"A Study on Impact of macroeconomic variables in the stock market"

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Abstract

Stock market is influenced by macro-economic variable factors. There are lot of empirical studies on the macro-economic variable factors, and how do they impact on the stock market of any economy. These cross-impacts create ripples in stock market, and thereby investor confidence levels are being tested, every now and then. A healthy and flourishing stock market has been considered relevant for national economic growth by channelizing capital toward investors and entrepreneurs. An economy is said to be efficient if it has a good banking and good stock market exhibiting upward trend. Earlier a country was considered strong and efficient if it exhibited a sustained growth of GDP (gross domestic product) and per capita income.

Keywords: *Macro-Economics, Stock Market, GDP, Investor, Economic Growth*

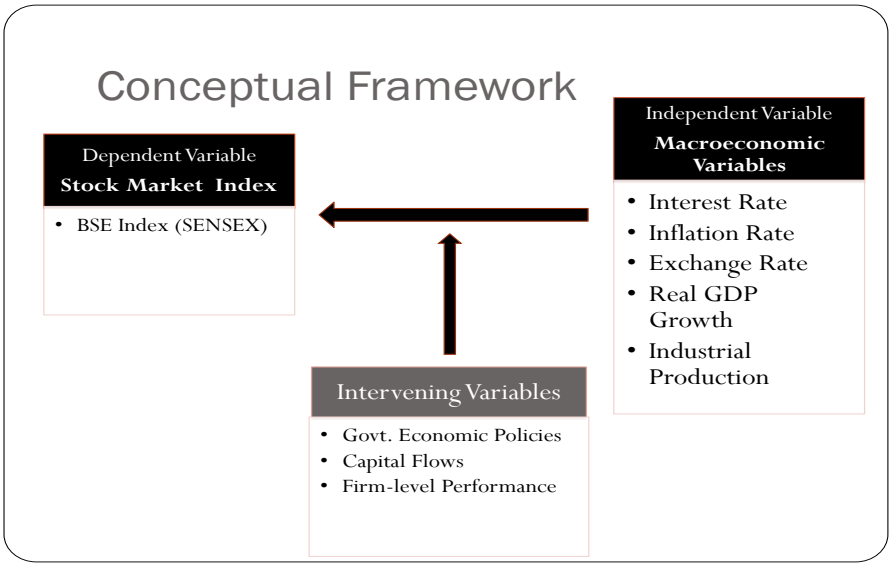
Introduction

Stock market plays a vital role in any country's economic growth and development. A healthy and flourishing stock market has been considered relevant for national economic growth by channelizing capital toward investors and entrepreneurs. An economy is said to be efficient if it has a good banking and good stock market exhibiting upward trend. Earlier a country was considered strong and efficient if it exhibited a sustained growth of GDP (gross domestic product) and per capita income. But, of late it has been recognised that stock market exerts greater influence on national economy.

Market capitalisation, savings, investment, consumption and sound banking and insurance system are considered to be a few important indicators of economic growth. The performance of stock market is one of them. The relation between stock returns and other macro economic variables has been investigated by several researchers over many years. Equities have always tradionally been regarded as a good hedge against inflation because equities are claim against physical assets whose real returns should remain unaffected by inflation.

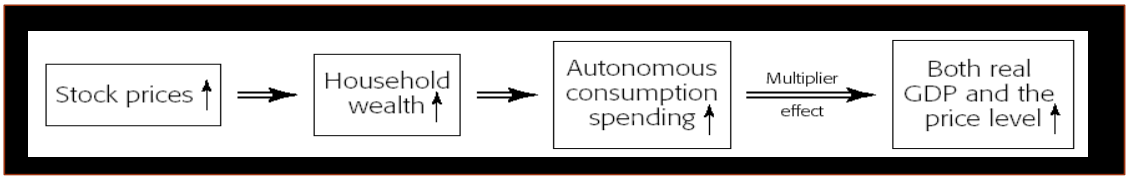
Now in this research paper we are investigating the following variables: Stock market index (Sensex), GDP, Inflation, CRR, Index on industrial production, and USD (US dollars, forex).

Now let us have a look at the conceptual framework of this research paper:

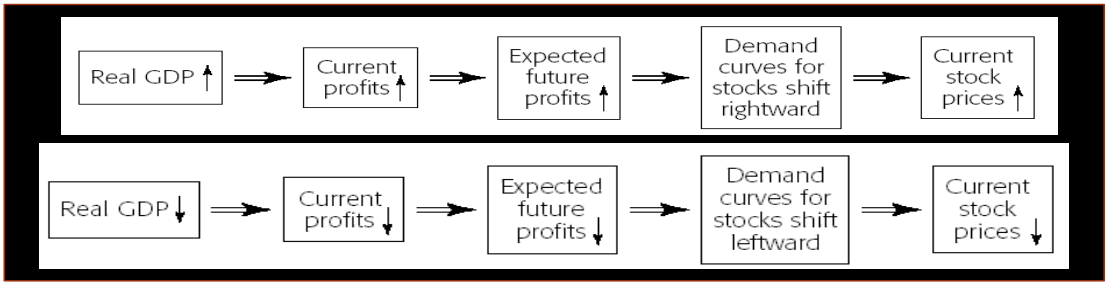


Stock Market and Economic Growth

The Wealth Effect



The Expectations Hypothesis



Operational Definitions of Variables

Variables	Operational Definitions	Identity
Stock Market Index	The stock market index has been used as a measure of aggregate stock prices. The BSE index will be used in logarithmic form.	Dependent Variable
Economic Growth	The quarterly real GDP growth rate published by RBI.	Independent Variable
Money Supply	The logarithmic form of quarterly money supply (M3) data of RBI.	Independent Variable
Inflation Rate	The logarithmic form of Wholesale Price Index published by NRB	Independent Variable
Interest Rate	One year T-bills rate of RBI or CRR rate	Independent Variable
Industrial Production	The logarithmic form of quarterly Index of Industrial Production data by the RBI	Independent Variable
Exchange Rate	The real exchange rate between the INR and USD	Independent Variable

Research design

- H1: GDP has significant relationship with the sensex
- H2: Index on Industrial Production and sensex has a significant relationship.
- H3: Interest rate (CRR) has significant negative relationship with the sensex
- H4: Inflation (WPI) has significant relationship with the sensex
- H5: Forex (US dollar) has significant relationship with sensex

Note: Sensex here refers stock market, as a whole

Data Collection Plan

- **Secondary Data**
- Stock Price Data: BSE Database
- Macroeconomic Variables: RBI Database and CMIE Database / Quarterly Time Series Data (2005 to 2012) – (**Note:** Author's research period, is taken for study)

Data Analysis - Indian Macro economic variables (Quarterly data since December 2005 till June 2012)

Qrtr #	Sensex	CRR	IIP	GDP	USD Rate	WPI
1	9397.93	5	109.57	856139	45.65	105.3
2	10523.36	5	119.2	884578	44.4	105.6
3	11016.81	5	112.6	830876	45.45	108.8
4	11632.45	5	116.7	825833	46.37	111.5
5	13481.71	5.25	125.33	936237	44.98	112.5
6	13367.04	6	135.87	971418	44.17	112.6
7	14355.78	6.5	133.93	911603	41.23	114.7
8	16053.56	7	135.07	904529	40.52	115.9
9	19829.39	7.5	143.1	1025818	39.46	116.6
10	16957.29	7.5	154.57	1054685	39.82	119.3
11	15721.49	8.25	145.8	1000947	41.66	125
12	13926.9	9	144.93	981599	43.78	128.7
13	9509.36	5.5	144.73	1084993	48.77	126.7
14	9341.45	5	145.47	1091135	49.78	123.7
15	13507.45	5	143.2	1057641	48.79	125.9
16	16154.6	5	149.03	1070305	48.42	129.4
17	16762.44	5	153.5	1166482	46.64	132.4
18	16771.76	5.75	165.87	1213211	45.93	135.6
19	17401.41	6	156.97	1147409	45.62	139.2
20	18636.18	6	159.23	1151725	46.49	141.4
21	20020.89	6	166.73	1262338	44.86	144.2
22	18532.13	6	179	1324484	45.27	148.5
23	18828.37	6	167.93	1238738	44.71	152.5
24	17109.24	6	164.3	1228982	45.78	155.1
25	16427.8	6	168.7	1339724	50.92	157.2
26	17450.14	4.75	180.13	1395071	50.28	159.7
27	16989.11	4.75	167.63	1306276	54.1	164

Data Source: www.bseindia.com, CMIE database (Business Beackon)

Statistical Data Analysis (Using Minitab)

Correlations: Sensex, GDP

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Pearson correlation of Sensex and GDP = 0.646
P-Value = 0.000
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Correlations: Sensex, CRR

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Pearson correlation of Sensex and CRR = 0.315
P-Value = 0.110
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Correlations: Sensex, IIP

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Pearson correlation of Sensex and IIP = 0.747
P-Value = 0.000
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Correlations: Sensex, USD Rate

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Pearson correlation of Sensex and USD Rate = -0.162
P-Value = 0.418
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Correlations: Sensex, WPI

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Pearson correlation of Sensex and WPI = 0.636
P-Value = 0.000
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Regression Analysis: Sensex versus CRR, IIP, GDP, WPI, USD Rate

Sensex = 27941 - 712 CRR + 74.6 IIP - 0.0031 GDP + 147 WPI - 771 USD Rate

Model – I

SENSEX = c + b1CRR + b2 IIP + b3 GDP + b4 EXRATE + b5 WPI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	27940.98	8698.450	3.212179	0.0042
CRR	-711.7718	510.0150	-1.395590	0.1774
IIP	74.56527	92.65505	0.804762	0.4300
GDP	-0.003115	0.012004	-0.259484	0.7978
EXRATE	-771.4154	182.0779	-4.236734	0.0004
WPI	146.5030	61.24008	2.392273	0.0262

R-squared	0.801298	Mean dependent var	15174.30
Adjusted R-squared	0.753988	S.D. dependent var	3239.672
S.E. of regression	1606.864	Akaike info criterion	17.79509
Sum squared resid	54222268	Schwarz criterion	18.08305
Log likelihood	-234.2337	F-statistic	16.93717
Durbin-Watson stat	1.439411	Prob(F-statistic)	0.000001

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	5	218659996	43731999	16.94	0.000
Residual Error	21	54222268	2582013		
Total	26	272882264			

Source	DF	Seq SS
CRR	1	27077852
IIP	1	141967553
GDP	1	2754738
WPI	1	512943
USD Rate	1	46346910

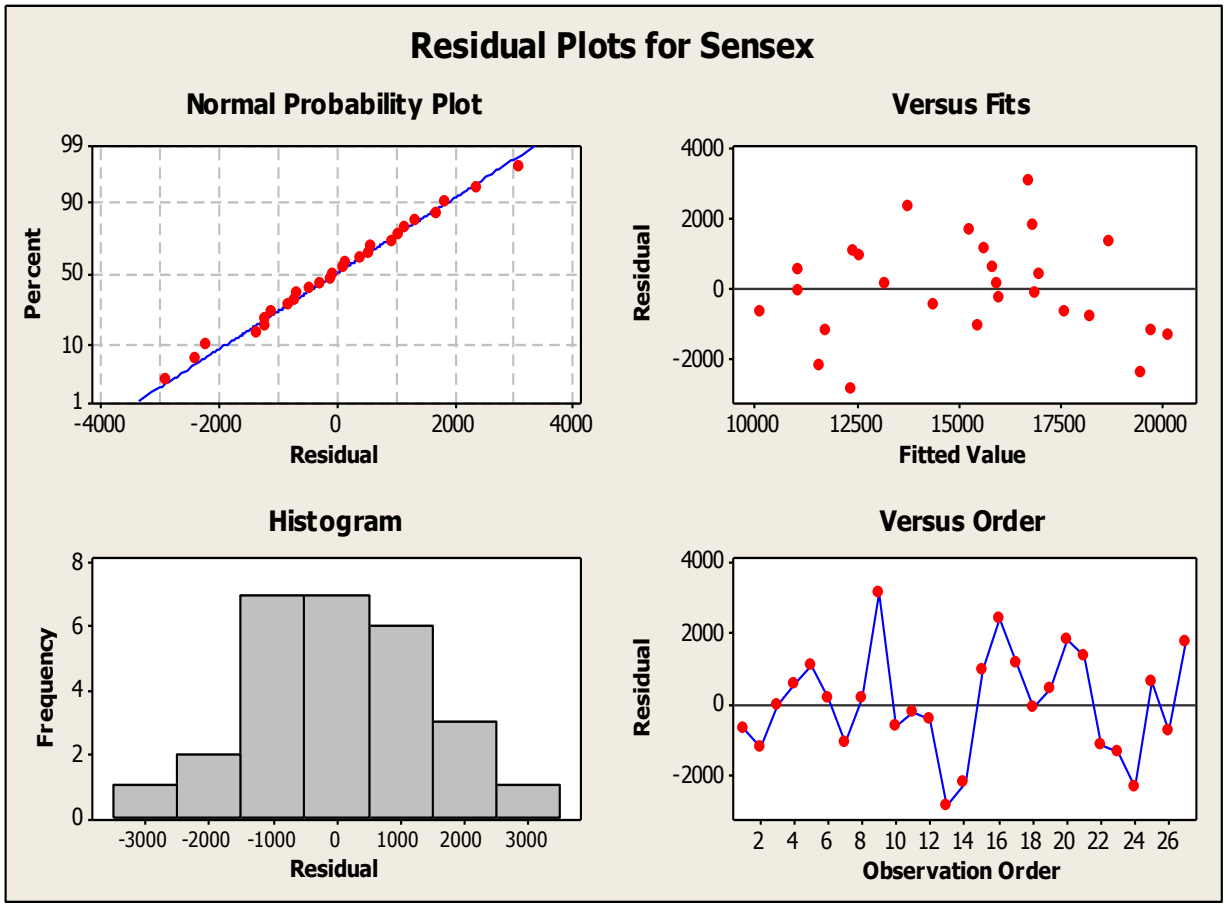
Unusual Observations

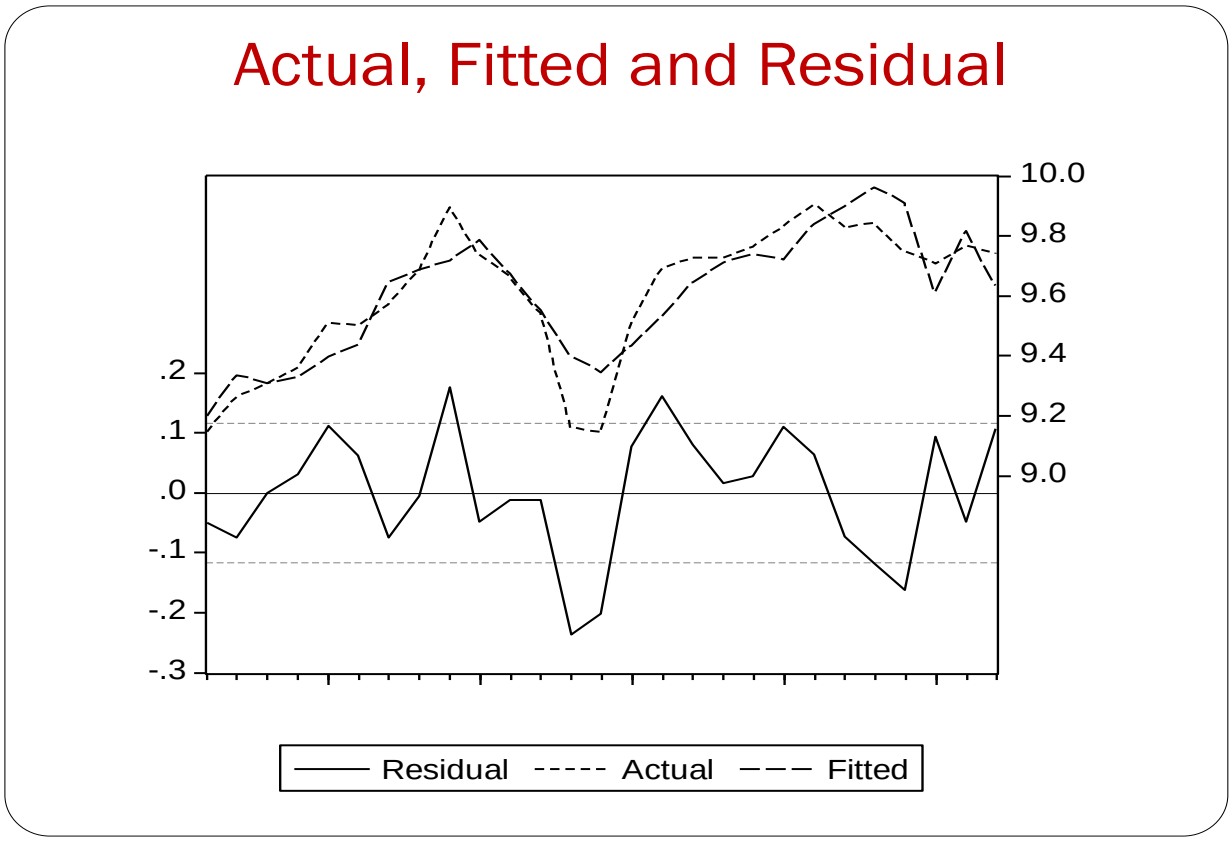
Obs	CRR	Sensex	Fit	SE Fit	Residual	St Resid
9	7.50	19829	16720	873	3110	2.30R

Model – II
(Log-Log Model)

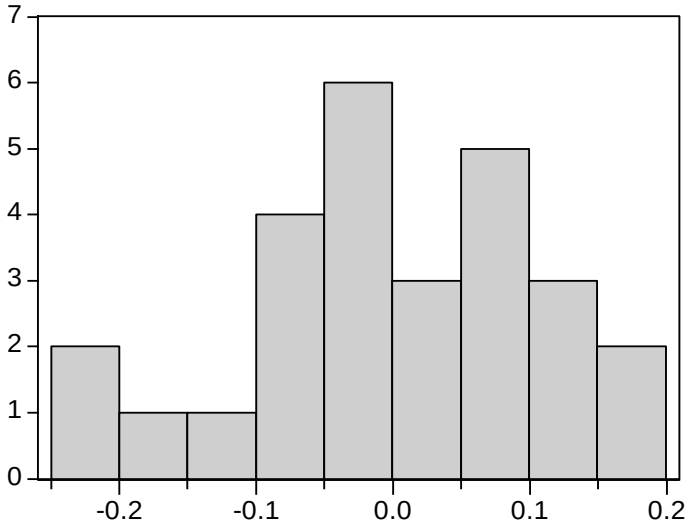
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.41566	7.519015	2.183220	0.0405
LOG(CRR)	-0.454203	0.256276	-1.772320**	0.0909
LOG(IIP)	0.909593	0.932502	0.975432	0.3404
LOG(GDP)	-0.591568	0.871286	-0.678959	0.5046
LOG(EXRATE)	-2.734893	0.644993	-4.240192*	0.0004
LOG(WPI)	1.669147	0.591902	2.819974*	0.010

R-squared	0.798820	Mean dependent var	9.602684
Adjusted R-squared	0.750920	S.D. dependent var	0.233499
S.E. of regression	0.116534	Akaike info criterion	-1.268134
Sum squared resid	0.285185	Schwarz criterion	-0.980170
Log likelihood	23.11980	F-statistic	16.67685
Durbin-Watson stat	1.446136	Prob(F-statistic)	0.000001


Residual Plots for Sensex
Normal Probability Plot
Percent
Residual
Versus Fits
Residual
Fitted Value
Histogram
Frequency
Residual
Versus Order
Residual
Observation Order

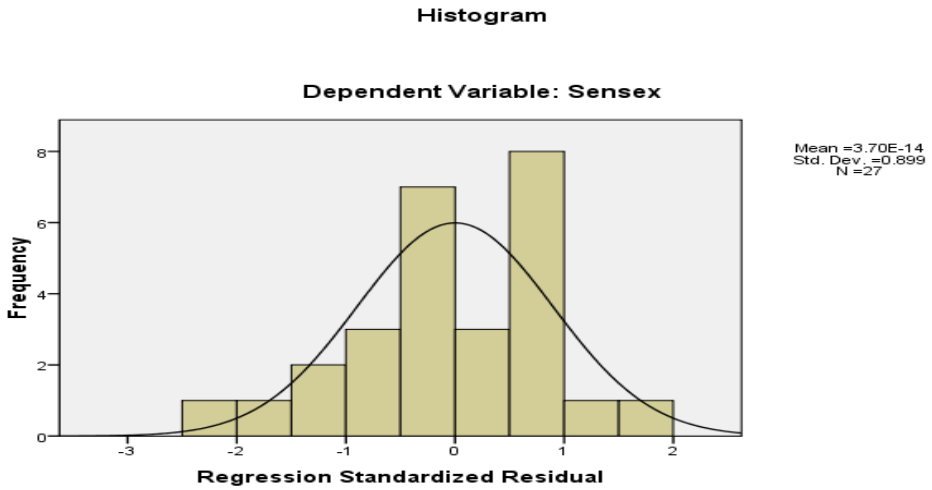

Actual, Fitted and Residual
Residual
Actual
Fitted

Normality of Residual

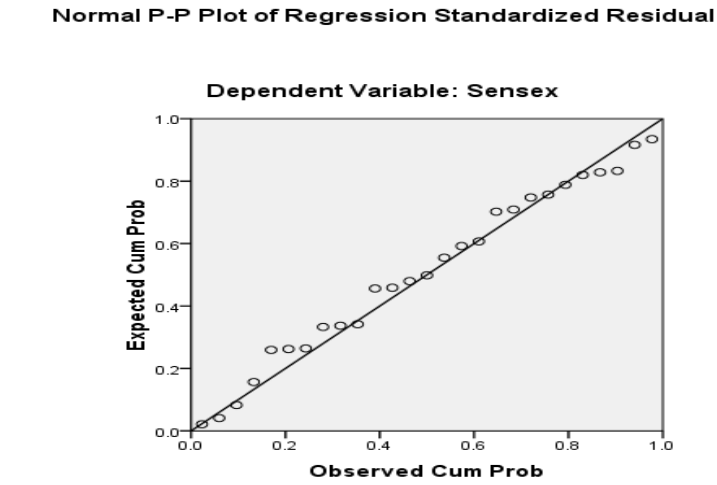


Series: Residuals	
Sample 2001 2027	
Observations 27	
Mean	2.92E-15
Median	-0.000496
Maximum	0.175983
Minimum	-0.236238
Std. Dev.	0.104731
Skewness	-0.442545
Kurtosis	2.667663
Jarque-Bera	1.005561
Probability	0.604846

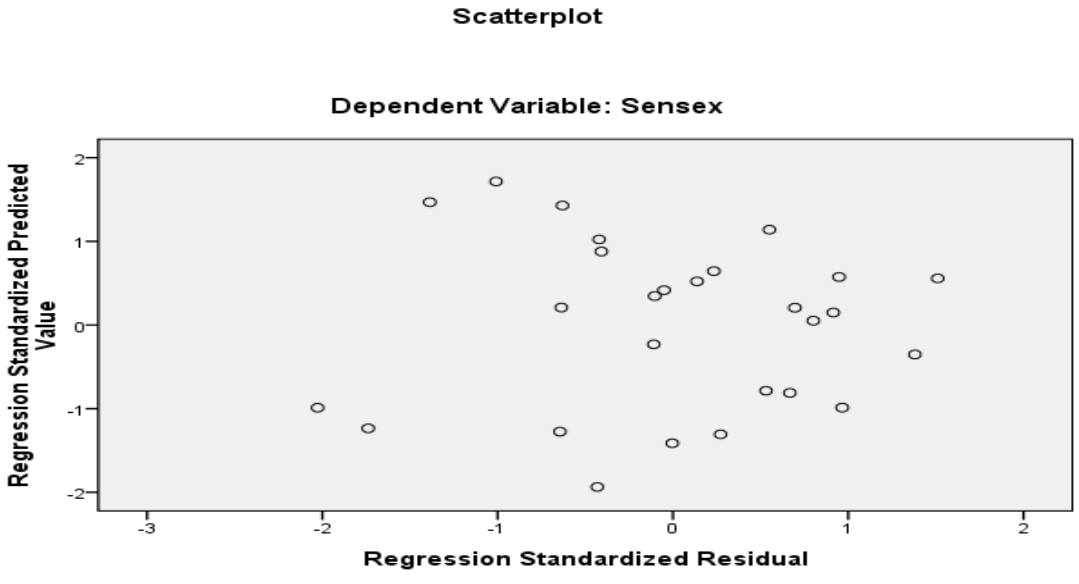
Residuals



Normal Plot



Homeskedasticity of Errors



Summary of Findings, Analysis and Conclusions

- The data analysis clearly shows that the macro economic variables are influencing the stock market index (sensex) from the above calculations.
- For instance, r –squared is .80 and.79, P-value is also ideal in the above calculations. These are the indications that thereby the macro economic variables are influencing the sensex.
- The entire hypothesis are being tested and demystified through the above analysis.

Bibliography / References

1) Atje, R. and Jovanovic, B. (1993), "Stock markets and Development", European Economic Review, Vol. 37, pp. 632-40.
2) Brown, S.J. and Otsuki, T. (1990), "Macroeconomic factors and the Japanese equity markets: the CAPMD project", in Elton, E.J. and Gruber, M.J. (Eds), Japanese Capitals Markets, Harper & Row, New York, NY.
3) Chen, N., Roll, R. and Ross, S. (1986), "Economic forces and the stock market", Journal of Business, Vol. 59 No. 3, pp. 383-403.
4) Maghayereh, A. (2003), "Causal relations among stock prices and Macroeconomic variables in the small, open economy of Jordan", JKAU: Econ. & Adm., Vol. 17 No. 2, pp. 3-12.
5) Levine, R. and Zervos, S. (1996a), "Stock market Development and long-run growth", The World Bank Economic Review, Vol. 10 No. 2, pp. 323- 39.
6) Poon, S. and Taylor, S.J. (1991), "Macroeconomic factors and the UK stock market", Journal of Business Finance & Accounting, Vol. 18 No. 5, pp. 619-39.