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INFLUENCE OF LEADING AND LAGGING INDICATORS ON PRICE-EARNINGS RATIO OF NIFTY: A STUDY

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ABSTRACT

The present paper aims to determine the influence of leading and lagging indicators on the Price-Earnings ratio of nifty for the period form 2011-2015. The study uses statistical tools such as multiple regression analysis, Karl Pearson correlation analysis to study the influence of leading and lagging indicators on Price-Earnings ratio of Nifty. Further, the study also employs variance inflation factor test to check the existence of Multicollinearity in the data series.

The regression statistics show that about 55.1 percent of variations in Price-Earnings ratio of Nifty are explained by leading indicators viz., Housing price index, consumer confidence index, Purchasing managers index and Bond yield. Further about 59.1 percent of variation in Price-Earnings ratio Nifty are explained by lagging indicators viz., consumer price index, balance of trade, Exchange rate and inventory to sales ratio. Finally, the study concludes that all the leading indicators under study are statistically significant and found to have significant influence on the Price-Earnings ratio of nifty. However, the study found that except balance of trade all other lagging indicators under study are statistically significant and have considerable influence on the Price-Earnings ratio of Nifty.

Key words: Consumer Confidence Index, Housing Price Index, Leading and Lagging Indicators, Price-Earnings ratio.

Introduction

Price-Earnings ratio is considered as one of the vital parameters in the valuation of equity stocks. It is generally believed that low Price-Earnings ratio leads cheaper market prices, which intern are expected to generate higher returns in the future. In addition to this Price-Earnings ratio can be used as a yardstick to measure the overvaluation or undervaluation of the equity market.

Price-earnings ratios differ not only from company to company and industry to industry, but also from period to period. It is not always realized that these two variants are far from being identical. In the first case, the ratio is used for comparing different stocks with one another. In the second, it is used to compare the same stocks, or the general market, with themselves in order to discover the significance of changes brought by passage of time. The very purpose of using price-earnings ratios as a means of comparing the relative merits of individual stocks or stock groups is to have them reflect the relation of current earnings to future earnings. Otherwise, all stocks showing identical current earnings would be selling at an identical price. [1]

One aspect of the studies on P/E ratio which has been ostensibly neglected is the examination of the historical link between interest rates and P/E. The relationship between P/E and interest rates is topical now because the previous long bull market was associated with low levels of interest rates. Lower interest rates increase the demand for consumer and corporate credit, and lower the cost of capital. It, therefore, becomes cheaper for corporations to finance their expansion with lower yield bonds and loans. [2]

Significance of price-to-earnings ratio is well documented to in the existing literature. However, there exists very little literature on the impact of macroeconomic variables on Price-Earnings ratio. The degree of influence of macroeconomic variables on stock market may differ from one variable to the other. This degree of difference is explained by leading and lagging variables, as leading indicators signal the future events and the lagging indicators just follow an economic event.

In this context the present paper is designed to understand the influence of Leading and Lagging indicators on Price-Earnings ratio of Nifty.

Literature Review

In ordered to indentify the research gap and provision for further research the following literatures are reviewed for the present study.

Ben Amoako-Adu and Brian Smith,(2002) : The study investigates the relationship between P/E ratio and interest rate for the period from 1965 to 1997. The study found the correlation between P/E ratio and interest rates were negative and very high, confirming the inverse relationship between P/E ratios and interest rates. Further, the regression analysis reveals that the interest rates are inversely related to P/E ratios after controlling for other relevant factors.

Wan Mahmood, Wan Mansor and Abdul Fatah, Faizatul Syuhada(2007): The study found that as for the short run relationship, the results show significant positive predictive power from dividend yield to stock return and significant negative relation from stock returns to price earnings ratios. Further the study also found from stock returns and P/E ratio to dividend yield, as well as from dividend yield and stock returns to P/E ratio

Dr.Venkatraja.B(2014): Used regression analysis to study the impact of macroeconomic variables on stock market performance India. The study found that 82 percent of variation in BSE-Sensex is explained by macroeconomic variables such as wholesale price index, index of industrial production, gold price, inflow of foreign institutional investment, real effective exchange rate. The study concludes that, wholesale price index, index of industrial production, foreign institutional investment, and real effective exchange rate have high degree of positive influence on BSE-Sensex.

Mohanamani. P, Dr. T. Sivagnanasithi (2014), Employed Descriptive Statistics, Pearson's correlation matrix, Unit root test and Granger Causality tests to test the relationship between stock market and six macro economic variables such as BSE Sensex, Call Money rate, Exchange rate between Indian Rupees and US dollar, Foreign Institutional Investment, Industrial productivity, money supply and whole sale price index over the period 2006:04 to 2013:07. The study reveals that there is a positive relationship between stock market, Wholesale price index, money supply, and industrial productivity. However, the exchange rate and foreign institutional investment are found to be insignificant to Indian stock market.

Iftaqar Ahmad, Dr.Jyotsna Sinha(2016): Examined the relationship between macroeconomic variables viz., Gross domestic Product and Exchange rate and stock market performance with reference to BSE-Sensex. The results show there is a positive relationship between both independent variables and BSE-Sensex. It was found that the GDP has high

degree of positive correlation with BSE-Sensex. The study further concluded that GDP is a significant predictor of BSE-Sensex while Exchange rate is found to be insignificant in predicting the performance of BSE-sensex.

The following major observations were made from the above mentioned literature.

1. Price-to-earnings ratios are negatively correlated with interest rates.
2. Dividend yield of stock have positive power of prediction to stock returns.
3. Price-to-earnings ratio has negative power of prediction to stock returns.
4. Wholesale price index, index of industrial production, foreign institutional investment and real effective exchange rate have high degree of positive influence on BSE-Sensex.

After reviewing the above literature and observations it has come to our understanding that no specific study has been conducted to test the influence of leading and lagging indicators on the Price-Earnings ratio of the Indian equity market. In view of this the present study is designed to identify the leading and lagging indicators and analyze their influence on the Price-Earnings ratio of Nifty.

Theoretical Frame Work

Price-Earnings ratio

Price- Earnings ratio indicates the market price of an equity share to the earrings per share. It measures the number of times the earnings per share discounts the market price of an equity share. The ratio indicates how much investor is prepared to pay per rupee of earnings. The intrinsic value of share may be more or less than the market value which is influenced by company's track record and dividend distribution policy, speculative trading, state of economy, efficiency of management, capital gearing etc. Price-earrings approach to share valuation is simple and more popular. This ratio reflects the market's assessment of the future earnings potential of the company. A high ratio reflects high earnings potential and a low ratio reflects the low earnings potential. [8]

Leading and Lagging Indicators

An indicator is anything that can be used to predict future financial or economic trends. There are three categories of indicators, classified according to the types of predictions they make.

1. **Leading indicator:** These types of indicators signal future events. Bond yields are thought to be a good leading indicator of the stock market because bond traders anticipate and speculated trends in the economy
2. **Lagging indicators**: is one that follows an event. The importance of lagging indicators is its ability to confirm that a pattern is its ability to confirm that a pattern is occurring or about to occur. Unemployment is one of the most popular lagging indicators. If the unemployment rate is rising, it indicates that the economy has been doing poorly.
3. **Coincident indicators**: these indicators occur at approximately the same time as the conditions they signify. Rather than predicting future events, these types of indicators change at the same time as the economy or stock market. Personal income rates will coincide with a strong economy. [9]

Objectives of the Study

The following objectives are set for the present study.

1. To identify the leading and lagging variables
2. To determine the degree of influence that leading and lagging variables have on Price-Earnings ratio of Nifty.
3. To offer suggestions to investors in the light of our findings

Hypothesis

Total 8 hypotheses have been framed for the present study. Which are presented as under.

H_1: Housing Price Index does not influence Price-Earnings ratio of Nifty.

H_2: Consumer Confidence Index does not influence Price-Earnings ratio of Nifty.

H_3: Purchasing Managers Index does not influence Price-Earnings ratio of Nifty.

H_4: Bond Yield does not influence Price-Earnings ratio of Nifty.

H_5: Consumer Price Index does not influence Price-Earnings ratio of Nifty.

H_6: Balance of Trade does not influence Price-Earnings ratio of Nifty.

H_7: Exchange rate does not influence Price-Earnings ratio of Nifty.

H_8: Inventory to sales ratio does not influence Price-Earnings ratio of Nifty.

Methodology

The proposed methodology of the study is as follows

Price-earnings ratio is generally used to evaluate relative attractiveness of company's stock price compared to the current earnings. Similarly, Price-earnings ratio of a particular stock market index can be a useful metric in evaluating the attractiveness of all the stocks listed on it.[18] Thus, Practitioners and investors in the equity market consider Price-earnings ratio as a yardstick to measure the overvaluation or undervaluation of the stock market. It is in this context the paper attempts to investigate the influence of leading and lagging indicators on Price-earnings ratio Nifty.

The data collected for the study is secondary in nature. Quarterly data relating to leading and lagging indicators has been collected for the period from 2011 to 2015. The present study is designed using statistical tools such as multiple regression analysis, karl pearson correlation analysis. Further, the study also uses variance inflation factor (VIF) test to check the existence of Multicollinearity in the data series.

Description of leading and lagging indicators included in the study are as under.

Leading indicators	**Source**
Housing price Index	Database of Indian Economy
Consumer Confidence Index	Reserve Bank of India
Purchasing managers index	1. www. Investing.com 2. Office of Economic Advisor, Government of India
Bond Yield	www. Investing.com
Lagging indicators	**Source**
Consumer price index	Ministry of statistics and program implementation, Government of India
Balance of Trade	Monthly economic reports. Ministry of Finance, Government of India.
Exchange rate	Monthly economic reports. Ministry of Finance, Government of India.
Inventory to sales ratio	Reserve bank of India

To better understand the impact of leading and lagging indicators on the Price-Earnings ratio of the nifty, the study will run an individual regression analysis for leading indicators and lagging indicators distinguished as Regression Model-I and II. Where the Regression model-I attempts to investigate the influence of leading indicators on the Price-to-

earnings ratio of Nifty and Regression Model-II examines the degree of influence of lagging indicators on the Nifty Price-Earnings ratio.

Regression Model- I

$PEX_t = a+ß_1HPI+ß_2CCI+ß_3PMI+ß_4BY+e$ (Equation)

Where,

PEX_t= Price to Earnings ratio

a = Intercept

$ß_1$ = Slope of Housing price index

$ß_2$ = Slope of Consumer confidence Index

$ß_3$ = Slope of Purchasing managers index

$ß_4$ = Slope of Bond yield

e = error term

Regression Model- II

$PEX_t = a+ß_1CPI+ß_2BOT+ß_3ER+ß_4ITS+e$ (Equation)

Where,

PEX_t= Price to Earnings ratio

a = Intercept

$ß_1$ = Slope of Consumer price index

$ß_2$ = Slope of Balance of Trade

$ß_3$ = Slope of Exchange rate

$ß_4$ = Slope of Inventory to Sales ratio

e = error

Results and Analysis

Table-1

Pair Wise Coefficient Of Correlation for Model-I

		PE	HPI	CCI	PMI	BY
PE	Pearson Correlation	1	0.51904	0.18066	-0.0724	-0.4694
	Sig. (2-tailed)		0.01902	0.44592	0.76166	0.03678
	N	20	20	20	20	20

Table-1 shows the pair-wise correlation among leading indicators and Price-earnings ratio of Nifty. The table reveals that, Housing Price Index, and Consumer Confidence Index

are positively correlated with Price-earnings ratio of Nifty. However, Purchasing Managers Index and Bond Yield are found to be negatively correlated.

Table-2

Regression Statics for Model- I

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
I	.742[a]	0.551	0.431	1.53017
a. Predictors: (Constant), BY, PMI, HPI, CCI b. Dependent Variable: PE				

Table-2 presents regression statistics for Regression model –I. The R square value for model-I is 0.551 which indicates that about 55.1 percent variations in Price-earnings ratio of Nifty are explained by the leading indicators under study i.e., Bond Yield, Purchasing Managers Index, Housing Price Index and Consumer Confidence Index, thus the Regression model-I indicates goodness of fit.

Table-3

ANOVA Test for Model- I

Model		Sum of Squares	Df	Mean Square	F	Sig.
I	Regression	43.029	4	10.757	4.594	.013[a]
	Residual	35.122	15	2.341		
	Total	78.151	19			
a. Predictors: (Constant), BY, PMI, HPI, CCI b. Dependent Variable: PE						

The table-3 shows Test results of ANOVA for Model –I. It is evident from the table that the P-value of the model –I is 0.13 which is less than the significance level of 5% (0.05). This indicates that all the leading indicators under study have considerable influence on the price-earnings ratio of Nifty.

Table- 4

Regression Coefficients for Model –I

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
I	(Constant)	11.72	15.135		0.774	0.451		
	HPI	0.042	0.013	0.721	3.201	0.006	0.591	1.691
	CCI	0.161	0.066	0.601	2.441	0.028	0.494	2.024
	PMI	-0.225	0.245	-0.189	-0.921	0.371	0.714	1.401
	BY	-0.535	0.943	-0.116	-0.568	0.579	0.721	1.388
a. Dependent Variable: PE								

Table -4 presents the regression coefficient for leading indicators and is presented in the following regression model.

Price-Earnings ratio = (0.042)HPI+(0.161)CCI+(-0.225)PMI+(-0.535)BY+11.72

Form the above model it can be interpreted that among all other leading indicators under study Viz. Consumer Confidence Index has high degree of influence on the Price-earnings ratio of Nifty. i.e., for every one unit increase in the Consumer Confidence index the Price-earnings ratio of Nifty is increased by 0.161 units. Further, Housing Price Index has negligible influence on the Price-earnings ratio of Nifty. i.e., for every one unit increase in Housing Price Index Price-earnings ratio of Nifty is increased by 0.042. However, the study found that Purchasing Managers Index and Bond Yield have negative impact on the Price-earnings ratio of Nifty ratio. For one unit increase in Purchasing Managers Index and Bond Yield Price-earnings ratio of Nifty decreased by -0.225 and -0.535 respectively.

The table further shows results of Collinearity Statistics. The study used Variance inflation factor (VIF) test to check the presence or absence of the Collinearity among leading indicators and Price-earnings ratio of Nifty. The results of the test show that there is no Collinearity among leading indicator and Price-earnings ratio of Nifty. Since the Variance inflation factor (VIF) value of all the leading indicators are within acceptable limit of 5 percent.

Testing of Hypothesis for Model –I

It evident for the table-4 that the significant value of t-statistics for all the leading indicators are less than the 0.05 this leads to the rejection of the null hypothesis H1, H2,H3 and H4. Thus it can be conclude that all the leading indicators under study have significant influence on the price-earnings ratio of Nifty.

Table-5

Pair wise coefficient of correlation for Model –II

		PE	CPI	BOT	ER	ITS
PE	Pearson Correlation	1	0.444658	-0.1176	0.265008	-0.52195
	Sig. (2-tailed)		0.049486	0.62146	0.258824	0.018247
	N	20	20	20	20	20

Table-5 shows the pair-wise correlation among lagging indicators and Price-earnings ratio of Nifty. The table reveals that, Consumer Price Index, and Exchange Rates are positively correlated with Price-earnings ratio of Nifty. However, Balance of Trade and Inventory to Sales ratio are negatively correlated with price-earnings ratio of Nifty.

Table-6

Regression Statics for Model- II

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
II	.768[a]	0.591	0.481	1.46059
a. Predictors: (Constant), ITS, BOT, ER, CPI				
b. Dependent Variable: PE				

Table-6 presents regression statistics for Regression model –II. The R square value for model-II is 0.591 which indicates that about 59.1 percent variations in price-earnings ratio of Nifty are explained by the lagging indicators under study i.e., Consumer Price Index, Balance of Trade, Exchange Rate and Inventory to Sales ratio. This indicates the goodness of fit of the regression model-II.

Table- 7

ANOVA Test for Model- II

Model		Sum of Squares	Df	Mean Square	F	Sig.
II	Regression	46.151	4	11.538	5.408	.007[a]
	Residual	32	15	2.133		
	Total	78.151	19			
a. Predictors: (Constant), ITS, BOT, ER, CPI b. Dependent Variable: PE						

The table-7 shows test results of ANOVA for Model –II. It is evident from the table that the P-value of the model –II is 0.07 which is less than the significance level of 5% (0.05) this indicates that lagging indicators under study have considerable influence on the price-earnings ratio of Nifty.

Table-7

Results of Regression Coefficients for Model –II

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	20.78	8.818		2.356	0.032		
	CPI	0.371	0.11	2.209	3.388	0.004	0.064	15.564
	BOT	2.757	0	0.031	0.175	0.864	0.863	1.158
	ER	-0.595	0.186	-1.978	-3.195	0.006	0.071	14.041
	ITS	-0.143	0.118	-0.261	-1.211	0.245	0.587	1.703
a. Dependent Variable: PE								

Table -7 presents the regression coefficient for lagging indicators and is presented in the following regression model.

Price-Earnings ratio = (0.371) CPI+ (2.757) BOT+ (-0.595) ER+ (-0.143) ITS+20.78

Form the above model it can be interpreted that among all other lagging indicators under study, Balance of Trade has high degree of influence on the Price-earnings ratio of Nifty. i.e., for every one unit increase in Balance of Trade the Price-earnings ratio of Nifty is

increased by 2.757 units. Further, Consumer Price Index is also found to have positive impact on the Price-earnings ratio of Nifty. i.e., for every one unit increase in Consumer Price index Nifty Price-earnings ratio is increased by 0371. However, the study found that the exchange rate and Inventory to Sales ratio have negative impact on the Price-earnings ratio of Nifty. For one unit increase in Exchange Rate and Inventory to Sales ratio Price-earnings ratio of Nifty is decreased by -0.595 and -0.143 respectively.

The table further, shows the test results of the Multi Collinearity Statistics. The study uses variance inflation factor (VIF) test to check the presence or absence of collinearity among lagging indicators and P/E ratio of Nifty. The results show the regression model suffers from the problem of multicollinearity. Since the variance inflation factor (VIF) value of consumer price index and Exchange rate are 15.564 and 14.041 which are more than the acceptable limit of 5 percent.

Testing Hypothesis for Model-II

It is clearly evident from the table-7, that except Balance of Trade all other leading indicators are statistically significant. The significance value of t-statistics for Consumer Price Index, Exchange Rate, and Inventory to Sales Ratio is less than 0.0.5 which calls for rejection of null hypothesis H5, H7, and H8. While the significant value of t-statistic for Balance of Trade is more than 0.05 this leads to the acceptance of the null hypothesis H6. Thus it can be concluded that except Balance of Trade all other lagging indicators under study are statistically significant.

Suggestions

The following suggestions are offered in the light of our findings.

1. Investors who keenly watch Price-Earnings ratio for valuing their stock are here by suggested to closely watch leading indicators such as Consumer Confidence Index and Housing Price Index, since these two leading indicators have positive impact on the Price-Earnings ratio of Nifty.
2. Further, Consumer price index is also found to have positive impact on Nifty P/E ratio. In view of this investors are recommended to keep a track on consumer price index.
3. In addition to above suggestions investor in stock market are here by suggested to keep a track on leading indicators viz. Purchasing managers index and Bond yield and Lagging indicators viz. Exchange rate and Inventory to sales ratio. Since these leading and lagging indicators have negative impact on the Price-Earnings of Nifty.

Limitations of the Study

The study suffers from the following limitations.

1. Due to unavailability of monthly data for all the leading and lagging indicators the study considers only quarterly data to study the influence of leading and lagging indicators on the price-earnings ratio of Nifty.
2. Since the historical Data relating to few of the leading and lagging indicators could not be accessed. In view of this the study period was restricted to only five years. Therefore results arrived must be reaffirmed for the long period, so the correctness of the factors/indicators influencing P/E be understood. Therefore there is a provision to dig matter in detail for the very long period.

Conclusion

The present paper aims to investigate the influence of leading and lagging indicators on the price-earnings ratio of Nifty. Out of many leading indicators the study considers four major leading indicators viz., Housing Price Index, Consumer Confidence Index, Purchasing Managers Index, and Bond Yield. Further, Consumer Price Index, Balance of Trade, Exchange rate and Inventory to Sales Ratio are considered as major lagging indicators.

For the comprehensive understanding of the regression out, two regression models, viz, Model-I and Model-II have been framed, where, the Model-I attempts to investigate the influence of leading indicators on Price-earnings ratio of Nifty. Further, the Model-II investigates the impact of lagging indicators on the Price-earnings ratio of Nifty.

The study concludes that all the leading indicators under study viz., Housing Price Index, Consumer Confidence Index, Purchasing Managers Index and Bond Yield are statistically significant and have considerable impact on the price-earnings ratio of Nifty. Further, it is found that except Balance of Trade all other lagging indicators under study viz., Consumer Price Index, Exchange Rate and Inventory to Sales Ratio are statistically significant and have considerable influence on the price-earnings ratio of Nifty. However, it observed that regression model for lagging indicators suffers from the problem of multicollinearity. Since the variance inflation factor (VIF) value for Consumer Price Index and Exchange Rate are 15.564 and 14.041 respectively this is more than the acceptable limit of 5 percent.

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