



A Study on Monsoon Risk and Volatility in Indian Stock Market

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ABSTRACT:

The Indian economy and monsoon are interrelated and the impact of monsoon on Indian economy is most considerable factor. The agriculture sector is most effectible sector from monsoon fluctuation year by year. But what is the actually, monsoons effect on the stock markets, will be interesting to know the negative correlation between the two. In the last one decade, there is hardly enough correlation to suggest that monsoon can have much bearing on the market sentiments. In fact, as per the data, the BSE-Sensex returns were the highest in the year when rainfall was most deficient with regards to long period average (LPA). However, it is part psychological and part actual. Monsoon seems to be the only respite that Indian companies can look forward to after two continuous bad monsoon years. Falling rupee, high monetary deficit, flight of overseas funds and poor income, these were the handiest topics inside the India tale for plenty quarters now. However, a very good monsoon might deliver right tidings, at the least for a few businesses.

Keywords- Monsoon, Risk and Volatility, Stock Market.

INTRODUCTION

Our country has a different climate relatively marked by high temperature and dry winters. Commonly it has three seasons: summer, monsoon season and winter season. Where, the hot season is from March to May, wet season is from June to October, and the winter season is from November to February. Northern India remains dry, dusty, and unpleasant during the summer months. The nature of monsoon, which lies between mid-July and September, is erratic where some areas experience heavy rains the others experience drought and still others get

flooded Due to its geographical position and the climatic conditions, India witnesses different climatic seasons in a year commonly known as – winter, summer and Monsoon.

The best efforts of many highly trained economists and market specialists, there is no widespread consensus about how, or even if, weather affects the performance of the stock market. Ultimately it's an interesting question, but one that financial economics isn't really equipped to answer Indian Monsoon and its impact on the share market. Indian Meteorological Department has predicted "deficient" monsoon and revised its forecast from 93% to 88% for year i.e. 2015-16, triggering fears of bad harvest and food price inflation. Indian Monsoon, which brings rainfall for 4 months in a year i.e. June to September, is most important for a Developing Indian Economy and its Stock market... The agriculture sector is the backbone of the Indian economy and thus, monsoon should be considered as the backbone of Indian Economy as any changes in monsoon effects our Indian economy. 50-60% of India's Population still depends on Agricultural sectors for their daily living. Agriculture sector is again dependent on India Monsoon as 75% of Indian Land gets water through Rains. The production of food grains depends on the amount and distribution of monsoon rainfall over the country.

MONSOON (RAINY)

A monsoon is a seasonal shift in the prevailing wind direction that usually brings with it a different kind of weather. It almost always refers to the Asian monsoon, a large region extending from India to Southeast Asia where monsoon conditions prevail. During the winter monsoon, a persistent and large high pressure zone over Asia drives cool, dry air southward toward the tropics. This provides the monsoon region with its dry season. Then during May and June of each year, the summer monsoon arrives with persistent southerly wind flow driven by a warm air mass with low pressure at the surface that forms over southern Asia as it is warmed by the sun. Air from the relatively higher pressure air mass over the Indian and tropical western Pacific Ocean flows northward toward the low pressure over land, bring with it torrential rains. A late arrival of the monsoon can be bad for agriculture, as the monsoon rains are necessary for summer crops.

During the months of June, July, August and September India gets major part of its share of rain. Rain starts from Andaman-Nicobar then Kerala and advances to almost all parts of the country. In the month of September this monsoon after drenching all of India, begins to retreat, called as Retreating Monsoon. Rainfall begins to decrease and up to November, the monsoon completely goes from major part of India, except for Tamil Nadu and some other southern states

INDIAN STOCK MARKETS

The stock market refers to the collection of markets and exchanges where the issuing and trading of equities (stocks of publicly held companies), bonds and other sorts of securities takes place, either through formal exchanges or over-the-counter markets. Also known as the equity market, the stock market is one of the most vital components of a free-market economy, as it provides companies with access to capital in exchange for giving investors a slice of ownership

According to the Securities and Exchange Board of India there are 21 stock exchanges in operation in India. The BSE and NSE are the largest Indian exchanges, satisfying the needs of nearly all foreign investors. Most of the trading in the Indian stock market takes place on its two stock exchanges: the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). The BSE has been in existence since 1875. The NSE, on the other hand, was founded in 1992 and started trading in 1994. However, both exchanges follow the same trading mechanism, trading hours, settlement process, etc. At the last count, the BSE had about 4,700 listed firms,

whereas the rival NSE had about 1,200. Out of all the listed firms on the BSE, only about 500 firms constitute more than 90% of its market capitalization; the rest of the crowd consists of highly illiquid shares

VOLATILITY

Volatility represents risk and is a great concern for anyone who is dealing with money or investing in the stock market or any other financial instruments. So, the issues of volatility have become increasingly important in recent times to financial practitioners, market participants, retail investors, regulators and researchers. Various factors which cause volatility in stock prices are weather and monsoon, rising interest rates, high inflation fuelled by firm global crude oil prices, slowdown in the economy and in corporate earnings, fluctuations in currency markets, sluggish pace of economic reforms, political instability, crash in assets prices across the board, political tension and possible terrorist attacks.

SEASONALITY EFFECT

The Seasonality Effect is better known as the Calendar Effect. The Seasonality Effect includes a number of patterns dealing with the issue of time and it is one of the main patterns of the securities market efficiency anomalies. The Seasonality patterns in stock yields are a subject that can be closely related to Weak-Form-of Market-Efficiency. When Weak-Form-Efficiency is studied, the applicable information detail is limited to previous stock prices. But the seasonal patterns in stock yields, as a relentless phenomenon, implies that the investors have diverse rates of returns necessary on risky assets, relying on which Month of the Calendar, a month based investment is made. Investors can try to specify an assured period of time and calendar or a set of time, to test the particular phenomenon about the stock yields and then notice if any rules one can be followed or any speculation opportunity can be created. Calendar Effects include: January Effect, the Day of the Week Effect, the Month of the Year Effect, Semi-Month Effect, Holiday Effect, Monday Effect, Weekend Effect, and Turn of the Year Effect etc.

Except some irrigated pockets, 65% of Indian agricultural land is rain-fed. Irregular and inadequate rainfall affects the agricultural production massively. The inevitable consequence is agro-inflation and subsequent price rise of some agro-based manufacturing items. Such situation also brings the farmers to an economic distress situation cutting their purchasing power to a great extent. If the general inflation rises alongside, public spending, investment and the foreign exchange reserve are badly affected. In short, a poor rainfall has a spiral effect on the entire market since 70% of our economy, directly or indirectly, is agriculture dependent. Naturally, the stock markets are going to show their reactions. Investors look forward to the news from the Indian Meteorological Department (IMD). If the prediction is not favorable, the stocks, particularly of companies having a large rural customer base, perform badly.

OBJECTIVES OF THE STUDY

- i) To analyse the monsoon effect in Indian stock market.
- ii) To identify impact of monsoon risk and volatility in Indian stock exchanges
- iii) To examine historical movements in Indian stock market

METHODOLOGY

This study is based on secondary data. The collected from various secondary sources and collected data was analysed by using statistical measures.

LITERATURE REVIEW

This section discusses the previous researches related to weather effect on stock return and volatility.

Mrunal Chetanbhai Joshi(2013), Factors Affecting Indian Stock Market : According to the study, the movement in the Indian stock market is mostly caused by factors at the global level, including the flow of foreign institutional investors, political stability, growth in the gross domestic product, inflation, weather, liquidity, and various interest rates.

Suleyman., Kahyaoglu, and Odabas, The Effect of weather on investor behaviour(2014): attempts to analyse weather effect on the investment behaviors of individual investors trading in BIST (Borsa Istanbul) from the years 2009 to 2011 period. They discovered the extent of cloudiness and temperature having affect at the investor behaviors, and the number of sunny days, the wide variety of overcast days, and sunshine period has no impact on investor behaviors.

Sameer Yadav , Stock Market Volatility (2017): presents a review of Indian Capital Market & its structure. The findings also indicate that recent stock market cycles have slowed down. Both the bull and bear phases of the stock market cycle have shown a decrease in volatility in the post-liberalization period. It also states volatility estimate is crucial for a number of factors involving various market participants. Developed markets have maintained their long-term supply with higher returns and less volatility.

Aman Bajaj, Natchimuthu N, Lavanya Mary, Calendar Anomalies in the Indian Stock Markets: Monsoon Effect (2019): This study uses the EGARCH model to determine whether the monsoon effect exists in the Indian stock market and examines its effects on the volatility of returns for the chosen indices during the monsoon season. For the study, four stock market indices were chosen to represent various stock combinations in the market. According to the study, the Indian stock market experiences a monsoon effect.

Chinnadurai Kathiravan, Murugesan Selvam, Balasundram Maniam & Munusamy Dharani, Effect of weather on stock market (2021): The study provides a thorough analysis of the published research on the topic of weather effect and stock market behavior. This is the first research project to review previous studies on the relationship between weather and the stock market. The study opens up the possibility for additional investigation and future guidance in the area of weather impact on stock returns. The primary goal of the study was to draw researchers' attention to the topics of weather influences and stock market movement, which are not already covered in the debate of mainstream research. As a result, an effort has been made in this study to analyse prior research projects in the field of meteorological conditions and the stock market.

INTERPRETATION

Monsoon and Growth of Indian Stock Markets

When India receives insufficient rainfall in a year, then it leads to crop failure. It also leads to a situation where sowing gets delayed, which in turn affects the production of important crops, such as pulses, rice, cotton, and oil seeds. So, when the output of such crops 'production remains lower than the normal amount, because of less rainfall, and then it hits the GDP of the country. In fact, deficient in rainfall also affects the production of soybeans, millet, sugarcane, etc. When the GDP gets affected then it creates a sense of 'lack of confidence' among the investors in the market. This is how the stock market gets affected.

In the present day Indian economy is going through a tough phase, hence a lot depends upon a good monsoon season. Annual rainfall is very important for the farm outputs because more than 55% of the cultivable land depend on the monsoon rainfall. About 15 percent of the Indian economy is based on the farm sector products; good rainfall ensures high production of the farm products which accelerates the economic growth of developing country like India. Last year's rainfall has been 23 percent less than the average rainfall and it is having an adverse effect on the country's economy. Due to less rainfall last years there are a delay in coming of the summer crops such as rice, oilseeds, pulses and cereals. These crops play a very important role in the growth of the economy. Agricultural land, sustain about 55 percent of the population, thus rainfall becomes a very necessary factor for the flourishing of the agricultural lands in India among the investors in the market. This is how the NSE stock market gets affected

70% of India's Population Directly Depends on Agriculture. Each and every one in India looks forward to the monsoon season every year. The Production of crops and grains gets a boost when rainfall is normal. Better Monsoon results in Bumper Crop which reduces prices of vegetables, cereals and essential commodities. Monsoon boosts Hydro Electric industries and improves the power situation in the Economy. The country's economy improves as GDP Gross Domestic Products increases due of a good monsoon. Drought leads to poor income and burden on the government coffers due subsidies for the poor, but a good rainfall brings a boost to the economy resulting in Growth of Economy, which brings positive trend in share market. Monsoon is a key to determine agricultural output, inflation, consumer spending and overall economic growth in Indian Economy and Share market.

NSE Stock Market is a Barometer of Indian economy; Since Majority of Indian Economy Depends on Monsoon, Stock market trend can change depending on Changes in Monsoon Season.

Impact

Better Monsoon--> Better Crops --> Better Agriculture --> Increase in disposable income --> Better sales for manufacturing and services companies --> Higher Profitability -->Higher Dividends/Higher stock prices --> Better economic performance

Monsoon and Main players in Stock Market

Good monsoon will improve the rural demand for products, increasing the purchasing power and companies like HUL, Dabur, Godrej Consumer, and ITC will benefit a lot. Two wheeler and low cost cars, tractors demand also will be helpful for M&M, Escorts, Eicher, Maruti, Bajaj Auto. High farm production will also lower raw material costs for companies that make packaged foods, for instance, Britannia, GSK Consumer, ITC and Nestle.

Data show a close link between rains and fortunes of FMCG companies. For instance, in 2009-10, the average rainfall was 22% below the LPA. HUL's sales fell 13% during the year. In 2007-08, rainfall was 6% above the LPA. As a result, HUL's sales rose 17.6%. Similarly, normal rainfall helped HUL grow sales by 12.1% in 2011-12.

Fertilizer and Irrigation companies like Chambal, RCF, and Jain Irrigation etc. will get a direct boost due to better rainfall. Once the rains support in a better agricultural output, the windfall gains will be witnessed automatically in the manufacturing and services sector.

Impact of Monsoon on NSE stocks

There are many companies that study the impact the monsoon has on the NSE stock market every year. It is important to mention that Agriculture is the main strength of India's economy. The performance of agriculture certainly matters in determining how healthy the stock market would be. For this reason, if the monsoon turns out to be below expectations, then it certainly hits the economy of India in a negative way. As a result, it also affects the health of NSE Stock Market

But, why agriculture is such a vital aspect of India's economy. Like we know, India's major population still relies on the agricultural sector when it comes to earn their living. From farmers to pesticide sellers, there are many ways in which people are associated to the agricultural sector in India. Hence, when India receives less rainfall in a year then it obviously affects the production of food grains. The distribution of seasonal rainfall across India really matters in this regard, because 75 percent of water requirement is met through rain water

There are many companies and industries that are directly or indirectly related to the agricultural sector, such as pesticides, edible oil, jute, etc. So, when their performance remains on the low side, investors hesitate to invest their money on such companies' stocks. One more factor that affects the GDP of India in a positive way is the gain of foreign currency.

When food items like pulses are produced in surplus amount then Indian government exports the surplus amount to other nations. In this way, our country earns foreign currency. This factor also affects the performance of the NSE stock market in a positive way. So, those were some of the reasons that explain why monsoon is related to the health of NSE stock exchange in India.

Stock Market Reaction to the Monsoon

We can make out the Impact of Monsoon on Indian stock market by seen the monsoon data since the year 2000 to get correct picture of it. It was observed that monsoon was just 10% below the long term average. The Two of the biggest falls were observed in the year 2009 with Shortage of the rains fall by 21.8 percent, followed by the year 2002 when monsoon fell short by 19.2 percent. In the year 2004, 2012 and 2014 the rainfall was short by around 13 percent. In order to check the Impact on the market, we divided the year in two parts. The first group is between April and September and the second group falls between October and March. The logic behind doing is that because by April early predictions start coming in on monsoon expectation and budget impact fizzles out in a month. Similarly by October monsoon impact is clear and the corporate and industry numbers start showing the impact the poor monsoon had on the economy

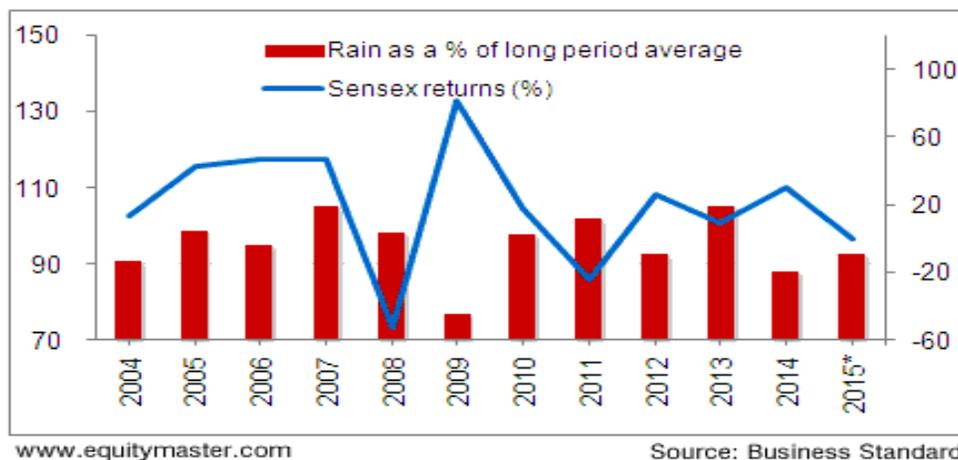
Sensex returns during poor monsoon years

Year	April To September	October To March
2002	6.81	61.87
2004	8.95	30.64
2009	1.35	15.86
2012	-0.16	9.15
2014	1.02	-5.99

Table No 1

The biggest shock in the data is in the year 2009, which saw the biggest drop in monsoon but the markets blast up by 76.41 percent in the first half. Second half was flattish as food grain production touched 218.11 million tonnes as compare to 234.47 million tonnes in 2008.

If we consider the last decade, it is hard to find any strong correlation between monsoon and stock market performances. On the basis of the long-term average, The BSE Sensex shows the highest returns in the worst monsoon years. Even Nifty has generated positive returns mainly during the poor rainfall spells



www.equitymaster.com

Source: Business Standard

Source: equitymasters.com

Chart No 1

- Despite the moderate rainfall, there was a huge drop in 2008 due mainly to global economic crisis.
- The positive movement of 2009 was not at all related to monsoon rather to the recovery initiatives from the last fall.
- In 2014, India experienced weak monsoon and heavy drought in most parts of the nation. Still, the stock markets were not much affected, evidently due to the Modi enthusiasm

As per an article in Business Standard, in the last one decade, there is hardly enough correlation to suggest that monsoon can have much bearing on the market sentiments. In fact, as per the data, the BSE-Sensex returns were the highest in the year when the rainfall was most deficient with regards to long period average.

However, it is part psychological and part actual. Monsoon seems to be the only respite that Indian companies can look forward to this year, after two continuous bad monsoon years. Falling rupee, high fiscal deficit, flight of foreign funds and poor earnings, these have been the only themes in the India story for many quarters now. However, a good monsoon might bring good tidings, at least for some companies.

Correlation

- **Correlation-Rainfall and Sensex**

Year	% change in Rain fall	% change in Sensex
2012	-9	+26
2013	+13	+9
2014	-18	+29
2015	+5	-5

Source:www.bseindia.com, IMD

N	Rain fall -x	Sensex -y	x*y	X ²	Y ²
1	-9	+26	-234	81	-234
2	+13	+9	117	169	117
3	-18	+29	-522	324	522
4	+5	-5	-25	25	25
Total	-9	59	599	1623	-664

$$\text{Correlation} = r = -.80$$

The correlation shows -.80. so we can interpret that increment in monsoon will affect the stock market. Because the correlation shows the negative value, it means the values are related in opposite manner.

- **Correlation-Rainfall and Sensex**

Year	% change in Rain fall	% change in Nifty 50
2012	-9	+27
2013	+13	+3
2014	-18	+35
2015	+5	-4

Source:www.nseindia.com,IMD

N	Rain fall -x	Nifty 50-y	x*y	X ²	Y ²
1	-9	27	-243	81	729
2	+13	3	39	169	39
3	-18	35	-630	324	1225
4	+5	-4	-20	25	16
Total	-9	61	-854	549	1979

$$\text{Correlation} = r = -1.02$$

The correlation between rainfall and nifty shows -1.02. The fluctuations in monsoon have impact on NSE nifty in an opposite direction.

Reasons for lesser Monsoon Impact on Indian Stock Market

The main reason behind lesser impact of monsoon impact on stocks is falling contribution of agriculture to GDP. Contribution of the sector to GDP has fallen from 25 percent to 18 percent. The dependence on rains for agriculture is reflecting in the lesser drop in food grain production. The Better irrigation, shifting to crops requiring less water, adoption of technology and contributed in reduce the impact of monsoon.

FINDINGS

- Monsoon one of the important factor which directly affects the stock market in positive and negative manner.
- Annual rainfall is very important for the farm outputs because more than 55% of the cultivable land depend on the monsoon rainfall. So the industries listed in stock exchanges especially agro-industries, food and beverage industries etc. depends too much on this
- The proportion and changes in monsoon are one of the reasons for changes in investing perceptions of investors.
- Better monsoon lead to better crops and good raw material to industries and improve movement in stock market
- NSE and BSE Stock Market is a Barometer of Indian economy Since Majority of Indian Economy Depends on Monsoon
- Risk and volatility will always depend on monsoon. Previous year rainfall changes will affect next year investing activities of investors
- From 2012 to 2015 the Sensex and rainfall data shows a negative correlation. So its movement also in an opposite manner.
- From 2012 to 2015 the BSE and rainfall data shows a negative correlation. So its movement also in an opposite manner.
- If any reason is there behind reduction in impact of rainfall changes to stock market risk, that is reducing contribution of agricultural sector to GDP

SUGGESTIONS

- India's economy is mostly supported by its agricultural sector. The performance of agriculture certainly matters in determining how healthy the stock market would be.
- India's economy will undoubtedly suffer if the monsoon turns out to be less than anticipated.
- Crop losses caused by insufficient or excessive rainfall affect farmer incomes and reduce rural demand and sales.

CONCLUSION

In the study we have tried to observe the presence of ‘monsoon effect’ in Indian equity market. Monsoon is one of the considerable factors, when we taking into account of risk and volatility of stock markets in India. Investor’s psychological aspects on monsoon prediction also matters along with actual impact of monsoon. It is very difficult to correlate the rainfall and stock market index because the fluctuations in some years are not so interrelated but the impact of monsoon cannot be denied. The contribution of agriculture to the GDP also dramatically decreasing, it is also one of the main reason to reduce the impact monsoon to stock markets. Even if Stock markets not shown any fluctuation because of monsoon changes, definitely some individual stocks listed in stock markets, mainly whose turnover directly dealt with rural area, will be affected from monsoon. However, other developments on the global and national front either amplify or offset the monsoon’s effect on market performance.

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