

Impact Of French Flash Manufacturing PMI, German Flash Manufacturing PMI, German IFO Business Climate On Euro Currency

Shailaja P. Yadav*

Key Words:

- 1.Forex
- 2.Euro Currency
- 3.Economic Indicators
- 4.Domestic Interest Rates
- 5.Inflation Rate

Abstract

This study presents a broad understanding of the Forex market, its participants and the methods used for analysis of the Forex markets. This research focuses on the currency Euro and the major economic indicators of the Euro zone. This research aids in understanding the movement of the Euro to the timely releases of Euro-zone economic indicators. Further this study also helps in determining the movement of the euro in a particular direction in the short term i.e. an hour and the possibility of trading the currency in the aforesaid time frame. Data was analyzed using inferential statistics. Thus findings of this study revealed that the German flash PMI is at the top spot as the most important economic indicator in business survey as it contributes 67 percent of changes in EUR/USD. French flash manufacturing PMI is second most important economic indicator in business survey as it contributes 53 percent of changes in EUR/USD. German IFO business climate constitutes 47 percent of the changes in EUR/USD. It is the third most important economic indicator in business survey due to its large sample size and historic correlation with German and wider Euro zone economic conditions.

INTRODUCTION

The Foreign Exchange Market is by far the largest financial market and it operates in every corner of the world, in every single currency. The presence of the Euro currency in the global economy becomes stronger due to integrated financial markets. Foreign Exchange Market directly influences each country's foreign-trade patterns, determine the flow of international investment and affect domestic interest and inflation rates. The Foreign Exchange market strengthens all other financial markets. Foreign Exchange (Forex, FX) Market will be analyzed with the help of various economic indicators such as Trade Deficit, Gross National Product, Industrial Production, Unemployment Rate, Inflation Rate, Factory Utilization Rate, Balance of Trade, Business inventories etc. Economic indicators are playing vital role while determining the degree of volatility of financial markets.

REVIEW OF LITERATURE

The impact of macroeconomic indicators on currency has been widely studied, analyzed and documented in the finance literature. These investigations have covered macroeconomic indicators such as Inflation with respect to consumer price index and wholesale price index, Minimum

Bid Rate, Growth in terms of German GDP and Flash GDP, German ZEW economic sentiment, German Flash PMI, French Flash Manufacturing PMI, German IFO business climate, Spanish Unemployment.

Lovell, K. (1995) examined the macroeconomic performance of 19 OECD countries over the period 1970–1990. According to Lovell Performance is in terms of the ability of a country's macroeconomic managers to provide four services to their citizens: a high level of real GDP per capita, a low rate of inflation, a low rate of unemployment and a favourable trade balance. The findings of the research suggested that the performance rankings do change, and that the relative performance of the European countries declines, when the environmental disseminates are added to the service list.

Hall, B. (1995) used a newly available dataset on the R&D investment of individual French manufacturing firms in the 1980s, research replicate and update a series of studies on French R&D and productivity at the firm level from the 1970s, and evaluate the robustness of the methods currently used to measure the private returns to R&D. The main findings of this study are: Having a longer history of R&D expenditures helps improve the quality of the R&D elasticity estimates, but the choice of depreciation rate for R&D capital makes little difference. Beisea, M. (1999) dealt with the effects of publicly funded research at universities, polytechnics and federal research laboratories on industrial innovations in Germany. This research paper discussed the

*Indira Institute of Business Management, Navi Mumbai. Email: and can be reached shailaja.yadav111@gmail.com.



characteristics of companies that benefit from the findings of public research institutions.

Combes, P. (2000) tested how the local economic structure (local sectoral specialization and diversity, competition, average size of plants, and total employment density) affects the 1984–1993 employment growth of 341 local areas. These areas entirely and continuously covered the French territory. Major findings of this study are: The impact of the local economic structure differs in industry and services. Industrial sectors, local total employment density, competition, and plant size reduce local growth. Sectoral specialization and diversity have a negative impact on growth, but also increase the growth of a few sectors. Service sectors always exhibit negative specialization effects and positive diversity effects. Competition and plant size have a negative impact and density a positive one, but exceptions are observed for some sectors.

Mairesse, J. (2001) explored the correlations between five IT and R&D indicators and measures of labour and total factor productivity, average wages and skill composition, on four panel data samples of French manufacturing and services firms over the two five year periods 1986-1990 and 1990-1994. Jimenez-Contreras, (2003) outlines the evolution of international scientific production in Spain over the last 25 years, a period characterized by steady growth in research production. Other special characteristics of Spanish research, such as its dependence on the public sector and its essentially academic nature, are discussed in this research paper.

Jaya, M. (2012) examined that the Stock market is the barometer for the economic health of any country. The various phases of business and economic cycle are also reflected in the movement of stock market index. The epoch making changes in the stock market substantiate the relationship between the economic factors of a country and stock market movement. According to this study the movement of macroeconomic factors plays an imperative role in influencing the movement of any stock market index. This study suggests that the Government and policy makers should give importance to this bi-directional (NIFTY and GDP) causal relationship while framing policies. Singh, R. (2013) investigated the nature of the relationship between nifty index and key macroeconomic variable. According to the findings of the study Stock exchange index also follows a cycle or set pattern of flow like any other index.

Maheshwari, A., This study investigated long run relationships between stock prices and five macroeconomic variables in India. The stock market is a mirror index of an economy. The findings of this study indicated that market

capitalization have long term relationship with NSE returns but exchange Rate, FOREX, WPI and GR results are not significant. LairellakpamGovind, Mihir Dash focused on identifying the factors which affect the volatility in Indian stock markets. The volatility in financial markets is a phenomenon which is influenced by many factors. Amador, O., Gachter, F., Larch, M., Peter, G. sheds light on the actual impact of monetary policy on stock liquidity and thereby addresses its role as a determinant of commonality in liquidity.

Statement of Problem

This study examines whether the relationship between French Flash Manufacturing PMI and EUR/USD price, German Flash Manufacturing PMI and EUR/USD price, German IFO Business Climate and EUR/USD price exists. This study also examines whether there is any significant impact of French Flash Manufacturing PMI, German Flash Manufacturing PMI and German IFO Business Climate on EUR/USD price. If the investors can identify a certain pattern of correlation and impact factor of the actual release of French Flash Manufacturing PMI, German Flash Manufacturing PMI and German IFO Business Climate and EUR/USD price at the end of three hours, then it would be easier for the investors to take investment decisions.

OBJECTIVES OF THE STUDY

To identify the indicators which impact the movement of Euro in a period of an hour, i.e. intradaytrade.

To determine the strength of an indicator to move the Euro in a particular direction i.e. appreciation or depreciation.

To identify a trend in the movement of Euro within an hour after the data release.

To ascertain the volatility in the Euro in three hours.

To help secure a trading position within an hour after the data release.

To study the relationship between the economic indicator and Euro against dollar

Hypotheses

There is no relationship between the data release of French flash manufacturing (PMI) and changes in the price of Euro per dollar.

There is a relationship between the data release of French flash manufacturing (PMI) and changes in the price of Euro per dollar.

There is no significant impact of French flash manufacturing on EUR/USD



There is the significant impact of French flash manufacturing on EUR/USD

There is no relationship between the data release of German flash manufacturing (PMI) and changes in the price of Euro per dollar.

There is a relationship between the data release of German flash manufacturing (PMI) and changes in the price of Euro per dollar.

There is no significant impact of German flash manufacturing on EUR/USD

There is the significant impact of German flash manufacturing on EUR/USD

There is no relationship between the data release of German IFO business climate and changes in the price of Euro per dollar.

There is a relationship between the data release of German IFO business climate and changes in the price of Euro per dollar.

There is no significant impact of German IFO business climate on EUR/USD

There is significant impact of German IFO business climate on EUR/USD

RESEARCH METHODOLOGY

Research Methodology adopted was qualitative with secondary data analysis, where data was taken from Bloomberg Terminal.

Research Type: Qualitative

Research Design: Exploratory

Type of Data: Secondary

Data Collection

The study mainly uses the secondary data for the purpose of the analysis. The information regarding French Flash PMI, German FLASH PMI and German IFO business climate were obtained from the Bloomberg terminal for the period from April 2011 to March 2013 on a monthly basis

Statistical Tools

Statistical tool used for this study is inferential statistics in which Karl Pearson's coefficient of correlation, Regression Analysis and ANOVA Test.

FRENCH FLASH MANUFACTURING PMI

French Flash Manufacturing PMI: French Flash Manufacturing PMI is among the first economic indicator for each month and provides evidence of changing economic conditions ahead of comparable government statistics. An

estimate of the Manufacturing Purchasing Managers' Index PMI for a country based on about 85% of total PMI survey responses each month. It is intended to provide an accurate advance indication of the final PMI data.

Usual effect

Actual PMI > Forecast PMI = Good for currency

Frequency

Released monthly, around 3 weeks in the current month

The significance of PMI

It's a leading indicator of economic health and its related to businesses that reacts quickly to market conditions, and their purchasing managers hold perhaps the most current and relevant insight into the company's view of the economy.

Hypothesis Testing

Step1: Defining the hypotheses

H0: There is no relationship between the data release of French Flash Manufacturing (PMI) and changes in the price of Euro per dollar.

H1: There is a relationship between the data release of French Flash Manufacturing (PMI) and changes in the price of Euro per dollar.

Step2: Level of significance

Level of significance is 0.01

Step3: Test to be used

Karl Pearson's coefficient correlation: Correlations is used to test two quantitative variables. Karl Pearson's coefficient correlation determines whether there is any significant linear relationship exists in a bivariate association. The three possible research hypotheses for this model are: positive linear relationship, negative linear relationship, and no linear relationship H0.

Step4: Decision rule

P value < level of significance reject H0

Observation

As per the above table the value of P is 0.000 which is less than 0.05. The value of r is .729 which signifies that there is a moderate Karl Pearson's coefficient of correlation between Actual release of French Flash Manufacturing PMI and EUR/USD price at the end of three hours.

Interpretation

It has been observed from the table 1 that Actual release of French Flash Manufacturing PMI has a positive correlation with EUR/USD price at the end of three hours. The value of r



is .729 which signifies that there is a moderate Karl Pearson's coefficient of correlation between the actual release of French Flash Manufacturing PMI and EUR/USD price at the end of three hours. This means that changes in one variable are correlated with changes in the second variable. It can be concluded that one variable increases in value; the second variable also increases in value. Similarly, as one variable decreases in value, the second variable also decreases in value i.e. when the data release of French flash manufacturing PMI is greater the price of euro shoots up and when it churns out to be less than expected the price of the euro goes down. Hence the H0: There is no relationship between the data release of French flash manufacturing

(PMI) and changes in the price of Euro per dollar gets rejected and alternate hypothesis i.e. H₁ gets accepted.

Step1: Defining the Hypotheses

H0: There is no significant impact of French Flash Manufacturing (PMI) on EUR/USD

H1: There is the significant impact of French Flash Manufacturing (PMI) on EUR/USD

Step2: Level of significance

Level of significance is 0.05

Step3: Test to be used:

Regression analysis

Table 1: Karl Pearson's coefficient of correlation between Actual release of French Flash Manufacturing PMI and EUR/SD price at the end of three hours (closing price of EUR/USD)

Correlations			
		Actual release of French Flash Manufacturing PMI	EUR/USD price at the end of three hours (close price of EUR/USD)
Actual release of French Flash Manufacturing PMI	Karl Pearson's coefficient of correlation	1	.729**
	Sig. (2-tailed)		.000
	N	24	24
EUR/USD price at the end of three hours (close of EUR/USD) .729*	Karl Pearson's coefficient of correlation	.729**	1
	Sig. (2-tailed)	.000	
	N	24	24

Table 2: Regression Model

Model Summary						
Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	
1	.729 ^a	0.531	0.51		0.043	
Predictors: (Constant), Actual data release of French Flash PMI						
Coefficients ^a						
Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
(Constant)	0.776	0.111			6.965	0
Actual release of French manufacturing PMI	0.012	0.002	0.729		4.995	0
a. Dependent Variable: EUR/USD price at the end of three hours						
The constant value reflects the value of EUR/USD i.e. 0.776 when French flash PMI is zero.						

Observation

In this regression model EUR/USD price at the end of three hours is a dependent variable and an actual release of French Flash Manufacturing PMI is an independent variable.

As per the table 2, R square is 53.1% which indicates that Actual release of French Flash Manufacturing PMI indicator has 53.1% impact on EUR/USD price.

Interpretation

It has been observed from table 2 that EUR/USD price at the end of three hours is a dependent variable and an actual release of French Flash Manufacturing PMI is an independent variable. With the help of table 2, below mentioned equations get formulated

$$\text{The price of EUR/USD} = .776 + .012 (\text{French manufacturing PMI})$$

R is the square root of R-Squared and this determines the relationship between French Flash Manufacturing PMI and EUR/USD movement. R-Square signifies the proportion of variance i.e. 53.1% of changes in the price of EUR/USD is due to French Flash Manufacturing PMI. The coefficient for French Flash Manufacturing PMI is 0.012 so for every unit increase in for French Flash Manufacturing PMI, a unit 0.012 increases in the price of EUR/USD is predicted to hold the entire variable constant. Hence the H0: There is no significant impact of French flash manufacturing on EUR/USD gets rejected.

Observation

As per the table 3 total variance is 0.085 which is partitioned into the variance which can be explained by the independent variables (Regression) i.e. 0.045 and the variance which is not explained by the independent variables (Residual) i.e. 0.040.

The Regression degrees of freedom correspond to the number of coefficients estimated 1. DF associated with

residual is 22 and total DF is the sum of regression Df and Residual Df.

In Mean Squares, the Sum of Squares divided by their respective DF i.e. 0.045/1 and 0.04/22.

Interpretation

It has been observed from table 3 that the value of significance is 0.000 less than 0.005 so study rejects H0 and accepts H1 which states that there is some relationship between French Flash PMI and EUR/USD. With the help of ANOVA table this research rejects H0 which states that there is no significant impact of data release on EUR/USD and postulate that there is significant impact of this indicator on EUR/USD.

Interpretation

Graph 1 depicts Period 19th April 2011 to 21st March 2013. The above graph is a two axis graph in which bar graph represents the release of French manufacturing PMI data and line graph represents the price of euro per dollar at the time of the data release. The line graph goes in line with the bar graph for most of the data which states that the price moments fluctuate based on the data release if it is above the forecast the price goes up and if it is below the forecast the price goes down. For e.g. : The data release on 21 march 2013 was 43.9 less than the forecast of 44.4 so the closing price of EUR/USD has dropped down signifying the impact of this data on EUR/USD.

Interpretation

Graph 2 depicts Period 19th April 2011 to 21st March 2013. This chart represents the changes in the price movement before the release of data and after the data release this chart takes into consideration the difference of open and close of EUR/USD before three hours and three hours after the data release. The difference of open and close after three hours is greater than the difference between open and close before three hours hence it can be concluded that the data had a positive impact on EUR/USD

Table 3 :ANOVA Test

ANOVA ^b					
Model	Sum of Squares	DF	Mean Square	F	Sig.
Regression	0.045	1	0.045	24.949	.000 ^a
Residual	0.04	22	0.002		
Total	0.085	23			
a. Predictors: (Constant), Actual data release					
b. Dependent Variable EUR/USD price at the end of three hours					



and the difference of open and close after three hours is less than the difference between open and close before three hours hence it can be concluded that the data had a negative impact on EUR/USD and this holds true for most of the data in the graph. For e.g.: The data release on 22-Nov-12 was much more than the expectation so EUR/USD moved up after three hours. The data release of French Flash manufacturing PMI has significant impact on EUR/USD positive data release will give the euro a new high and data below the forecast will pull down the EUR/USD

GERMAN FLASH MANUFACTURING PMI

German Flash Manufacturing PMI: Level of a diffusion index based on surveys purchasing managers in the manufacturing industry. It is a survey of about 500 purchasing managers which asks respondents to rate the relative level of business conditions including employment, production, new orders, prices, supplier deliveries, and

inventories.

Measures: Level of a diffusion index based on surveys purchasing managers in the manufacturing industry.

Usual Effect: Actual PMI > Forecast PMI = Good for currency.

Frequency: Released monthly, around 3 weeks in the current month

The significance of German Flash Manufacturing PMI:

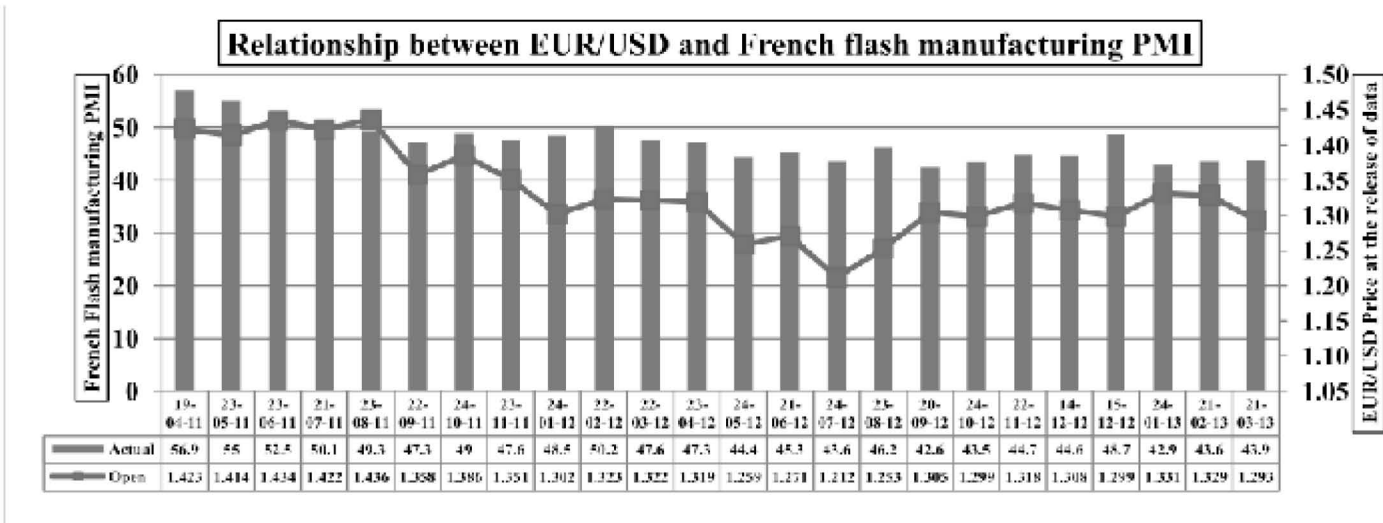
It's a leading indicator of economic health and its related to businesses react quickly to market conditions, and their purchasing managers hold perhaps the most current and relevant insight into the company's view of the economy.

Hypothesis Testing:

Step1: Defining the hypotheses

H0: There is no relationship between the data release of

Graph1: EUR/USD movement at the time of the data release of French flash manufacturing (PMI)



Graph2: Tracking the EUR/USD movement on a comparative basis for 3 hours before the release and after of data.

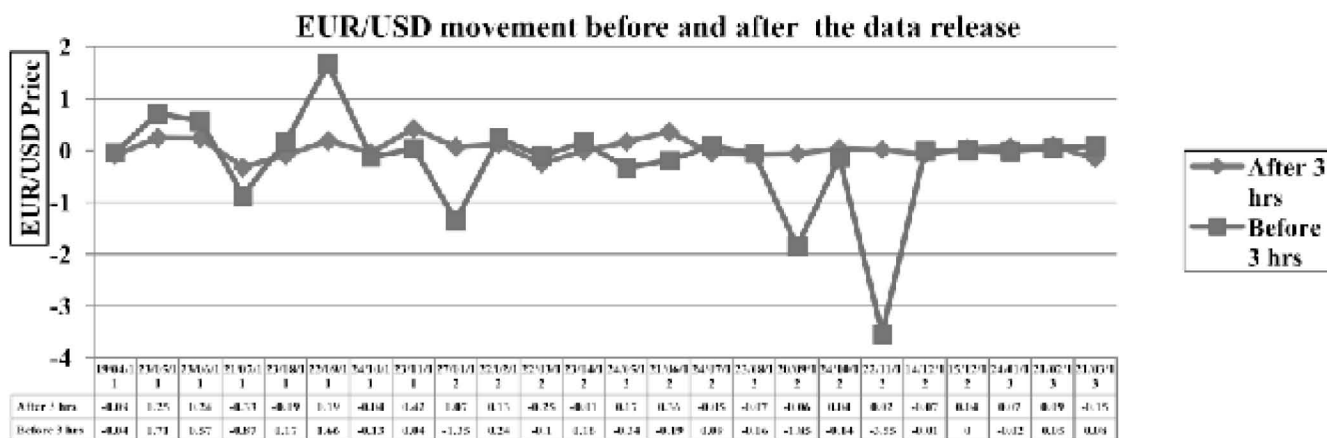


Table 4: Karl Pearson's coefficient of correlation between Actual release of German Flash Manufacturing (PMI) and EUR/USD price at the end of three hours (closing price of EUR/USD)

Correlations			
		Actual release of German Flash Manufacturing (PMI)	EUR/USD price at the end of three hours (close price of EUR/USD)
Actual release of German Flash Manufacturing (PMI)	Karl Pearson's coefficient of correlation	1	.822**
	Sig. (2-tailed)		.000
	N	24	24
EUR/USD price at the end of three hours (close of EUR/USD) .822**	Karl Pearson's coefficient of correlation	.822**	1
	Sig. (2-tailed)	.000	
	N	24	24

German Flash Manufacturing (PMI) and changes in the price of Euro per dollar.

H1: There is a relationship between the data release of German Flash Manufacturing (PMI) and changes in the price of Euro per dollar.

Step2: Level of significance

Level of significance is 0.05.

Step3: Test to be used

Karl Pearson's coefficient correlation: Correlations is used to test two quantitative variables. Karl Pearson's coefficient correlation determines whether there is any significant linear relationship exists in a bivariate association. The three possible research hypotheses for this model are: positive linear relationship, negative linear relationship, and no linear relationship H0.

Step4: Decision rule

P value < level of significance reject H0

Observation

As per the above table the value of P is 0.000 which is less than 0.05. The value of r is .822 which signifies that there is a strong Karl Pearson's coefficient of correlation between Actual release of German Flash Manufacturing PMI and EUR/USD price at the end of three hours.

Interpretation

It has been observed from the table 4 that Actual release of German Flash Manufacturing PMI has a positive correlation with EUR/USD price at the end of three hours. The value of r is .822 which signifies that there is a strong Karl Pearson's coefficient of correlation between the actual release of

German Flash Manufacturing PMI and EUR/USD price at the end of three hours. This means that changes in one variable are correlated with changes in the second variable. It can be concluded that one variable increases in value; the second variable also increases in value. Similarly, as one variable decreases in value, the second variable also decreases in value i.e. when the data release of German Flash Manufacturing PMI is greater the price of euro shoots up and when it churns out to be less than expected the price of the euro goes down. Hence the H0: There is no relationship between the data release of German Flash Manufacturing PMI and changes in the price of Euro per dollar gets rejected and alternate hypothesis i.e. H1 gets accepted.

Step1: Defining the Hypotheses

H0: There is no significant impact of German Flash Manufacturing PMI on EUR/USD

H1: There is the significant impact of German Flash Manufacturing PMI on EUR/USD

Step2: Level of significance

Level of significance is 0.05

Step3: Test to be used: Regression analysis

In this regression model EUR/USD price at the end of three hours is a dependent variable and an actual release of German Flash Manufacturing PMI is an independent variable.

As per the table 2, R square is 67.6% which indicates that Actual release of German Flash Manufacturing PMI indicator has 67.6% impact on EUR/USD price.

Interpretation

It has been observed from table 5 that EUR/USD price at the end of three hours is a dependent variable and an actual release of German Flash Manufacturing PMI is an independent variable. With the help of table 5, below mentioned equations get formulated:

$$\text{The price of EUR/USD} = .753 + .012 (\text{German Flash Manufacturing PMI})$$

R is the square root of R-Squared and this determines the relationship between the German Flash Manufacturing PMI and EUR/USD movement. R-Square signifies the proportion of variance i.e. 67.6% of change in the prices of EUR/USD is due to German Flash Manufacturing PMI. The coefficient for German Flash Manufacturing PMI is .012 so for every unit increase in for German Flash Manufacturing PMI, a unit 0.012 increases in the price of EUR/USD is predicted to hold

the entire variable constant. Hence the H0: There is no significant impact of German Flash Manufacturing PMI on EUR/USD gets rejected.

Observation

As per the table 6 total variance is 0.086 which is partitioned into the variance which can be explained by the independent variables (Regression) i.e. 0.058 and the variance which is not explained by the independent variables (Residual) i.e. 0.028.

The Regression degrees of freedom correspond to the number of coefficients estimated 1. DF associated with residual is 22 and total DF is the sum of regression Df and Residual Df.

In Mean Squares, the Sum of Squares divided by their respective DF i.e. 0.058/1 and 0.028/22.

Table 5: Regression Analysis

Model Summary					
Model	R	R Square	Adjusted R Square	R	Std. Error of the Estimate
1	.822 ^a	0.676	0.662		0.035632
Predictors: (Constant), Actual data release of German Flash PMI					
Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.753	0.086		8.799	0
Actual data release	0.012	0.002	0.822	6.779	0
a. Dependent Variable: EUR/USD price at the end of three hours.					
The constant value reflects the value of EUR/USD i.e. 0.753 when German flash PMI is zero.					

Table 6: ANOVA Test

ANOVA					
Model	Sum of Squares	DF	Mean Square	F	Sig.
Regression	0.058	1	0.058	45.956	.000 ^a
Residual	0.028	22	0.001		
Total	0.086	23			
a. Predictors: (Constant), Actual data release					
b. Dependent Variable EUR/USD price at the end of three hours					

Interpretation

It has been observed from table 6 that the value of significance is 0.000 less than 0.005 so study rejects H0 and accepts H1 which states that there is some relationship between German Flash Manufacturing PMI and EUR/USD. With the help of ANOVA table this research rejects H0 which states that there is no significant impact of data release on EUR/USD and postulate that there is significant impact of this indicator on EUR/USD.

Interpretation

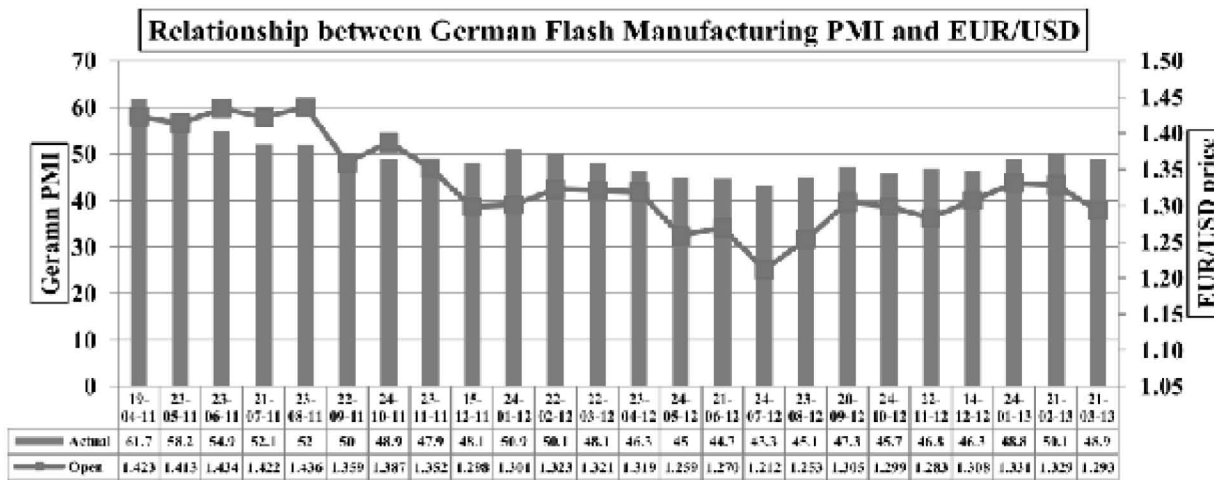
Graph 3 depicts Period 19th April 2011 to 21st March 2013. The above graph is a two axis graph in which bar graph represents the release of German Flash Manufacturing PMI data and line graph represents the price of euro per dollar at the time of the data release. The line graph goes in line with the bar graph for most of the data which states that the price moments fluctuate based on the data release if it is

above the forecast the price goes up and if it is below the forecast the price goes down. For e.g.: The data release on 22nd March 2013 is less than previous data release so the price of EUR/USD has gone down while the data release on 21st February was more than previous release so the price of EUR/USD has gone up along the lines of bar graph.

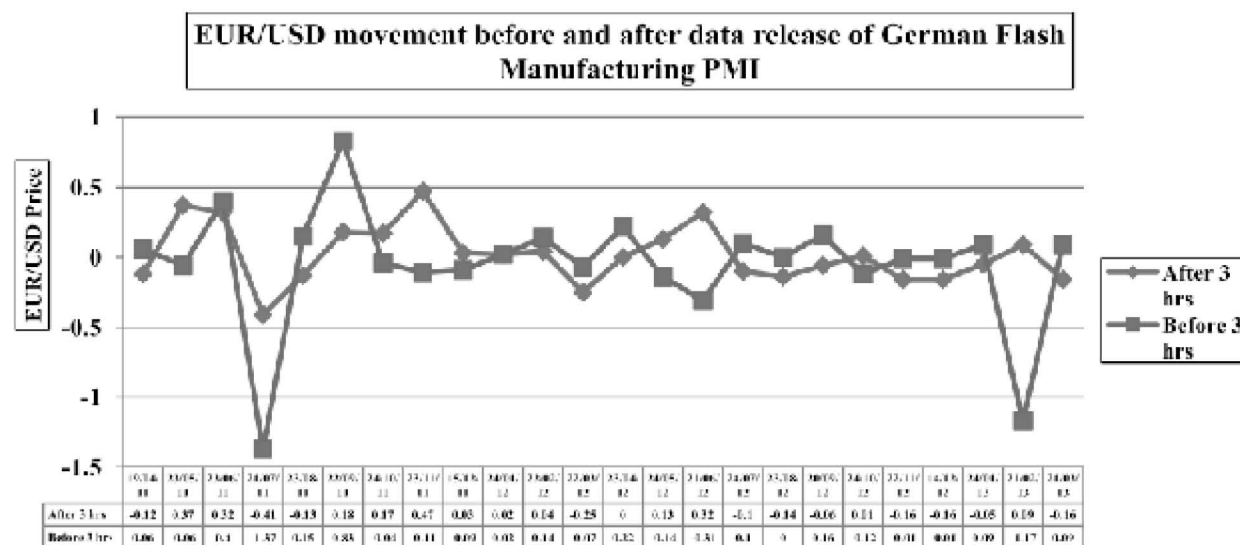
Interpretation

Graph 4 depicts Period 19th April 2011 to 21st March 2013. This chart represents the changes in the price movement before the release of data and after the data release this chart takes into consideration the difference of open and close of EUR/USD before three hours and three hours after the data release. The difference of open and close after three hours is greater than the difference between open and close before three hours hence it can be concluded that the data had a positive impact on EUR/USD and the difference of open and close after three hours is less than

Graph3: EUR/USD movement at the time of the data release of German Flash Manufacturing PMI



Graph4: Tracking the EUR/USD movement on a comparative basis for 3 hours before the release and after of data.



the difference between open and close before three hours hence it can be concluded that the data had a negative impact on EUR/USD and this holds true for most of the data in the graph. In this graph the line representing after a data release moves in line with the data release before 3 hours except for two cases where it is below so more less the impact of GDP is evident in the change in price of EUR/USD. The data release of German Flash Manufacturing PMI has significant impact on EUR/USD positive data release will give the euro a new high and data below the forecast will pull down the EUR/USD.

GERMAN IFO BUSINESS CLIMATE

German IFO Business Climate: This survey is highly respected due to its large sample size and historic correlation with German and wider Euro zone economic conditions. It tends to create a hefty market impact upon release. Source changed series from a base year of 2000 to a base year of 2005 as of May 2011; Level of a composite index based on surveys manufacturers, builders, wholesalers, and retailers.

Usual Effect: Actual > Forecast = Good for currency.

Frequency: Released monthly, around 3 weeks into the current month

The significance of PMI: It's a leading indicator of economic health and is related to businesses reacts quickly to market conditions, and changes in their sentiment can be an early signal of future economic activity such as spending, hiring, and investment.

Hypothesis testing:

Step1: Defining the hypotheses

H0: There is no relationship between the data release of German IFO Business Climate and changes in the price of Euro per dollar.

H1: There is a relationship between the data release of German IFO Business Climate and changes in the price of Euro per dollar.

Step2: Level of significance

Level of significance is 0.05

Step3: Test to be used

Karl Pearson's coefficient correlation: Correlations is used to test two quantitative variables. Karl Pearson's coefficient correlation determines whether there is any significant linear relationship exists in a bivariate association. The three possible research hypotheses for this model are: positive linear relationship, negative linear relationship, and no linear relationship H0.

Step4: Decision rule

P value < level of significance reject H0

Observation:

As per the above table the value of P is 0.000 which is less than 0.05. The value of r is .689 which signifies that there is a moderate Karl Pearson's coefficient of correlation between Actual release of German IFO Business

Table 7: Correlation between Actual release of German IFO business climate and EUR/USD price at the end of three hours (closing price of EUR/USD)

Correlations			
		Actual release of German IFO Business Climate	EUR/USD price at the end of three hours (close price of EUR/USD)
Actual release of German IFO Business Climate	Karl Pearson's coefficient of correlation	1	.689**
	Sig. (2-tailed)		.000
	N	24	24
EUR/USD price at the end of three hours (close of EUR/USD) .689**	Karl Pearson's coefficient of correlation	.689**	1
	Sig. (2-tailed)	.000	
	N	24	24

Climate and EUR/USD price at the end of three hours.

Interpretation

It has been observed from the table 7 that Actual release of the German IFO Business Climate has a positive correlation with EUR/USD price at the end of three hours. The value of r is .689 which signifies that there is a moderate Karl Pearson's coefficient of correlation between the actual release of German IFO Business Climate and EUR/USD price at the end of three hours. This means that changes in one variable are correlated with changes in the second variable. It can be concluded that one variable increases in value; the second variable also increases in value. Similarly, as one variable decreases in value, the second variable also decreases in value i.e. when the data release of German IFO Business Climate is greater the price of euro shoots up and when it churns out to be less than expected the price of the euro goes down. Hence the H_0 : There is no relationship between the data release of German IFO Business Climate and changes in the price of Euro per dollar gets rejected and alternate hypothesis i.e. H_1 gets accepted.

Step1: Defining the hypotheses

H_0 : There is no significant impact of German IFO Business Climate on EUR/USD

H_1 : There is significant impact of German IFO Business Climate on EUR/USD

Step2: Level of significance

Level of significance is 0.05

Step3: Test to be used: Regression analysis

Observation

In this regression model EUR/USD price at the end of three hours is a dependent variable and an actual release of German IFO Business Climate is independent variable.

As per the table 2, R square is 47.5% which indicates that Actual release of German IFO Business Climate indicator has 47.5% impact on EUR/USD price.

Interpretation

It has been observed from table 8 that EUR/USD price at the end of three hours is a dependent variable and an actual release of German IFO Business Climate is independent variable. With the help of table 8, below mentioned equations get formulated:

$$\text{The price of EUR/USD} = 0.077 + .012 (\text{German IFO Business Climate})$$

R is the square root of R-Squared and this determines the relationship between the German Flash Manufacturing PMI and EUR/USD movement. R-Square signifies the proportion of variance i.e. 47.5% of changes in the price of EUR/USD is due to German IFO Business Climate. The coefficient for German IFO Business Climate is .012 so for every unit increase in for German IFO Business Climate, a unit 0.012 increases in the price of EUR/USD is predicted to

Table 8: Regression Analysis

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.689 ^a	0.475	0.451	0.050015	
Predictors: (Constant), Actual data release of German IFO Business Climate					
Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.077	0.281		0.274	0.786
Actual data release	0.012	0.003	0.689	4.462	0.000
a. Dependent Variable: EUR/USD price at the end of three hours.					
The constant value reflects the value of EUR/USD i.e. 0.776 when German IFO business Climate is zero.					

hold the entire variable constant. Hence the H0: There is no significant impact of German IFO Business Climate on EUR/USD gets rejected.

Observation

·As per the table 9 total variance is 0.105 which is partitioned into the variance which can be explained by the independent variables (Regression) i.e. 0.05 and the variance which is not explained by the independent variables (Residual) i.e. 0.055.

·The Regression degrees of freedom correspond to the number of coefficients estimated 1. DF associated with residual is 22 and total DF is the sum of regression Df and Residual Df.

Interpretation

It has been observed from table 9 that the value of significance is 0.000 less than 0.005 so study rejects H0 and

accepts H1 which states that there is some relationship between German IFO Business Climate and EUR/USD. With the help of ANOVA table this research rejects H0 which states that there is no significant impact of data release on EUR/USD and postulate that there is significant impact of this indicator on EUR/USD.

Interpretation

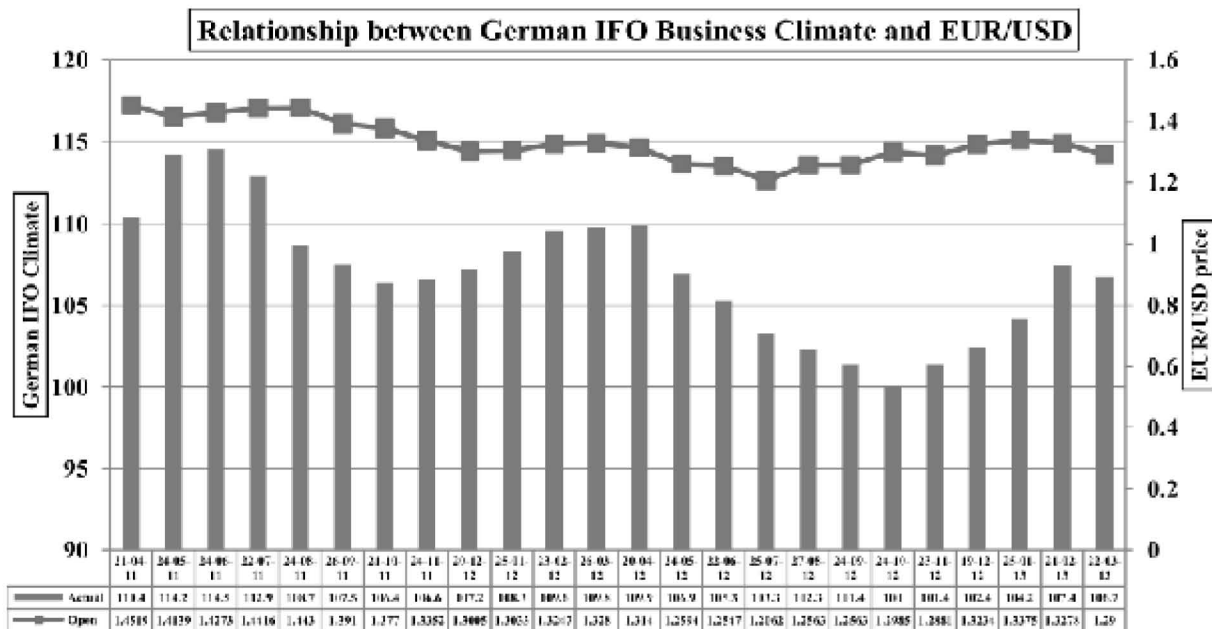
Graph 5 depicts Period 21st April 2011 to 22nd March 2013. The above graph is a two axis graph in which bar graph represents the release of German IFO Business Climate data and line graph represents the price of euro per dollar at the time of the data release. The line graph goes in line with the bar graph for most of the data which states that the price moments fluctuate based on the data release if it is above the forecast the price goes up and if it is below the forecast the price goes down. For e.g.: The data release on 22 march 2013 was 106.7 less than the forecast of 107.8 so

Table 9: ANOVA Test

ANOVA ^b					
Model	Sum of Squares	DF	Mean Square	F	Sig.
Regression	0.05	1	0.05	19.913	.000 ^a
Residual	0.055	22	0.003		
Total	0.105	23			

a. Predictors: (Constant), Actual data release
 b. Dependent Variable EUR/USD price at the end of three hours

Graph5: EUR/USD movement at the time of the data release of German IFO Business Climate



the closing price of EUR/USD has dropped down signifying the impact of this data on EUR/USD and similarly the data release on 25th January is more than the forecast so the price of EUR/USD has gone up.

Interpretation

Graph 6 depicts Period 21st April 2011 to 22nd March 2013. This chart represents the changes in the price movement before the release of data and after the data release this chart takes into consideration the difference of open and close of EUR/USD before three hours and three hours after the data release. The difference of open and close after three hours is greater than the difference between open and close before three hours hence it can be concluded that the data had a positive impact on EUR/USD and the difference of open and close after three hours is less than the difference between open and close before three hours hence it can be concluded that the data had a negative impact on EUR/USD and this holds true for most of the data in the graph. In this graph the after 3 hour line signified by a blue line moves more or less in lines with before 3 hours line exclusive of the data release on 24th October 2012 and 24th September 2012 where the data result was disappointing defying the expectation. German IFO business climate has significant impact on EUR/USD positive data release will give the euro a new high and data below the forecast will pull down the EUR/USD.

FINDINGS

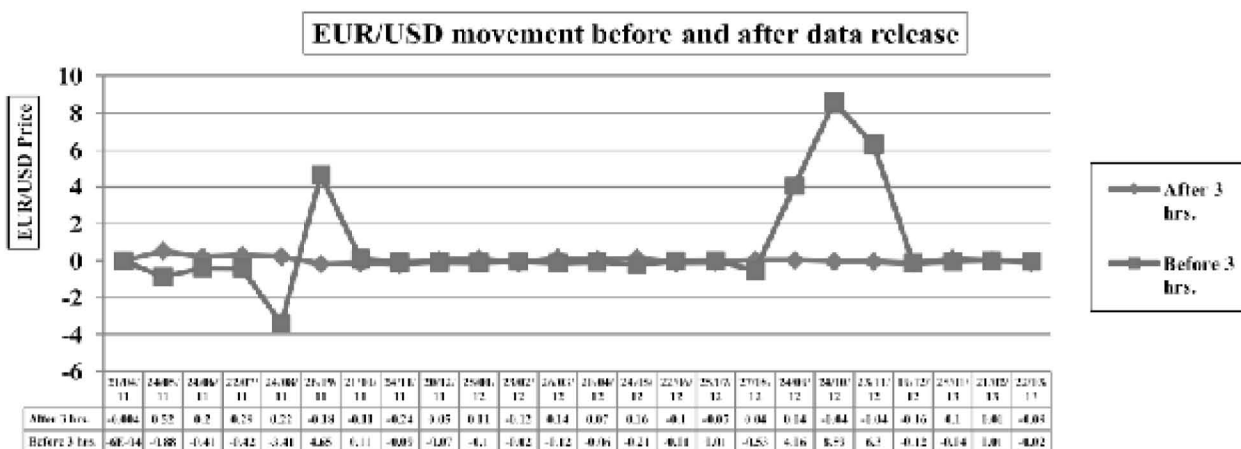
French flash manufacturing PMI is second most important economic indicator in business survey as it contributes 53 percent of changes in EUR/USD. French flash manufacturing PMI determines the progress of

manufacturing activities in the French third largest economy in the European Union. German flash PMI is at the top spot as the most important economic indicator in business survey as it contributes 67 percent of changes in EUR/USD. German manufacturing PMI forms the crux of manufacturing health in Germany which is the largest economy in the European Union. German IFO business climate constitutes 47 percent of the changes in EUR/USD. It is the third most important economic indicator in business survey due to its large sample size and historic correlation with German and wider Euro zone economic conditions

CONCLUSION

The value of r is .729, .822, and .689 in case of French Flash Manufacturing PMI, German Flash Manufacturing PMI and German IFO Business Climate which signifies that there is a moderate Karl Pearson's coefficient of correlation between actual release of French Flash Manufacturing PMI and EUR/USD price at the end of three hours, there is a strong Karl Pearson's coefficient of correlation between actual release of German Flash Manufacturing PMI and EUR/USD price at the end of three hours and there is a moderate Karl Pearson's coefficient of correlation between actual release of German IFO Business Climate and EUR/USD price at the end of three hours respectively. This study concluded that the changes in one variable are correlated with changes in the second variable. It can be concluded that one variable increases in value; the second variable also increases in value. Similarly, as one variable decreases in value, the second variable also decreases in value i.e. when the data release of French flash manufacturing PMI, German Flash Manufacturing PMI and German IFO Business Climate are greater the price of euro shoots up and when it churns out

Graph6: Tracking the EUR/USD movement on a comparative basis for 3 hours before the release and after of data.



to be less than expected the price of the euro goes down. The release of French Flash Manufacturing PMI has significant impact on EUR/USD positive data release will give the euro a new high and data below the forecast will pull down the EUR/USD. This economic indicator contributes 53% of changes in EUR/USD price movement. German Flash Manufacturing PMI is a most important economic indicator which contributes 67% of changes in

EUR/USD price movement. German IFO Business Climate is an economic indicator which contributes 47% of changes in EUR/USD price movement. There are other factors such as data release of dollar, political instability in Europe, global economic scenario, changes in monetary policy influences EUR/USD price. This research rejects all the hypotheses and accepts all the alternate hypotheses.

APPENDIX: Tables for French Flash Manufacturing, German Flash PMI, German IFO Business Climate

French Flash Manufacturing

Date	Actual	Forecasted	Previous	Timing	Open	High	Low	Close	Open before 3 hrs	After 3 hrs	Before 3 hrs
21-Mar-13	43.9	44.4	43.9	04:00	1.2935	1.295	1.2929	1.295	1.2943	-0.15	0.08
21-Feb-13	43.6	43.9	42.9	04:00	1.3286	1.329	1.3271	1.3277	1.3291	0.09	0.05
24-Jan-13	42.9	44.9	44.6	04:00	1.3315	1.3317	1.3302	1.3308	1.3313	0.07	-0.02
14-Dec-12	44.6	44.9	44.5	04:00	1.3076	1.3085	1.3067	1.3083	1.3075	-0.07	-0.01
22-Nov-12	44.7	44.1	43.7	04:00	1.3178	1.3186	1.3171	1.3176	1.2823	0.02	-3.55
24-Oct-12	43.5	43.9	42.7	03:00	1.2985	1.2987	1.2973	1.2981	1.2971	0.04	-0.14
20-Sep-12	42.6	46.5	46	03:00	1.3045	1.3059	1.3044	1.3051	1.286	-0.06	-1.85
23-Aug-12	46.2	43.7	43.4	03:00	1.2526	1.2544	1.2524	1.2533	1.252	-0.07	-0.06
24-Jul-12	43.6	45.6	45.2	03:00	1.2117	1.2135	1.2108	1.2122	1.2126	-0.05	0.09
21-Jun-12	45.3	44.6	44.7	03:00	1.2705	1.2706	1.2664	1.2669	1.2686	0.36	-0.19
24-May-12	44.4	47.1	46.9	03:00	1.2587	1.2599	1.2555	1.257	1.2553	0.17	-0.34
23-Apr-12	47.3	47.3	46.7	03:00	1.3192	1.321	1.3189	1.3193	1.3208	-0.01	0.16
22-Mar-12	47.6	50.4	50	04:00	1.3216	1.3246	1.321	1.3241	1.3206	-0.25	-0.1
22-Feb-12	50.2	49.1	48.5	04:00	1.3234	1.325	1.3219	1.3221	1.3258	0.13	0.24
24-Jan-12	48.5	49.2	48.9	04:00	1.3019	1.3029	1.3007	1.3012	1.2884	0.07	-1.35
15-Dec-12	48.7	47.1	47.3	04:00	1.2986	1.2994	1.2981	1.2982	1.2986	0.04	0
23-Nov-11	47.6	47.7	48.5	04:00	1.3512	1.3531	1.3506	1.347	1.3516	0.42	0.04
24-Oct-11	49	48.1	48.2	03:00	1.3858	1.3874	1.3829	1.3862	1.3845	-0.04	-0.13
22-Sep-11	47.3	48.6	49.1	03:00	1.3576	1.3601	1.3555	1.3557	1.3742	0.19	1.66
23-Aug-11	49.3	50.1	50.5	03:00	1.4356	1.4371	1.4354	1.4365	1.4373	-0.09	0.17
21-Jul-11	50.1	52.3	52.5	03:00	1.4219	1.4274	1.421	1.4252	1.4132	-0.33	-0.87
23-Jun-11	52.5	54.2	54.9	03:00	1.4344	1.4344	1.4306	1.432	1.4401	0.24	0.57
23-May-11	55	57	57.5	03:00	1.4138	1.4144	1.4102	1.4113	1.4209	0.25	0.71
19-Apr-11	56.9	55.2	55.4	03:00	1.423	1.4242	1.422	1.4239	1.4226	-0.09	-0.04

German Flash PMI

Date	Actual	Forecasted	Previous	Timing	Open	High	Low	Close	Open before 3 hrs	After 3 hrs	Before 3 hrs
21-Mar-13	48.9	50.8	50.3	04:30	1.2933	07:05	1.2929	1.2949	1.2942	-0.16	0.09
21-Feb-13	50.1	50.4	49.8	04:30	1.3288	1.329	1.3271	1.3279	1.3171	0.09	-1.17
24-Jan-13	48.8	47.1	46	04:30	1.3311	1.3319	1.3297	1.3316	1.332	-0.05	0.09
14-Dec-12	46.3	47.1	46.8	04:30	1.3076	1.3085	1.3068	1.3092	1.3075	-0.16	-0.01
22-Nov-12	46.8	45.9	46	04:30	1.2828	1.2868	1.2827	1.2844	1.2827	-0.16	-0.01
24-Oct-12	45.7	48.1	47.4	03:30	1.2985	1.2987	1.2973	1.2984	1.2973	0.01	-0.12
20-Sep-12	47.3	45.4	44.7	03:30	1.3046	1.2342	1.2321	1.3052	1.3062	-0.06	0.16
23-Aug-12	45.1	43.5	43	03:30	1.253	1.2545	1.2524	1.2544	1.2529	-0.14	0
24-Jul-12	43.3	45.3	45	03:30	1.2116	1.2135	1.211	1.2126	1.2126	-0.1	0.1
21-Jun-12	44.7	45.3	45.2	03:30	1.2699	1.2702	1.2666	1.2667	1.2668	0.32	-0.31
24-May-12	45	47.1	46.2	03:30	1.2587	1.2599	1.2555	1.2574	1.2573	0.13	-0.14
23-Apr-12	46.3	49	48.4	03:30	1.3193	1.321	1.3188	1.3193	1.3215	0	0.22
22-Mar-12	48.1	51.1	50.2	04:30	1.3213	1.3246	1.3211	1.3238	1.3206	-0.25	-0.07
22-Feb-12	50.1	51.6	51	04:30	1.3232	1.325	1.3211	1.3228	1.3246	0.04	0.14
24-Jan-12	50.9	49.1	48.4	04:30	1.3014	1.3029	1.3008	1.3012	1.3016	0.02	0.02
15-Dec-11	48.1	47.6	47.9	04:30	1.2984	1.2997	1.2981	1.2981	1.2975	0.03	-0.09
23-Nov-11	47.9	48.4	49.1	04:30	1.3517	1.3531	1.3455	1.347	1.3506	0.47	-0.11
24-Oct-11	48.9	50	50.3	03:30	1.3872	1.3874	1.3829	1.3855	1.3868	0.17	-0.04
22-Sep-11	50	50.2	50.9	03:30	1.3587	1.3601	1.3549	1.3569	1.367	0.18	0.83
23-Aug-11	52	50.9	52	03:30	1.4358	1.4376	1.4354	1.4371	1.4373	-0.13	0.15
21-Jul-11	52.1	54.1	54.6	03:30	1.4221	1.4274	1.4257	1.4262	1.4084	-0.41	-1.37
23-Jun-11	54.9	57.1	57.7	03:30	1.4337	1.4338	1.4306	1.4305	1.4377	0.32	0.4
23-May-11	58.2	61.2	62	03:30	1.4133	1.4144	1.4092	1.4096	1.4127	0.37	-0.06
19-Apr-11	61.7	60.1	60.9	03:30	1.4228	1.4246	1.422	1.424	1.4234	-0.12	0.06

German IFO Business Climate

Date	Actual	Forecasted	Previous	Timing	Open	High	Low	Close	Open before 3 hrs.	After 3 hrs.	Before 3 hrs.
22-Mar-13	106.7	107.8	107.4	05:00	1.29	1.2916	1.29	1.2909	1.2898	-0.09	-0.02
21-Feb-13	107.4	104.9	104.3	05:00	1.3278	1.3289	1.3271	1.3277	1.3279	0.01	0.01
25-Jan-13	104.2	103.1	102.4	05:00	1.3375	1.3377	1.335	1.3365	1.3371	0.1	-0.04
19-Dec-12	102.4	101.9	101.4	05:00	1.3234	1.3256	1.3224	1.325	1.3222	-0.16	-0.12
23-Nov-12	101.4	99.6	100	05:00	1.2881	1.2888	1.287	1.2885	1.3511	-0.04	6.3
24-Oct-12	100	101.5	101.4	04:00	1.2985	1.2992	1.2973	1.2989	1.3844	-0.04	8.59
24-Sep-12	101.4	102.6	102.3	04:00	1.2563	1.2566	1.2553	1.2559	1.2969	0.04	4.06
27-Aug-12	102.3	102.7	103.2	04:00	1.2563	1.2566	1.2553	1.2559	1.251	0.04	-0.53
25-Jul-12	103.3	104.8	105.2	04:00	1.2062	1.2072	1.206	1.2069	1.2063	-0.07	0.01
22-Jun-12	105.3	106.1	106.9	04:00	1.2547	1.2565	1.2543	1.2557	1.2546	-0.1	-0.01
24-May-12	106.9	109.4	109.9	04:00	1.2594	1.2599	1.2561	1.2578	1.2573	0.16	-0.21
20-Apr-12	109.9	109.6	109.8	04:00	1.314	1.3155	1.313	1.3133	1.3134	0.07	-0.06
26-Mar-12	109.8	109.7	109.7	04:00	1.328	1.3285	1.3261	1.3266	1.3268	0.14	-0.12
23-Feb-12	109.6	108.7	108.3	05:00	1.3247	1.3261	1.3231	1.3259	1.3245	-0.12	-0.02
25-Jan-12	108.3	107.6	107.3	05:00	1.3033	1.3047	1.3022	1.3022	1.3023	0.11	-0.1
20-Dec-11	107.2	106.2	106.6	05:00	1.3005	1.3015	1.3001	1.3	1.2998	0.05	-0.07
24-Nov-11	106.6	105.3	106.4	05:00	1.3352	1.3379	1.3343	1.3376	1.3343	-0.24	-0.09
21-Oct-11	106.4	106.3	107.4	04:00	1.377	1.3798	1.3778	1.3781	1.3781	-0.11	0.11
26-Sep-11	107.5	107	108.7	04:00	1.391	1.3931	1.3902	1.3928	1.4375	-0.18	4.65
24-Aug-11	108.7	111.2	112.9	04:00	1.443	1.4442	1.4401	1.4408	1.4089	0.22	-3.41
22-Jul-11	112.9	113.7	114.5	04:00	1.4416	1.4422	1.4403	1.4387	1.4374	0.29	-0.42
24-Jun-11	114.5	113.6	114.2	04:00	1.4273	1.4276	1.4234	1.4253	1.4232	0.2	-0.41
24-May-11	114.2	113.9	114.2	04:00	1.4139	1.4139	1.4102	1.4087	1.4051	0.52	-0.88
21-Apr-11	110.4	110.6	111.1	04:00	1.4519	1.4575	1.4506	1.4567	1.4513	-0.004	-0.0006

REFERENCES

Amador, O., Gachter, F., Larch, M., Peter, G. Monetary policy and its impact on stock market liquidity. Evidence from the euro zone.

Beisea, M., Stahla, H. (1999). Public research and industrial innovations in Germany. *Research Policy*, 28 (4), 397–422.

Combes, P. (2000). Economic Structure and Local Growth: France, 1984–1993, *Journal of Urban Economics*, 47 (3), 329–355.

Hall, B., Mairesseb, J. (1995). Exploring the relationship between R&D and productivity in French manufacturing firms. *Journal of Econometric*, 65 (1), 263–293.

Jimenez-Contreras, E., Anegon, F., Lopez-Cozar, E. (2003). The evolution of research activity in Spain: The impact of the National Commission for the Evaluation of Research Activity (CNEAI). *Research Policy* 32(1), 123–142.

LairellakpamGovind, Mihir Dash. A study of granger causality of macroeconomic factors on Indian stock markets.

Lovell, K., Pastor, J., Turner, J. (1995). Measuring macroeconomic performance in the OECD: A comparison of European and non-

European countries. *European Journal of Operational Research* 87 (3), 507–518.

Maheshwari, A., Upamannyu, N., Bhakuni, P., Saban, A. IMPACT OF WPI, EXCHANGE RATE, GOLD RATE, FOREX AND MARKET CAPITALIZATION ON NSE RETURNS. ABHINAV.

Mairesse, J., Greenan, N., Topiol-Bensaid, A. (2001). Information Technology and Research and Development Impacts on Productivity and Skills: Looking for Correlations on French Firm Level Data. NBER.

Malarvizhi, K., Thenmozhi, R., Jaya, M. (2012). IMPACT OF GROSS DOMESTIC PRODUCT ON INDIAN STOCK MARKET- AN EMPIRICAL STUDY. *IJEMR*, 2 (1).

Singh, R. (2013). STUDY OF THE IMPACT OF MACRO ECONOMIC VARIABLE & THEIR ROLE AS AN INDICATORS FOR THE S&P CNX NIFTY, A NATIONAL JOURNAL OF MANAGEMENT, 1(1).

