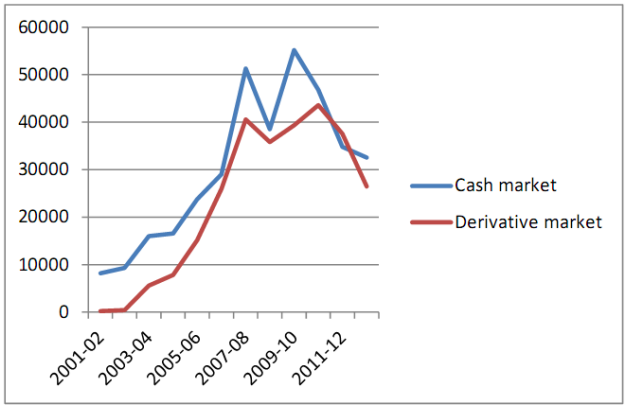
Year	Correlation	Degree of Correlation
2001-02	0.17688	no or negligible relationship
2002-03	0.107799	no or negligible relationship
2003-04	0.922594	very strong positive relationship
2004-05	0.748088	very strong positive relationship
2005-06	0.703449	very strong positive relationship
2006-07	0.447095	strong positive relationship
2007-08	0.795133	very strong positive relationship
2008-09	0.741765	very strong positive relationship
2009-10	0.469314	strong positive relationship
2010-11	0.1554	no or negligible relationship
2011-12	0.212188	weak positive relationship
2012-13	0.4778	strong positive relationship

On seeing the above table it can be clearly analysed that cash market and derivative market are correlated

with each other, the degree of correlation may varied but both the segment are correlated with each other. In some years the correlation is high and in some years the correlation is very low like in 2001-02, 2002-03, 2010-11 the correlation is negligible and in 2011-12 the correlation is weak and in rest of the years the correlation between the cash market and derivative market is high. Every year the correlation is positive which shows that both segment moves in the same direction. The overall correlation shows the very strong positive relationship between the cash market and derivative market.

Annual Data Analysis

Karl Pearson's coefficient of correlation(r) = 0.956258



Interpretation- when we analyse the overall relationship (from 2001-02 to 2012-13) between cash market and derivative market, we find that the Karl Pearson's coefficient of correlation is 0.956258 which shows that there is a very strong positive relationship between cash market and derivative market. Means the derivative market and the cash market are 95% correlated which shows that if, the derivative market moves it will influence the cash market or vice versa. Here the correlation is positive which shows that both segment i.e. cash market and derivative market moves in the same direction.

Hypothesis testing

- Ho1 there is no impact of launch of stock index future on cash segment of Indian stock market.

Regression	R-Square	P-value	Hypothesis testing
Regression in Cash market of NSE and Derivative market (index future) of NSE	0.926977	0.011967	Ho1 has been rejected as the P-value is 0.011967 (less than 0.05) at 95% level of Significance and the alternate hypothesis will be accepted.
Regression in Cash market of BSE and Derivative market (index future) of BSE	0.112451	0.000442	Ho1 has been rejected as the P-value is 0.000442 (less than 0.05) at 95% level of Significance and the alternate hypothesis will be accepted.
Regression in Cash market of BSE & NSE and Derivative market (index future) of BSE & NSE	0.914429	0.005459	Ho1 has been rejected as the P-value is 0.005459 (less than 0.05) at 95% level of Significance and the alternate hypothesis will be accepted.

- Ho2 there is no relationship in trading turnover of stock index future and cash segment for selected period.

Correlation	Value of R	Hypothesis testing
Correlation between Cash market of NSE and Derivative market (index future) of NSE	0.962796	The Ho1 has been rejected as the Cash market of NSE is 96.27% correlated with Derivative market (index future) of NSE and the alternate hypothesis will be accepted.
Correlation between Cash market of BSE and Derivative market (index future) of BSE	0.335337	The Ho1 has been rejected as the Cash market of BSE is 33.53% correlated with Derivative market (index future) of BSE and the alternate hypothesis will be accepted.
Correlation between Cash market of BSE & NSE and Derivative market (index future) of BSE & NSE	0.956258	The Ho1 has been rejected as the Cash market of BSE & NSE is 95.62% correlated with Derivative market (index future) of BSE & NSE and the alternate hypothesis will be accepted.

CONCLUSION

The Derivative market has shown rapid growth all over the world as well as in India but due to its speculative nature derivative market has been highly criticized specially during the recent global recession period. Derivative market is effecting the cash market undoubtedly but derivative market solely is not affecting the cash market rather up to a large extent it is effecting the cash market. The derivative market of NSE has more impact on cash market in comparison to derivative market of BSE as the derivative market of NSE has 92.26% impact on cash market, whereas derivative market of BSE has 11.24% impact on cash market, which shows that the derivative market of NSE more influence the cash market than the derivative market of BSE. The cash market of NSE is more correlated with the derivative market (stock index future) than the cash market of BSE as the correlation between cash market of NSE and derivative market (stock index future) is 96.27%, whereas the correlation between cash market of BSE and derivative market (stock index future) is just 33.53% which shows that the cash market of NSE is more correlated with the derivative market (stock index future) than the cash market of BSE.

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