

# **Project Dissertation**

## **A Study on Inter-linkage between Policy Announcements and Stock Market Fluctuations**

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## **CERTIFICATE FROM THE INSTITUTE**

This is to certify that the Project Report titled **A study on Inter-linkage between Policy Announcements and Stock Market Fluctuations**, is a bonafide work carried out by **Mr. Divij Mangal** of MBA 2013-15 and submitted to Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 in partial fulfillment of the requirement for the award of the Degree of Masters of Business Administration.

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## **DECLARATION**

I **Divij Mangal**, student of MBA 2013-15 of Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 declare that Dissertation Report on **A study on Inter-linkage between Policy Announcements and Stock Market Fluctuations** submitted in partial fulfillment of Degree of Masters of Business Administration is the original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge.

This Report is not being submitted to any other University for award of any other Degree, Diploma and Fellowship.

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## **EXECUTIVE SUMMARY**

This project attempts to study the impact that various announcements and events related to the political and legal environments in India, have on the stock markets of the country. The study is carried out by identifying various major events spread across the two government rules and covering two General elections of India (2009 and 2014).

The time period before and after the occurrence of these events is divided into various groups of three days each. Stock market return variances are then compared across these periods to check if any pre/post relationships exist between the occurrence of these events and equity market.

We found that budgetary and political considerations have an impact on stock markets. Also, stock markets do show cases of predicting political and legal events before their occurrence.

MACD analysis also helped us to understand probable causes for the observed volatility caused in markets by these events.



# **1. INTRODUCTION**

## **1.1 Equity Markets**

A financial market is defined as a market that brings sellers and buyers to a common platform to trade in financial assets. These financial assets take various forms such as bonds, derivatives, currencies, commodities and stocks. Financial market is helps in price discovery, lending and borrowing of capital and for transfer of risk among different parties. These financial markets can take many forms. But at a broad level they can be classified into two major types: money markets and capital markets.

Money markets involve assets of short duration with assets with duration of typically less than a week. Conversely, capital markets involve assets that typically have duration of more than a year and hence are long term in nature. Capital markets can further be subdivided into the equity and the debt markets. The capital and money markets together form a major chunk of the financial markets in existence today. Various companies, institutions, governments, individuals etc. utilize both the markets in good measure in order to meet their financial requirements.

The stock market is defined as a financial market for trading in shares of publicly traded companies through various exchanges. The stock market or equity market plays a vital role in a free-market economy by bringing together capital surplus and capital deficit parties together. This helps companies in need of capital for various financial purposes, raise the same from parties in search of good investment avenues.

India's Stock Market is one of the oldest in Asia. The East India Company carried out trade in loan securities as early as the 18<sup>th</sup> century. Following this, a group of informal brokers in Mumbai formed the Bombay Stock exchange in 1875. The Indian government, 1956 recognized it as the first stock exchange in India under the Securities Contracts (Regulation) Act. In 1986, the exchange came up with a measure to quantify its overall performance. This indicator was called the BSE Sensex, short for the 'sensitive index'. This is essentially an index of the top 30 companies of the exchange.

The first electronically traded Stock Exchange in India, NSE (National Stock Exchange) was established in November 1992. Today the NSE has become the largest stock exchange of India.

Though BSE also automated its systems in 1995 but it was never able to catch up with NSE's Spot Market turnover. The Three segments of the NSE trading platform established were

1. The Wholesale Debt Market (WDM), commenced operations in June 1994
2. The Capital Market (CM) segment, opened at the end of 1994.
3. The Futures and Options segment began operating in 2000.

Today the NSE stands at the the 14th position in the top 40 futures exchanges of the world. In 1996, the National Stock Exchange of India launched S&P CNX Nifty. CNX Nifty (Nifty = National Fifty) is a diversification of 50 stocks from 25 diverse economic sectors. In 1998, the National Stock Exchange launched its web-site to become the first exchange in India to start online trading in 2000. Today, NSE has approximately a 66% equity spot turnover and approximately a 100% equity derivatives turnover. This is one of the primary reasons as to why I consider CNX NIFTY index for my study.

## **1.2 Volatility:**

The most feared and respected word in the world of investors is Stock Market Volatility. Analysts are aware of its ability to outsmart the finest of the conclusions. Volatility is simply is defined as the irregular ups and downs that add excitement to the market functioning and the life of an investor. When the market fluctuates frequently and becomes unpredictable, the investors shift their focus to other avenues like gold and real estate, etc.

The findings of the paper can be used to identify the extent to which numerous governments' policies and announcements affect the domestic stock market. Additionally, the study also tries reflecting on whether successful implementation of said policies at a later date causes

further fluctuations in these two areas or not. Finally, the results can be utilized to make capital allocation decisions while trading in the backdrop of a major policy change announcement so as to mitigate potential risk of trading in a highly volatile market as well as serve as a reference point while during policy making dealing with capital flows of a country.

## **2. LITERATURE REVIEW**

We begin by reviewing literature exploring the relationship between various national events and the stock markets. Brooks, Patel and Su (2003) examined response of the market following press reports of 19 unexpected events and found that prices fell by about 1.6 percent within 22 minutes, but returned to pre-announcement levels within two hours.

Brooks, Patel and Tie (2003) studied the market reactions to unanticipated events like physical catastrophes or terrorist attacks and found that such happenings had an adverse effect on the equity markets. Based on this methodology of studying critical events, the researchers examined equity marketer's reactions in terms of fluctuations in prices, volume, spreads and trading location under the stressful conditions of 21 unanticipated news events on the basis of intraday transaction data. The adverse unanticipated happenings were classified into four broad categories: “unexpected”, “unanticipated”, “surprised” and “shocked”. It is important to note that that some of the events occurred not only in the day time when the stock exchange was open but also at odd hours at night. The trading process after the announcements of such unanticipated occurrences was examined on an equal-weighted basis of the following variables: “price”, “spread”, “volume”, “volatility” and “location”.

The results of the research suggested that such occurrences affected equities prices, but the response time of the stock market in the light of an adverse unanticipated event was longer than studies of the past had reported.

Harvinder Kaur (2004), in her paper, studied the extent and direction of volatility on Indian stock prices over the period 1990 to 2000. This was a purely descriptive study of volatile movements in BSE’s Sensex and NSE’s Nifty. A total of three types of volatility were looked into—volatility of daily returns in a year, volatility of daily returns in a month and volatility of monthly returns in a year. Annualized volatility of daily returns in a year was found to be the highest in 1992 followed by that in 2000 and 1999 respectively. In case of volatility of daily returns in a month, April was found to be the most volatile month followed by March and February. The researcher has attributed this to the possible effect of budget that is usually

presented in the month of February. Summing up, it was found that 1992 was the most volatile year and April was the most volatile month during the research period.

In 2004 Harvinder Kaur analyzed the nature of the stock market's volatility in India and the US. The study found that the response to the arrival of any news was asymmetrical, meaning that the impact of positive and negative happenings was not the same. Further the return and volatility on some weekdays have also changed somewhat after the introduction of the Rolling Settlement. There was a mixed evidence of return and volatility spillover between the US and Indian Markets.

Though there has been significant study when it comes to the effect of various policy announcements and events on equity markets, there is a marked deficiency of research linking such announcements and events to capital flows to and from a country, specifically FPI flows.

A recent discussion focused on why growth in the wake of financial crisis has been recovering at a slow rate. An explanation for the sluggish recovery offered by some commentators is that uncertainty about the future government policies is abnormally high. However, the literature has highlighted that the two critical challenges to establishing a distinct link between political uncertainty and real outcomes are, first, measuring political uncertainty and second identifying the causal effect of uncertainty on investments (Baker, Bloom and Davis (2012)).

## **2.1 Scope**

To analyze the impact of critical events that have impacted the stock market in the last 7 years, i.e. from January 2008 to March 2015, and finding the volatility of stock prices with the occurrence of such events. This will be done with the help of statistical and technical indicators on historical data of the indices. In case of events causing significant volatility on an index, this analysis can be essentially of use for the investors to reduce or avoid potential risk due to high volatility of stocks.

### **3. RESEARCH METHODOLOGY**

#### **3.1 Objective**

- To study the effect of various government policy announcements and events on equity market indices and capital flows.
- To facilitate the investors and market regulators to make the markets more efficient.

#### **3.2 Methodology**

- 1) Historical daily data of CNX Nifty index was collected from Yahoo Finance
- 2) List of various events that occurred from 01-Jan 2008 to 31-Mar 2015 was collected
- 3) Announcements were segregated into two major types
  - Budget Events
  - Political and business events
- 4) Identification of Event days
- 5) Formation of six groups of three days each pre and post the event date for the purpose of f-test analysis
- 6) Use of F- test for hypothesis testing
- 7) Detailed technical analysis using MACD analysis, to find changes in movement and crossovers on the determined significant events for the CNX NIFTY index

Tools used for analysis are:

- 1) F-Test (SPSS and MS Excel)
2. MACD Analysis

#### **3.3 Hypothesis**

The hypothesis defined as follow:

H0: There is no change in Variance.

H1: There is change in variance between two consecutive periods.

### 3.4 F-test

The F-distribution is defined as the ratio of two independent chi-square variables divided by their respective degrees of freedom.

$$F = \frac{\frac{df_1 \cdot s_1^2}{\sigma_1^2} / df_1}{\frac{df_2 \cdot s_2^2}{\sigma_2^2} / df_2}$$

#### Key Properties

- The F-values are non-negative
- The F-distribution is non-symmetric
- The mean is approximately equal to 1
- There are two independent degrees of freedom, one for the numerator and one for the denominator.
- There are numerous F distributions, one for each pair (numerator and denominator) of degrees of freedom.

Another of the uses of the F distribution is to test two variances. It is often accurate to compare two variances instead of two averages.

If F is close to 1, it means that the null hypothesis (the two population variances are equal) is true. But if F is much greater than 1, then the alternate hypothesis is true.

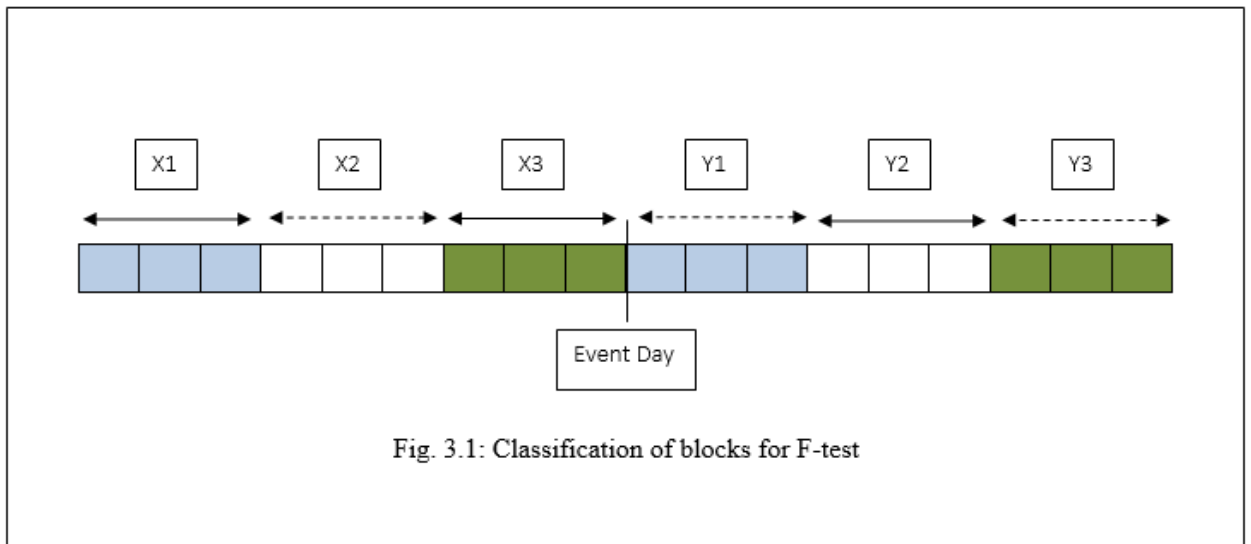
Here F-test is used to find volatility in logarithmic daily returns. Volatility in returns has been measured through variance of returns over sets of three (3) trading days. Six such sets have been depicted below, three before the occurrence of the event (X1, X2, X3) and three after the occurrence (Y1, Y2, Y3), of each event. The sets have been used to understand any volatility as one move towards the event date, and later away from it. Only three such sets

were considered on either side because consecutive events happening in quick succession tend to affect one another. This comparison of variances through F-tests can be pictorially viewed in Fig 3.1.

The study has used the statistical technique of hypothesis testing with the help of the F-test. The test statistic F is defined as follows:-

$$F = s(X_i)^2 / s(Y_i)^2$$

Here,  $X_i$  and  $Y_i$  are the two sample time periods,  $s(X_i)^2$  and  $s(Y_i)^2$  are the sample return variances. In all the cases, variance of return of the succeeding period (say,  $X_2$ ) has been compared with the preceding period (say,  $X_1$ ).



### 3.5 Assumptions

1. The larger of the two variances should always be placed in the numerator
2. The test statistic is defined as  $F = (s_1)^2 / (s_2)^2$  where  $(s_1)^2 > (s_2)^2$
3. If standard deviations are given in-place of variances, they must be squared



4. When the degrees of freedom aren't given in the table, go with the value with the larger critical value (the smaller degrees of freedom), to reduce chances of a type 1 error
5. The populations from which the samples were obtained must be normally distributed.
6. The samples must be independent

### **3.6 MACD Analysis**

The formula for the "standard" MACD is the difference between a security's 26-day and 12-day Exponential Moving Averages (EMAs). Of these two moving averages, the 12-day EMA is the faster than the 26-day EMA. Closing prices are used to form the moving averages. Usually, a 9-day EMA of MACD is plotted alongside to act as a trigger line. A bullish crossover occurs when MACD moves above its 9-day EMA, and a bearish crossover occurs when MACD moves below its 9-day EMA. A histogram represents the difference between MACD and the 9-day EMA. The histogram is positive when MACD is above its 9-day EMA and negative when MACD is below its 9-day EMA.

The MACD is used to measure the difference between two Exponential Moving Averages (EMAs). A positive MACD indicates that the 12-day EMA is trading above the 26-day EMA. A negative MACD indicates that the 12-day EMA is trading below the 26-day EMA. If MACD is non-negative and rising, then the gap between the 12-day EMA and the 26-day EMA is widening. This shows that the rate-of-change of the faster moving average is higher than the rate-of-change for the slower moving average. Positive momentum is increasing, indicating a bullish period for the price plot. If the MACD is negative and declining further, then the negative gap between the faster moving average and the slower moving average is expanding. Downward momentum is accelerating, indicating a bearish period of trading. MACD centerline crossovers occur when the faster moving average crosses the slower moving average.

### **3.7 MACD Bullish Signals**

MACD generates bullish signals from the following sources:

1. Positive Divergence
2. Bullish Moving Average Crossover
3. Bullish Centerline Crossover

### **3.8 MACD Bearish Signals**

MACD generates bearish signals from the following 3 sources. These signals are mirror reflections of the bullish signals:

1. Negative Divergence
2. Bearish Moving Average Crossover
3. Bearish Centerline Crossover

## **4. DATA ANALYSIS AND INTERPRETATION**

### **4.1 List of major events affecting Indian stock market from Jan 2008 – March 2015**

The research period considered witnessed high GDP growth rates, substantial growth in international trade, rise of regional political parties, large numbers of terrorist attacks, etc. Following is the list of events that have been chosen based on the fact that they impact stock market. These events are taken into consideration, in order to find out their impact on specific industries and companies. The events are divided into 2 categories as follows:

- Budget
- Political and business events

#### **4.1.1 Budget Events**

The Union budget announcements are one of the most major well followed events annually. Each year the union budgets affect the stock market as it brings in changes in policies and presents how the government is going to spend money in the upcoming years, which might be favorable for some and unfavorable for other sectors. This can potentially lead to market volatility in that period. In fact, volatility can be seen even before the budget day. This might be due to the pre-budget press leaks and expectations that are already built into the stocks. Similarly budgetary policies are also an important determinant for foreign capital flows into the country. The budgetary announcements set the stage for the economic outlook of the country in the eyes of potential investors outside the country. These investors keep a keen eye out for indications within the union budgets that the Central Government is committed towards promoting an environment of growth by pushing through expenditures in high multiple activities targeted at stimulating industrial output within the country. The budget announcements assume even greater

importance in a country like India, where governments have been known to engage in populist measures to strengthen their position, even at the cost of economic growth and development.

#### 4.1.2 Political and Business Events

Political factors have long since been some of the biggest influencers of stock market performance within a country. Various stock markets have been shown to exhibit seasonality effects in tandem with the election / political cycle of the host country. Political instability force investors to sell their holding. A fragmented election result usually indicates the formation of an unstable coalition government (Indian Lok Sabha Election 2009). Investors perceive this as leading to uncertainty on decisions for any major financial sector reform agenda or on the take of the government on fiscal or monetary policy etc. On the other hand, if election results bring back a stable and strong government to power (Indian Lok Sabha Election 2014), both domestic and foreign investors feel secure about investing in a stable financial sector policy regime. In 2013, this has been be readily observed in the current investor sentiment within the country wherein large portions of the financial believed that markets would perform exceedingly well in the event of BJP comes to power at the centre. One of the biggest reasons for the sluggish performance of the markets as well as dwindling capital inflows into the country is believed to be the stagnating economic policies or ‘policy paralysis’ that the current government is accused of displaying.

### **4.2 List of events utilized for the study**

With the above background regarding various announcements / events to be considered for the study and their classification, we begin by looking at some of the major events falling under the above mentioned heads in the Indian context over the period of 01-Jan 2008 to 31-March 2015.

#### 4.2.1 Budget Events

The Union Budget of India, referred to as the Annual Financial Statement[1] in Article 112 of the Constitution of India, is the annual budget of the Republic of India, presented each year on the last working day of February by the Finance Minister of India in Parliament. In the event of election years, an Interim budget is tabled by the Finance minister. A national interim Budget refers to the budget of a government that is going through a transition period. These budgets are common in democracies like India where one political party or a coalition is voted out and another political party or a coalition is voted into office. The two governments often have

different fiscal plans, so the old government budget is cut short and a new budget is created. The interim Budget helps span the transition time between the two governments so that the government can continue to function. In this sense, interim budgets are also extremely important for stock markets and investors. Here we consider all Union Budgets and Interim budgets tabled between 2008 and 2015.

Sr. No.	Date	Event
1	29/02/08	2008 Union Budget tabled in Parliament.
2	16/02/09	2009 Interim Union Budget tabled by Pranab Mukherjee
3	06/07/09	2009 Union Budget tabled by Pranab Mukherjee
4	26/02/10	2010 Union Budget tabled in Lok Sabha
5	28/02/11	2011 Union Budget tabled in Parliament by Pranab Mukherjee
6	16/03/12	2012 Union Budget tabled by Pranab Mukherjee
7	28/02/13	2013 Union Budget tabled in Parliament by P. Chidambaram
8	17/02/14	2014 Interim Union Budget tabled by P. Chidambaram
9	10/07/14	2014 Union Budget tabled in Parliament by Arun Jaitley
10	28/02/15	2015 Union Budget tabled in Parliament by Arun Jaitley

Table 4.1: Budget Events

#### 4.2.2 Political and Business Events

Under this heading, any policy announcements or news related to the political or legal scenario within the country are considered. Any changes in government, either at the state or centre level, new political appointments at economically important posts, any judicial ruling having a bearing on the business environment or stock market and investor confidence etc. are included here.

Even certain important macro-economic news could be classified under this heading instead if the political / legal ramifications of the same outweigh its macro-economic.

Sr. No.	Date	Event
1	04/06/08	The government announces an increase in petrol, diesel and LPG prices
2	22/07/08	The UPA led government in India survives a crucial no-confidence vote
3	26/11/08	2008 Mumbai terror attacks
4	19/05/09	Manmohan Singh is reelected as Prime Minister of India

5	10/12/09	India announces it is to create a new state, Telangana, out of AP
6	29/09/10	India launches a national identity scheme aimed at reducing fraud and improving access to state benefits.
7	20/04/11	Five corporate honchos arrested in 2G spectrum scam.
8	20/05/11	Mamata Banerjee sworn in as the first woman and 11th CM of West Bengal.
9	13/07/11	26 killed in a series of bomb-blasts in Mumbai.
10	02/02/12	Supreme Court cancels 122 licences given by A Raja in 2G spectrum scam.
11	22/06/12	Calcutta HC strikes down Singur Land Act of Mamta Banerjee government
12	22/07/12	Pranab Mukherjee is elected as India's 13th president.
13	21/11/12	Ajmal Kasab hanged on account of the 2008 Mumbai Attacks.
14	26/08/13	Lok Sabha passes the National Food Security Bill, 2013
15	13/09/13	Narendra Modi anointed BJP's prime ministerial candidate for the Lok Sabha polls
16	16/05/14	BJP winning majority seats of 282
17	16/06/14	Narendra Modi's 1 <sup>st</sup> Foreign Trip to Bhutan as PM
18	13/07/14	BRICS Summit
19	30/08/14	PM State Visit to Japan
20	26/09/14	PM State visit to USA
21	14/11/14	G20 Summit

Table 4.2: Political and Business Events

### 4.3 Data Collection

For the purpose of the study, as already mentioned earlier, we intend to conduct f-tests for comparing variances of CNX NIFTY returns. These variances are to be calculated for six groups of 3 days each, before and after the event date. We then also intend to delve further to understand the reasons for the behaviors by conducting MACD analysis for the CNX NIFTY index around major event days that show statistically significant effects on the NIFTY.

Hence our data requirement includes the following:

- A comprehensive list of major events spanning the period between 2008 and 2015 that, based on secondary research, could possibly affect stock markets. Also, based on secondary research, these events need to span across budgets, political and legal events and business events
- Historical daily data for the CNX NIFTY index during the same period as well as historical charts with MACD (12 & 26 EMA) and signal curves (9 EMA)

The list of major events was compiled by looking through various news articles in archives and sorting them into the various types of events. Care was taken to ensure that the events were considered sufficiently impactful to affect stock markets.

The historical daily data for CNX NIFTY index for the country were accessed through online portal (Yahoo Finance).

The MACD and signal curves were obtained through the technical analysis platform on [www.moneycontrol.com](http://www.moneycontrol.com).

## 5. DATA ANALYSIS

### 5.1 Effect on equity markets

Using the data and the methodology specified earlier, 5 separate f-tests were run for each successive pair of levels (Xi and Yi). The f-statistic was then compared with the critical f-statistic for an alpha level of 0.1. Any statistic that was greater than the critical level was considered significant, i.e. it could be inferred that the change in variation of the returns on the CNX NIFTY index was caused due to the event and was not mere co-incidence.

The effect of the events / announcements was done not just on a stand-alone basis but also in terms of the categories that they were classified under. This analysis helps us figure out which class of events affects stock markets to what extent.

The statistical tests were conducted through the statistical package SPSS as well as MS Excel.

The results of the f-test have been summarized in the table 5.1.

Flag	Date	Y3 on Y2	Y2 on Y1	Y1 on X3	X3 on X2	X2 on X1
<b>Bud</b>	29-02-2008	2.80820505	0.54943046	20.0974828	0.17413465	1.72903327
<b>Pol</b>	04-06-2008	0.70721258	0.33989153	1.93995352	1.41586436	64.122369
<b>Pol</b>	22-07-2008	0.13353045	0.51249878	<b>15.709235</b>	0.25228852	0.39799212
<b>Pol</b>	26-11-2008	0.50027398	7.88089203	0.13004717	10.3667638	0.75656463
<b>Pol</b>	02-01-2009	0.329046	0.08058577	2.12721987	0.01238808	<b>31.807106</b>
<b>Bud</b>	16-02-2009	1.89652902	0.69307428	1.29461001	1.80437161	1.86926766
<b>Pol</b>	19-05-2009	0.03006857	9.2392949	0.01212081	11.6467739	2.82266368
<b>Bud</b>	06-07-2009	0.44493933	1.9733313	6.52888434	0.08353066	5.54395043
<b>Pol</b>	10-12-2009	8.52495922	1.04376294	0.23360743	<b>18.372196</b>	0.0321307
<b>Bud</b>	26-02-2010	0.06242415	0.2736506	<b>17.627997</b>	0.204564	0.34723767
<b>Pol</b>	29-09-2010	0.54637579	1.04484253	2.36064107	1.09553575	0.22319736
<b>Bud</b>	28-02-2011	0.21723092	0.37774476	0.95157348	2.13610614	5.53486624
<b>Pol</b>	20-04-2011	<b>58.315214</b>	0.10403048	0.16013551	0.6583017	7.88178249



<b>Pol</b>	20-05-2011	5.31399218	0.5234336	2.52885959	0.22832563	<b>17.214837</b>
<b>Pol</b>	13-07-2011	4.43647252	0.46168594	<b>9.9561762</b>	0.11621309	3.88299301
<b>Pol</b>	02-02-2012	2.00206976	0.86099496	0.12750088	<b>24.462443</b>	0.3027244
<b>Bud</b>	16-03-2012	0.33066042	1.65973852	0.92967515	1.69465278	2.32748077
<b>Pol</b>	22-06-2012	0.01078305	7.24850841	3.28276025	0.02724602	5.08853126
<b>Pol</b>	22-07-2012	0.05675692	3.10745637	1.93734277	6.8007107	0.03586928
<b>Pol</b>	21-11-2012	0.32562988	<b>54.476503</b>	0.05194482	3.24109013	0.52164487
<b>Bud</b>	28-02-2013	#DIV/0!	0	0.05491873	1.67960822	4.17132825
<b>Pol</b>	26-08-2013	0.03539204	1.01205456	2.09304812	1.08035775	6.26534885
<b>Pol</b>	13-09-2013	0.00572165	<b>38.314182</b>	0.04217277	3.53887932	0.17634709
<b>Bud</b>	17-02-2014	0.42569470	0.1840435	0.71408993	<b>14.042489</b>	2.55504400
<b>Pol</b>	16-05-2014	1.08368737	1.43250251	0.6342302	0.23540027	5.58488639
<b>Pol</b>	16-06-2014	0.53389336	0.54518728	1.80338045	1.39816575	1.43551612
<b>Bud</b>	10-07-2014	0.56011279	0.25023635	0.86408993	3.85319728	1.05750256
<b>Pol</b>	13-07-2014	1.30806053	0.6900403	0.78625523	0.1797193	4.8976215
<b>Pol</b>	30-08-2014	0.19848966	7.34785121	1.62370027	1.17228284	0.08257117
<b>Pol</b>	26-09-2014	0.3493628	<b>71.249451</b>	0.05055261	0.61882276	0.86434535
<b>Pol</b>	14-11-2014	2.82464508	0.44055259	2.62198847	11.1571268	0.01010217
<b>Bud</b>	28-02-2015	1.08697337	1.1434891	0.54783209	7.62749439	2.58679175

Table 5.1: F-test for stock markets including all events

This table tells us the effect that each of the events have on stock markets on a standalone basis. For any given event, any statistically significant result is highlighted in 'red'.

This is what we can infer from the results. The f-statistic for Y1 on X3 is significant for the budget of 2010. This indicates that the budget in 2010 caused significant fluctuation in the CNX NIFTY index 3-3 days when it was tabled in the Lok Sabha. This indicates that the effect of the budget on the markets was immediate in nature. The duration of the effect is inconclusive in this case and hence it is difficult to say if the effect was long-term or short-term.

In the same vein, we can see that the stimulus package offered by the government on 2<sup>nd</sup> Jan 2009 to stimulate the economy out of sluggish growth managed to cause significant volatility in the market even before the package was announced. A major reason for this could be leakage of

the news prior to the announcement of the same, informal expectations of the announcement that are then already factored into the stock prices etc.

Alternatively, let us analyze the results obtained when the events are grouped into various classes.

Flag	Date	Y3 on Y2	Y2 on Y1	Y1 on X3	X3 on X2	X2 on X1
Bud	29-02-2008	2.80820505	0.54943046	20.0974828	0.17413465	1.72903327
Bud	16-02-2009	1.89652902	0.69307428	1.29461001	1.80437161	1.86926766
Bud	06-07-2009	0.44493933	1.9733313	6.52888434	0.08353066	5.54395043
Bud	26-02-2010	0.06242415	0.2736506	<b>17.627997</b>	0.204564	0.34723767
Bud	28-02-2011	0.21723092	0.37774476	0.95157348	2.13610614	5.53486624
Bud	16-03-2012	0.33066042	1.65973852	0.92967515	1.69465278	2.32748077
Bud	28-02-2013	#DIV/0!	0	0.05491873	1.67960822	4.17132825
Bud	17-02-2014	0.42569470	0.1840435	0.71408993	<b>14.042489</b>	2.55504400
Bud	10-07-2014	0.56011279	0.25023635	0.86408993	3.85319728	1.05750256
Bud	28-02-2015	1.08697337	1.1434891	0.54783209	7.62749439	2.58679175

Table 5.2: F-test for stock markets with budget events

Table 5.2 gives us the f-statistic for the successive period NIFTY returns for various budgets tabled during the period of the study. It can be seen that two of the ten budget sessions included in the study have caused significant volatility in the market. These are the budgets tabled in the 2010 and the interim budget tabled in 2014. Another thing of import to note is that all two budgets appear to cause significant fluctuations 3-6 days pre their announcement. There also seemed to exist brief volatility in the market a couple of days before the last budget.

Flag	Date	Y3 on Y2	Y2 on Y1	Y1 on X3	X3 on X2	X2 on X1
Pol	04-06-2008	0.70721258	0.33989153	1.93995352	1.41586436	64.122369
Pol	22-07-2008	0.13353045	0.51249878	<b>15.709235</b>	0.25228852	0.39799212
Pol	26-11-2008	0.50027398	7.88089203	0.13004717	10.3667638	0.75656463
Pol	01-02-2009	0.329046	0.08058577	2.12721987	0.01238808	<b>31.807106</b>
Pol	19-05-2009	0.03006857	9.2392949	0.01212081	11.6467739	2.82266368
Pol	10-12-2009	8.52495922	1.04376294	0.23360743	<b>18.372196</b>	0.0321307

<b>Pol</b>	29-09-2010	0.54637579	1.04484253	2.36064107	1.09553575	0.22319736
<b>Pol</b>	20-04-2011	<b>58.315214</b>	0.10403048	0.16013551	0.6583017	7.88178249
<b>Pol</b>	20-05-2011	5.31399218	0.5234336	2.52885959	0.22832563	<b>17.214837</b>
<b>Pol</b>	13-07-2011	4.43647252	0.46168594	<b>9.9561762</b>	0.11621309	3.88299301
<b>Pol</b>	02-02-2012	2.00206976	0.86099496	0.12750088	<b>24.462443</b>	0.3027244
<b>Pol</b>	22-06-2012	0.01078305	7.24850841	3.28276025	0.02724602	5.08853126
<b>Pol</b>	22-07-2012	0.05675692	3.10745637	1.93734277	6.8007107	0.03586928
<b>Pol</b>	21-11-2012	0.32562988	<b>54.476503</b>	0.05194482	3.24109013	0.52164487
<b>Pol</b>	26-08-2013	0.03539204	1.01205456	2.09304812	1.08035775	6.26534885
<b>Pol</b>	13-09-2013	0.00572165	<b>38.314182</b>	0.04217277	3.53887932	0.17634709
<b>Pol</b>	16-05-2014	1.08368737	1.43250251	0.6342302	0.23540027	5.58488639
<b>Pol</b>	16-06-2014	0.53389336	0.54518728	1.80338045	1.39816575	1.43551612
<b>Pol</b>	13-07-2014	1.30806053	0.6900403	0.78625523	0.1797193	4.8976215
<b>Pol</b>	30-08-2014	0.19848966	7.34785121	1.62370027	1.17228284	0.08257117
<b>Pol</b>	26-09-2014	0.3493628	<b>71.249451</b>	0.05055261	0.61882276	0.86434535
<b>Pol</b>	14-11-2014	2.82464508	0.44055259	2.62198847	11.1571268	0.01010217

Table 5.3: F-test for stock markets with political and legal events

Tables 5.3 gives us the figures of the f-statistic, both pre and post various political and business events. Here, ten out of a potential 22 such announcements seemed to have caused any significant volatility in the NIFTY index. These events were UPA govt. surviving no-confidence vote on N-Deal, the announcement of formation of Telangana State, the arrest of five corporate honchos in the 2G spectrum case, Mumbai Bomb attack, Narendra Modi anointed as BJP's PM Candidate and his visit to USA after a very long time as PM.

But when it comes to the arrests in regards to the 2G spectrum case, the event was accompanied by fluctuations both before and after the announcement of the same. Also the effects seem to be temporary in nature, since neither of them persist for more than one consecutive period in one go. Market saw a great fluctuation when Narendra Modi was announced as BJP's PM candidate which gave Market investors a hope. Even his visit to USA saw market fluctuating. Hence, political and legal news seem to show clear trends when it comes to effect on the equity markets.

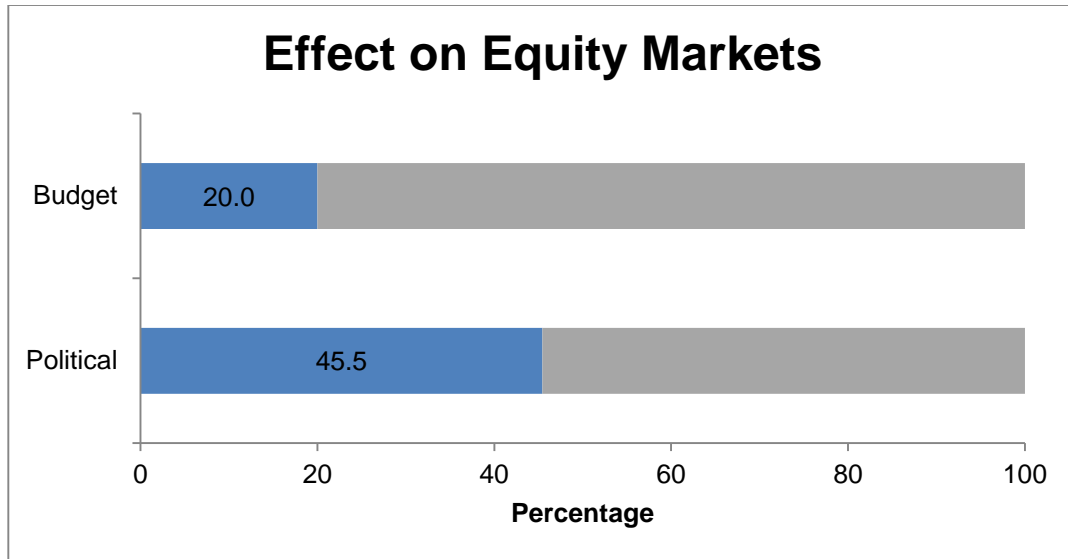


Fig. 5.1: Effect on Equity Markets of various types of events

From the above chart we can summarize that Political and Business events seem to affect equity markets with the highest frequency followed by budget. Hence any political events are the strongest determinants of stock market fluctuations of the two.

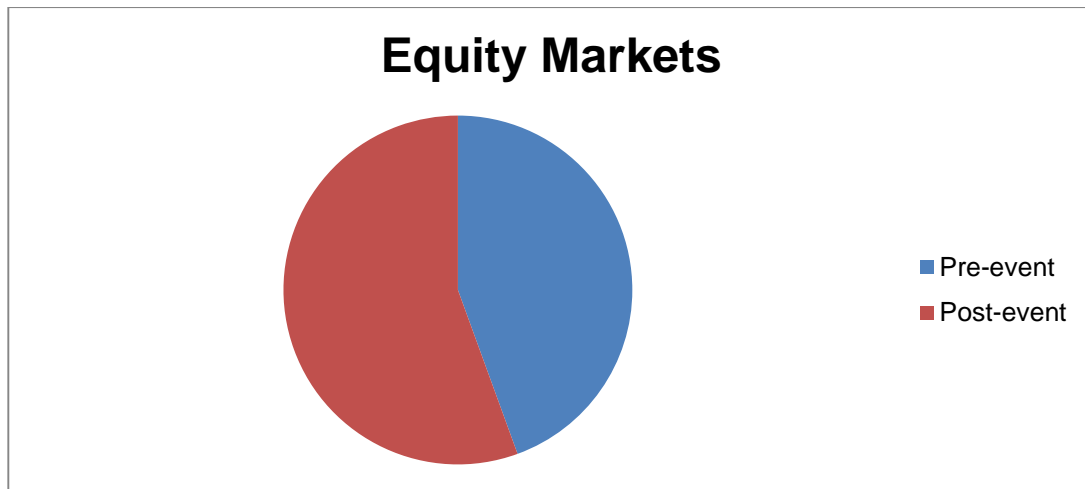


Fig. 5.2: Equity Markets pre/post frequency

## 5.2 MACD Analysis

Having seen that specific events go on to affect the stock market, we try to delve further and understand better what happens with the NIFTY Index pre or post the event / announcement and how and why exactly do certain events affect the stock markets the way they do. To achieve this, we perform technical analysis on the CNX NIFTY historical chart to better understand the bullish or bearish trends that were introduced pre or post the announcements and thereby try to decipher the reasons for the behavior observed.

We use the MACD technical indicators comprising of the 12 day EMA and 26 day EMA. We also employ the 9 day EMA indicator as the signal curve. We carry out the analysis for an event belonging to each of the classes

- Budget Events
- Political and Business Events



Fig. 5.3: Budget Event: Union Budget for 2008 introduced on 29/02/2008

From the above figure we can see that before the tabling of the 2008 union budget on 28/02/2008, CNX NIFTY was in a small bull phase that started around 10/02/2008.

We see that the MACD curve starts dipping around the 01/03/2008 and dips below the signal curve around 05/03/2008. This indicates a bearish trend setting in. This observation is in sync with the f-test results that show increased volatility in Y3 phase around 6 days from the budget day.

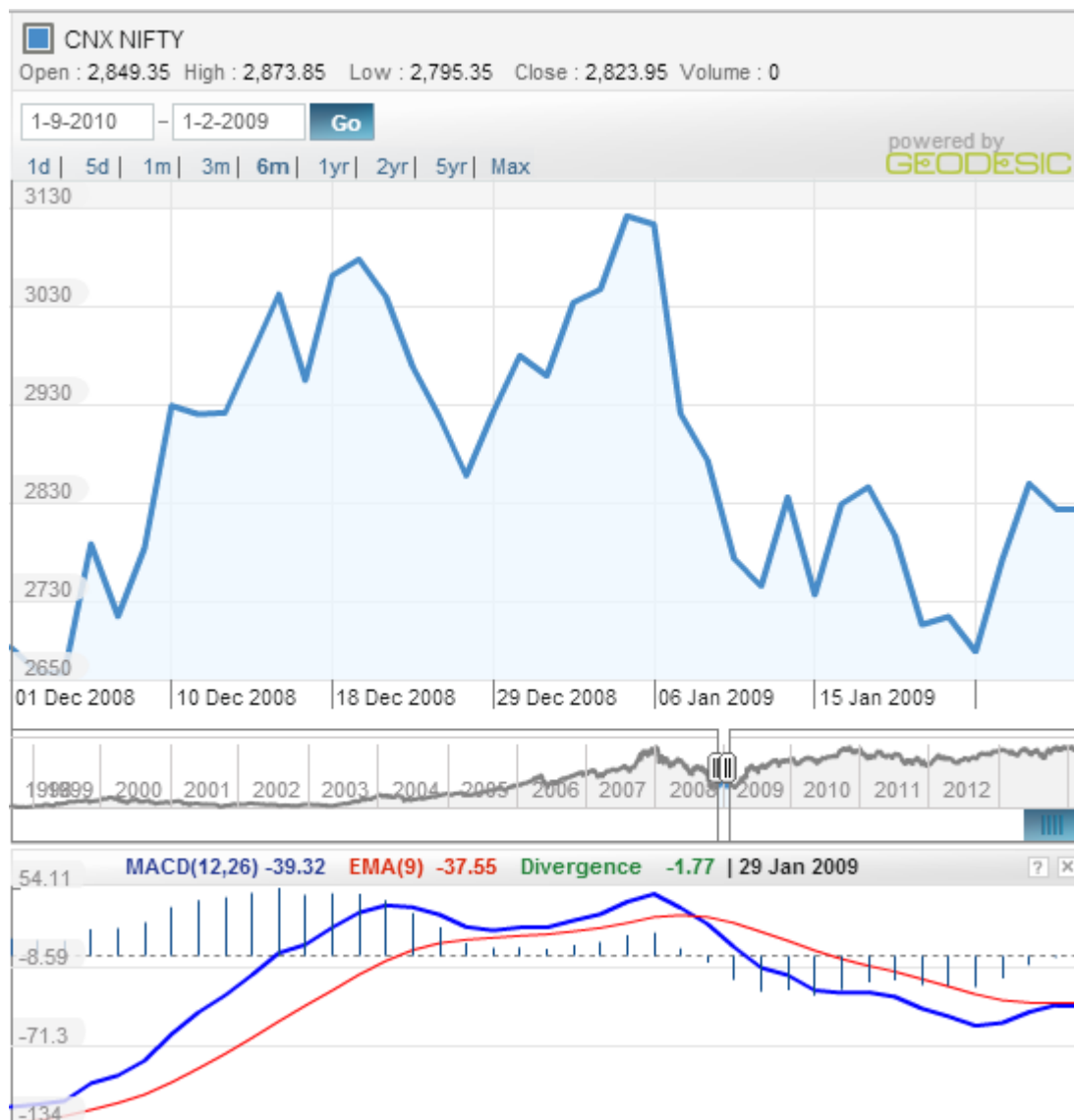


Fig. 5.4: Business Event: Government declaring stimulus package in early Jan 2009

We see that around 26 Dec 2008, the MACD starts dipping towards the signal curve. The divergence starts falling to near zero levels almost signaling a bear phase before stabilizing to stay above the signal curve.

On 2 Jan 2009, the government declares a stimulus package designed to reverse the dipping growth. The f-statistics indicated that the CNX NIFTY was impacted pre announcement of the stimulus package. This points towards the probability of leakage of the stimulus news 3-4 days before the actual announcement. The stabilization of the MACD curve that was originally leaning towards a bear signal supports the inference from the f-test indicating that the news of the impending stimulus announcement helped stabilize the index.



Fig 5.5: Political Event: Calcutta HC striking down the ‘Singur Land Act’ on 22/06/2012

The above chart indicates that the CNX NIFTY was on a weak bull run on 22/06/2012 when the Calcutta High Court passed its judgment to strike down the ‘Singur Land Act’ of the Mamata Banerjee government.

The f-statistic indicates that the news caused significant volatility in CNX NIFTY some 3-4 days post the judgment. However, the MACD curve indicates that the NIFTY index continued to move virtually unchanged right till 12/07/2012 when it finally crosses the signal curve to indicate the start of a bear phase.

Thus, the inferences drawn from the f-test and MACD analysis do not seem to converge in this case.

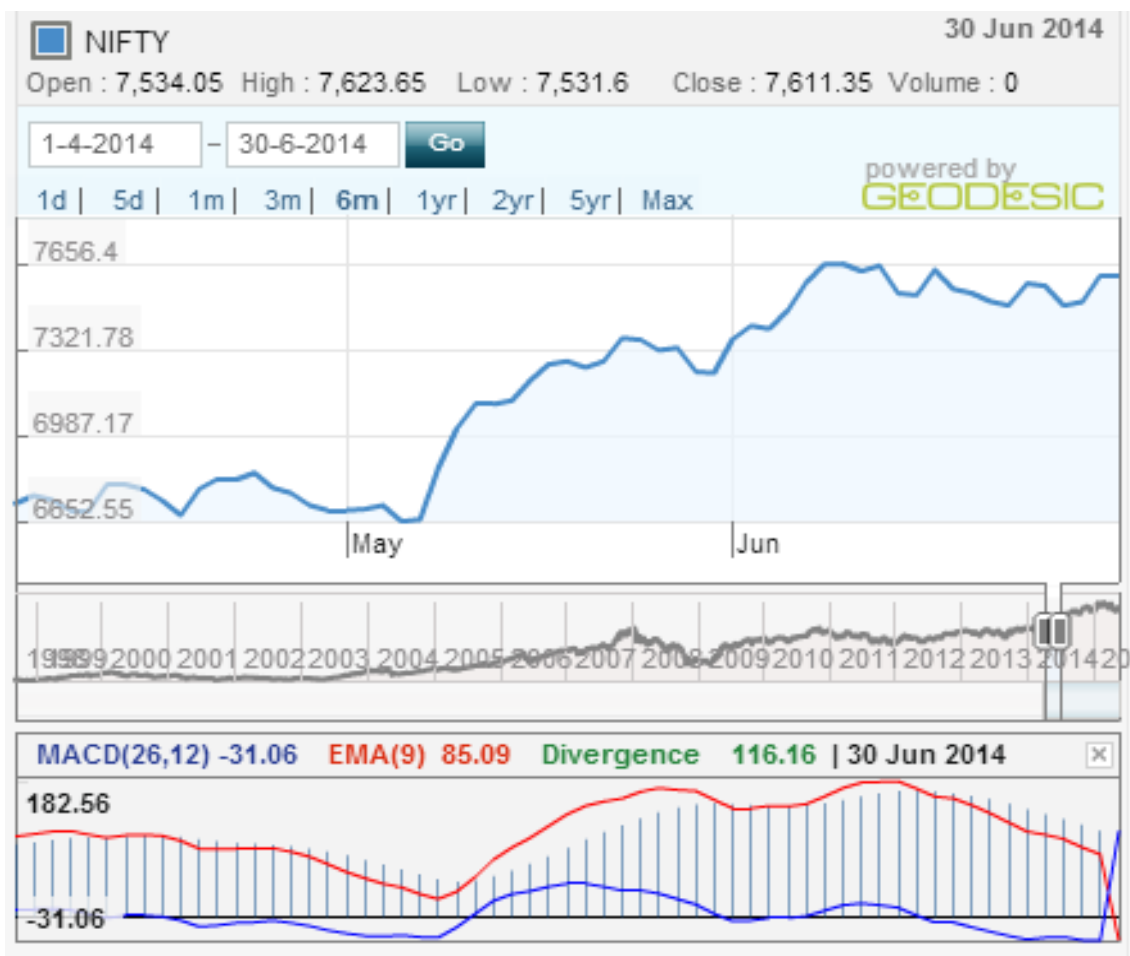


Fig 5.6 Political Event: Lok Sabha Election 2014



The above chart indicates that the CNX NIFTY was on a strong bull run in May 2014 when exit polls were showing clear indication of NDA government formation.

The f-statistic indicates that the news caused significant volatility in CNX NIFTY some 3-4 days post the judgment. However, the MACD curve indicates that the NIFTY index continued to move strongly after the Lok Sabha Results the signal curve to indicate the start of a bullish phase.

## **6. CONCLUSION**

The effect of Budgets, Political and business factors on equity markets were studied. Results show that Macroeconomic events do not cause any significant volatility on the stock prices as the number of cases with statistical significance was very low. Also, budgets too seemed to have very little impact on capital flows into a country. All other cases seemed to offer sufficient number of statistically significant cases. Political and Business events were found to be important determinants in the case of the stock markets.

Certain trends were also observed when checking the impact of the events on stock prices. The stock price fluctuations for budget events distinctly seemed to lag the event itself indicating that prejudging budget policy changes isn't all that easy. Political and business factors did not show a clear trend.

In many cases it was seen that even if the event causes some volatility, no lingering was seen beyond 2-3 trading days due to the effect of the event. The technical analysis using MACD indicators helped us understand probable reasons for the observed fluctuations. Yet, technical analysis too isn't useful in all cases.

## **7. LIMITATIONS**

One of the biggest limitations of this research is that it is relatively poor at isolating the effects of the events considered from the effects of other events that could have taken place during the same period. Several other events might have impacted the stock market volatility. These have been missed out in this research and can be used to carry out further research.

This research has considered only one index, whereas to make more accurate inferences, impact of major events on other stock exchanges like, Bombay Stock Exchange, can studied. Further, research could be carried out taking the stock market outside India, also into the consideration. Further research could be carried out for a larger time period, which will include the events which have occurred before as well as after the research period taken for this project. Increased research period would also lead to the increase in accuracy of the inferences.

Also this research can also be conducted on FII cash inflow to the nation to check on the macroeconomic effect.

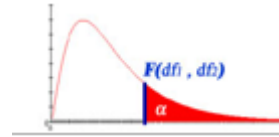
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## 9. APPENDIX

Date	CNX Nifty	CNX NIFTY Returns
31-03-2015	8491.00	-0.000153
30-03-2015	8492.30	0.018090
27-03-2015	8341.40	-0.000090
26-03-2015	8342.15	-0.022114
25-03-2015	8530.80	-0.001422
24-03-2015	8542.95	-0.000930
23-03-2015	8550.90	-0.002333
20-03-2015	8570.90	-0.007383
19-03-2015	8634.65	-0.005900
18-03-2015	8685.90	-0.004287
17-03-2015	8723.30	0.010442
16-03-2015	8633.15	-0.001688
13-03-2015	8647.75	-0.014614
12-03-2015	8776.00	0.008741
11-03-2015	8699.95	-0.001389
10-03-2015	8712.05	-0.005105
09-03-2015	8756.75	-0.020251
05-03-2015	8937.75	0.001692
04-03-2015	8922.65	-0.008181
03-03-2015	8996.25	0.004410
02-03-2015	8956.75	0.012680
27-02-2015	8844.60	0.018511
26-02-2015	8683.85	-0.009513
25-02-2015	8767.25	0.000588
24-02-2015	8762.10	0.000817
23-02-2015	8754.95	-0.008903
20-02-2015	8833.60	-0.006936
19-02-2015	8895.30	0.002954

Table 9.1: Snapshot of the data



**F Tables**

**Numerator Degrees of Freedom and Alpha = 0.1**

$\frac{df_2}{df_1}$													
		1	2	3	4	5	6	7	8	9	10	11	12
Denominator Degrees of Freedom	1	39.86	49.50	53.59	55.83	57.24	58.20	58.91	59.44	59.86	60.19	60.47	60.71
	2	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38	9.39	9.40	9.41
	3	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24	5.23	5.22	5.22
	4	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94	3.92	3.91	3.90
	5	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32	3.30	3.28	3.27
	6	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96	2.94	2.92	2.90
	7	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72	2.70	2.68	2.67
	8	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56	2.54	2.52	2.50
	9	3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44	2.42	2.40	2.38
	10	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35	2.32	2.30	2.28
	11	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27	2.25	2.23	2.21
	12	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21	2.19	2.17	2.15
	13	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20	2.16	2.14	2.12	2.10
	14	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15	2.12	2.10	2.07	2.05
	15	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09	2.06	2.04	2.02
	16	3.05	2.67	2.46	2.33	2.24	2.18	2.13	2.09	2.06	2.03	2.01	1.99
	17	3.03	2.64	2.44	2.31	2.22	2.15	2.10	2.06	2.03	2.00	1.98	1.96
	18	3.01	2.62	2.42	2.29	2.20	2.13	2.08	2.04	2.00	1.98	1.95	1.93
	19	2.99	2.61	2.40	2.27	2.18	2.11	2.06	2.02	1.98	1.96	1.93	1.91
	20	2.97	2.59	2.38	2.25	2.16	2.09	2.04	2.00	1.96	1.94	1.91	1.89
	21	2.96	2.57	2.36	2.23	2.14	2.08	2.02	1.98	1.95	1.92	1.90	1.87
	22	2.95	2.56	2.35	2.22	2.13	2.06	2.01	1.97	1.93	1.90	1.88	1.86
	23	2.94	2.55	2.34	2.21	2.11	2.05	1.99	1.95	1.92	1.89	1.87	1.84
	24	2.93	2.54	2.33	2.19	2.10	2.04	1.98	1.94	1.91	1.88	1.85	1.83
	25	2.92	2.53	2.32	2.18	2.09	2.02	1.97	1.93	1.89	1.87	1.84	1.82

Fig. 9.1: F - Table