

Do the Macroeconomic variables influence Exchange Traded Funds (ETFs)?

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Abstract: Exchange Traded Funds (ETFs) are essentially Index Funds that are listed and traded on exchanges like stocks. Until the development of ETFs, this was not possible before. Globally, ETFs have opened a whole new panorama of investment opportunities to Retail as well as Institutional Money Managers. They enable investors to gain broad exposure to entire stock markets in different Countries and specific sectors with relative ease, on a real-time basis and at a lower cost than many other forms of investing. An ETF is a basket of stocks that reflects the composition of an Index, like S&P CNX Nifty or BSE Sensex. The ETF's trading value is based on the net asset value of the underlying stocks that it represents. Think of it as a Mutual Fund that you can buy and sell in real-time at a price that change throughout the day. Compared to mutual funds, ETFs are relatively new. The first U.S. ETFs were created by State Street Global Advisors with the launch of the S&P 500 depositary receipts, also known as SPDRs ("spiders"). Although the first ETFs tended to track broad market indexes, more recent ETFs have been developed to track sectors, fixed income, global investments, commodities and currencies. There exists correlation between ETF and macroeconomic variables and also change in independent variables causes change in dependent variable. However, the degree of variability differs. These variables form significant part and the level of prediction is also good. Therefore, the model is good fit for the data. An investor needs to guise into these while taking investment decision.

Keywords: Mutual fund, Exchange traded fund, WPI, CPI

Introduction

Stock market plays an important role in the economy as it helps in channelizing the investment. In 2020 and 2021, stock markets have seen lot of volatility because of changes in external factors. With covid pandemic rising, the markets have fallen sharply and as the cases declined, markets have bounced back sharply. This global health emergency has influenced the economies of many countries by dwindling their economic variables. As a result, sharp effect is seen on stock market

across the globe. In India Sensex and Nifty are considered as barometer of Indian stock market. It means as economy behaves, these indices also perform relatively. Broadly, these macro-economic factors include: GDP, Inflation, Forex, Exchange rate, Crude Oil etc. there are earlier studies to examine the relationship between economic variables and sensex. Forex rate, inflation rate and gold prices have signification correlation with Sensex and these variables help in forming model for forecasting the Sensex (Rosy, 2012). The later part of this paper also focuses on Granger causality between variables and ETF. There has been attempt to check causality between macro-economic variables and MF. Specific macro-economic variables like crude oil, exchange rate, inflation have influence on the select mutual fund returns (Dinesh & Mihir, 2018).

Literature Review

Few important articles related to influence of economic variables are stated below: Dinesh Kumar & Mihir (2015), have investigated the effect of macroeconomic variables on mf schemes. Variables taken are market return, exchange rate, interest rate, inflation & crude oil prices. It was found that crude oil price has greater influence on mf return & sensex had greater influence on variance of return. Rosy (2012), examined the relation & impact of macroeconomic variables on stock market. The variables are CRR, reverse repo, gold price, WPI, oil, inflation & GDP. Correlation & regression was employed for relation & developing forecasting model of sensex. They have found that almost all variables have positive correlation with sensex. Regression analysis stated that few are significant & few are not.

Keshav & Rosy (2018) studied the impact of macroeconomic factors on Indian stock market. The methodology is used for the study is descriptive and Pearson correlation is used to find the relationship between the dependent and independent variables. The result shows that there is a positive relationship between the sensex and macroeconomic factors except avg. inflation and unemployment rate as they show negative relationship. Patnaik et al (2020) studied the selected macroeconomic variables and their impact on stock market of both the countries India and America and their interrelationships. To estimate the association, relationship, individual significant relationship and interrelationship correlation, regression, t-test and ANNOVA model have been taken into consideration. They found that Inflation rate and Interest rate are insignificantly affecting the BSE SENSEX but GDP and GDP PER CAPITA are statistically significant. Whereas DOW JONES is not meaningfully affected by all the macroeconomic variables as all are statistically insignificant. However, in case of individual relationship between macroeconomic variables and stock market of both the countries, all the macroeconomic variables are statistically significant.

Ray et al (2005) studied the relationship between the real economic variables and the capital market in Indian context. Compared to the earlier similar attempts, they used the modern non-linear technique like VAR and Artificial Neural Network and compares the results. The finding shows that certain variables like the interest rate, output, money supply, inflation rate and the exchange rate has considerable influence in the stock market movement in the considered period, while the other variables have very negligible impact on the stock market. Sarika & Bharti (2019) undertaken study on evaluating the Impact of Macroeconomic Variable on Indian Stock Market. They examined the impact of certain macroeconomic factors (disposable revenues, interest rates, govt. policies, inflation and exchange rates) on the results of securities market performance in the National and Bombay stock exchanges. There is a strong relationship exists between disposable income, government policies, the exchange rate and share price. This means that if these variables change, the stock prices of NSE and BSE will be affected. Furthermore, there is an unfavourable connection in the NSE and BSE between interest rate and inflation rate and share price, which means a shift in inflation and interest rate that will not have a strong impact on stock prices and will be in an adverse direction. In addition, a multiple regression that showed these variables was used to check the effect of selected macroeconomic factors on Indian stock prices. They have an influence on the NSE and BSE share prices.

Gagan & Mandeep (2010) studied the Impact of Macro-Economic Variables on Stock Prices in India. They have analysed the long-term relationship between BSE and certain macroeconomic variables. They used the regression equation model (Galton, 1877) in order to investigate the relationship among these factors. Results reveal that there is high correlation between the empirical results reveal that exchange rate and gold prices highly effect the stock prices on the other hand the influence of foreign exchange reserves and Inflation on the stock price is up to limited extend only.

Research Methodology

The secondary data required for the study have been collected from an extensive literature survey and content analysis from the books, journals stock exchange publications, research papers, working papers, dissertations, publicity materials and various websites related with the subject. There are approximately, 80 ETFs listed on NSE. Out of these, only Nifty ETF and Gold ETF are selected for the research. Total 10 gold ETFs and 8 nifty ETFs are selected for the study. Following the list of ETFS selected for the study:

Table 1 showing Nifty ETFs and Gold ETFs selected for the study

Sl No	Issuer Name	Name	Symbol	Underlying	Launch date
	Gold ETFs				
1	Axis Mutual Fund	Axis Gold ETF	AXISGOLD	Gold	Nov-10
2	Birla Sun Life Mutual Fund	Birla Sun Life Gold ETF	BSLGOLDETF	Gold	May-11
3	HDFC Mutual Fund	HDFC Gold ETF	HDFCMFGETF	Gold	Aug-10
4	ICICI Pru Mutual Fund	ICICI Pru Gold ETF	IPGETF	Gold	Aug-10
5	IDBI AMC	IDBI Gold ETF	IDBIGOLD	Gold	Nov-11
6	Kotak Mutual Fund	Kotak Gold ETF	KOTAKGOLD	Gold	Jul-07
7	Quantum Mutual Fund	Quantum Gold ETF	QGOLDHALF	Gold	Feb-08
8	Religare Mutual Fund	Religare Gold ETF	RELIGAREGO	Gold	Mar-10
9	SBI Mutual Fund	SBI Gold ETF	SBIGETS	Gold	Apr-09
10	UTI Mutual Fund	UTI Gold ETF	GOLDSHARE	Gold	Mar-07
	Nifty ETFs				
11	ICICI Pru Mutual Fund	ICICI Pru Nifty ETF	ICICINIFTY	Nifty 50	Mar-13
12	Kotak Mutual Fund	Kotak Nifty ETF	KOTAKNIFTY	Nifty 50	Feb-10
13	Motilal Oswal AMC	Most Shares M50	M50	Nifty 50	Jul-10
14	Quantum Mutual Fund	Quantum Nifty ETF	QNIFTY	Nifty 50	Jul-08
15	SBI Mutual Fund	SBI ETF Nifty	SETFNIF50	Nifty 50	Jul-15
16	UTI Mutual Fund	UTI Nifty ETF	UTINIFTETF	Nifty 50	Sep-15
17	Birla Sun Life Mutual Fund	Birla Sun Life Nifty ETF	BSLNIFTY	Nifty 50	Jul-11
18	Reliance Nippon AMC	Reliance NiftyBees ETF	NIFTYBEES	Nifty 50	Dec-01

Note: a. Edelweiss and Religare Nifty ETF is not considered because of large number of missing observations

b. Canara Robeco Gold ETF is not considered because it was redeemed and merged with Can Saving fund on Nov 2019. (<https://www.valueresearchonline.com/funds/14377/canara-robeco-gold-exchange-traded-fund/?21/3/2021>)

c. Reliance Gold ETF is not considered because of large number of missing observations

The analysis is undertaken by studying the relationship of macro-economic variables and ETF and also impact of variables on ETF.

Sl No	Measure	Tool
a	Relationship between variables and ETF	Correlation
b	Impact of variables	Multiple Regression
c	Influence	Granger Causality test

- a. Correlation: It is used to find out the strength of relation between the macroeconomic variables and the ETF. The variables selected are: GDP rate, Inflation rate, Bank rate, Rupee-USD exchange rate, Crude oil (\$ per bbl). Yearly values of these variables are taken for further study. Each variable is checked one by one to find out the significant relationship between macro-economic variable and ETF (Rosy, 2012).
- b. Multiple Regression: It is used to develop the model that can be used for forecasting the dependent variable (Rosy, 2012). All the above-mentioned variables are taken for running multiple regression. Dependent variable is taken as benchmark asset and other factors/ variables are taken as independent variables.
- Granger Causality test: The structures of the causal relationships between variables were analyzed through the Granger causality approach. The Granger causality test is a statistical hypothesis test for determining whether one time series is useful for forecasting another. If probability value is less than any α level, then the hypothesis would be rejected at that level. The Granger (1969) approach to the question of whether x causes y to see how much of the current y can be explained by past value of y and then to see whether adding lagged values of x can improve the explanation. Y is said to be granger caused by x if x helps in the prediction of y . EViews runs bivariate regressions of the form:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \dots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \dots + \beta_l x_{t-l} + \epsilon_t$$

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \dots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \dots + \beta_l y_{t-l} + u_t$$

Granger causality is used in the study for checking the causality between monthly economic variables and the benchmark asset. All above mentioned variables are considered here also.

Results and Discussion

The research has used eight macroeconomic variables in the study. These are: Wholesale Price Index (WPI), Consumer Price Index (CPI), Index for Industrial Production (IIP), Bank rate, Crude oil, Exchange Rate, Forex Reserve and Spot Underlying asset (gold for gold ETF, nifty for nifty ETFs). The monthly data of these variables were taken in the percentage form and used for the analysis purpose. Returns of gold ETF and nifty ETF based on market prices were taken for the analysis. Correlation is used to check the relationship between ETF and these variables. And then Multiple regression is used to find out their impact on ETF. To analyze the data, following hypothesis has been tested:

H01: There is no correlation between ETF and macro-economic variables.

Table 2 exhibits the correlation between gold ETF and all macro-economic variables. Correlation value lies between -1 to +1.

From the table it is inferred that there is strong positive correlation between spot gold and gold ETF. This means movement of both is uniform and in the same direction. Forex reserve, exchange rate, CPI, crude oil and WPI have positive relationship with gold ETF. IIP and bank rate

have negative correlation with gold ETF. It indicates that both move in opposite direction. If IIP and bank rate increases then gold ETF decreases and vice-versa. Among eight variables, only two variables viz spot gold and forex reserve has significant correlation with gold ETF.

Table 2 Correlation between gold ETF and variables

Correlations										
		Gold Etf	WPI	CPI	IIP	Bank Rate	Crude	Exch Rate	Forex Reser v	Spot Gold
Gold Etf	Pearson Correlation	1	0.004	0.024	-0.058	-0.123	0.021	0.114	.277**	.910**
	Sig. (2-tailed)		0.955	0.757	0.459	0.115	0.786	0.144	0	0
	N	165	163	165	165	165	165	165	165	165
WPI	Pearson Correlation	0.004	1	.541**	.317**	0	-0.075	0.116	-.196*	0.018
	Sig. (2-tailed)	0.955		0	0	0.996	0.343	0.139	0.012	0.822
	N	163	163	163	163	163	163	163	163	163
CPI	Pearson Correlation	0.024	.541**	1	.173*	0.086	-0.008	0.088	-0.088	0.036
	Sig. (2-tailed)	0.757	0		0.027	0.27	0.92	0.262	0.259	0.649
	N	165	163	165	165	165	165	165	165	165
IIP	Pearson Correlation	-0.058	.317**	.173*	1	0.047	-0.047	-.191*	-0.099	-0.014
	Sig. (2-tailed)	0.459	0	0.027		0.551	0.549	0.014	0.208	0.859
	N	165	163	165	165	165	165	165	165	165
Bank Rate	Pearson Correlation	-0.123	0	0.086	0.047	1	-0.126	0.076	0.002	-0.125
	Sig. (2-tailed)	0.115	0.996	0.27	0.551		0.108	0.333	0.982	0.11
	N	165	163	165	165	165	165	165	165	165
Crude	Pearson Correlation	0.021	-0.075	0.008	-0.047	-0.126	1	-.269**	.195*	0.03
	Sig. (2-tailed)	0.786	0.343	0.92	0.549	0.108		0	0.012	0.702
	N	165	163	165	165	165	165	165	165	165
Exch Rate	Pearson Correlation	0.114	0.116	0.088	-.191*	0.076	-.269**	1	.296**	0.084
	Sig. (2-tailed)	0.144	0.139	0.262	0.014	0.333	0		0	0.281
	N	165	163	165	165	165	165	165	165	165
Forex Reser v	Pearson Correlation	.277**	-.196*	0.088	-0.099	0.002	.195*	.296**	1	.289**
	Sig. (2-tailed)	0	0.012	0.259	0.208	0.982	0.012	0		0

	N	165	163	165	165	165	165	165	165	165
Spot Gold	Pearson Correlation	.910**	0.018	0.036	-0.014	-0.125	0.03	0.084	.289**	1
	Sig. (2-tailed)	0	0.822	0.649	0.859	0.11	0.702	0.281	0	
	N	165	163	165	165	165	165	165	165	165
**. Correlation is significant at the 0.01 level (2-tailed).										
*. Correlation is significant at the 0.05 level (2-tailed).										

Table 3 Multiple Regression output- gold ETF

Multiple regression is undertaken between economic variables and ETF. A value of 0.912 indicates good level of prediction. The R square column represents coefficient of determination, which is the proportion of variance in the dependent variable that can be explained by the independent variables (technically, it is the proportion of variation accounted for by the regression model above and beyond the mean model). Here, the value of 0.832 indicates that independent variables explain 83.2% of the variability of the dependent variable (gold ETF).

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.912 ^a	0.832	0.823	1.83993	0.832	95.093	8	154	0
a. Predictors: (Constant), Spot Gold, IIP, Crude, CPI, Bank Rate, Exch Rate, Forex Res, WPI									

The F-ratio in the ANOVA table test whether the overall regression model is good fit for the data. The table shows that the independent variables statistically significantly predict the dependent variable, $F(8, 154) = 95.093$, $P = 0.000$ (i.e. the regression model is good fit of the data). The regression and residual sums of squares indicate the variation in depend variable that is explained by the model.

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2575.381	8	321.923	95.093	.000 ^b
	Residual	521.341	154	3.385		
	Total	3096.722	162			
a. Dependent Variable: Gold Etf						
b. Predictors: (Constant), Spot Gold, IIP, Crude, CPI, Bank Rate, Exch Rate, Forex Res, WPI						

Unstandardized coefficients indicate how much the dependent variable varies with an independent variable when all other independent variables are held constant. For example: bank rate (B1) is equal to -0.028. This means that for each one percent increase in the bank rate, there is decrease in gold ETF of 0.028. Looking at the statistical significance of each independent variables, only spot gold is most significant variable to gold ETF as the value of $P < 0.05$. Standardized coefficient compares the strength of the effect of each individual independent variable to the dependent variable. Higher the absolute value of beta coefficient, the stronger the effect. Here, beta coefficient are similar to unstandardized coefficient for all variables except for

IIP and spot gold where some variation is seen. For eg: Beta coeff of spot gold = 0.906 which means with every increase of one standard deviation in spot gold, the gold ETF rises by 0.906 standard deviation.

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	0.306	0.786		0.389	0.698	-1.247	1.859
	WPI	-0.001	0.049	-0.001	-0.021	0.983	-0.097	0.095
	CPI	-0.006	0.056	-0.004	-0.102	0.919	-0.116	0.105
	IIP	-0.023	0.021	-0.039	-1.083	0.28	-0.064	0.019
	bank Rate	-0.028	0.106	-0.009	-0.264	0.792	-0.237	0.181
	Crude	-0.001	0.015	-0.002	-0.055	0.956	-0.031	0.03
	Exch Rate	0.07	0.086	0.032	0.811	0.419	-0.1	0.239
	Forex Res	0	0.069	0	-0.005	0.996	-0.137	0.136
	Spot Gold	0.781	0.03	0.906	25.832	0	0.721	0.84
a. Dependent Variable: Gold Etf								

Table no 4 exhibits the correlation between nifty ETF and all macro-economic variables. From the table it is inferred that there is positive relationship between spot nifty, crude oil and nifty ETF. This indicates that if spot nifty and crude oil increases then nifty ETF also increases and vice versa. All other variables have negative correlation with nifty ETF. These includes exchange rate, forex reserve, bank rate, IIP, WPI, CPI. It implies that as these variables changes there will be opposite change in nifty ETF. Out of eight variables, four variables are found significant correlation with nifty ETF. These four variables are: spot nifty, exchange rate, forex reserve, crude oil and WPI.

Table 4: Correlation between nifty ETF and variables

Correlations										
		Nifty ETF	WPI	CPI	IIP	Bank Rate	Crude	Exch Rate	Forex Reser v	Spot nifty
Nifty ETF	Pearson Correlation	1	-.170*	-.0005	-.0078	-.0018	.294*	-.422*	-.171*	.983*
	Sig. (2-tailed)		0.029	0.949	0.316	0.814	0	0	0.027	0
	N	167	165	167	167	167	167	167	167	167
WPI	Pearson Correlation	-.170*	1	.541*	.320*	-.0003	-.0071	0.114	-.182*	-.162*
	Sig. (2-tailed)	0.029		0	0	0.972	0.363	0.143	0.019	0.038
	N	165	165	165	165	165	165	165	165	165
CPI	Pearson Correlation	-.0005	.541*	1	.171*	0.086	-.0008	0.088	-0.089	-.0007

	Sig. (2-tailed)	0.949	0		0.027	0.268	0.92	0.259	0.254	0.933
	N	167	165	167	167	167	167	167	167	167
IIP	Pearson Correlation	-.0078	.320*	.171*	1	0.037	-.0037	-.194*	-0.076	-.0115
	Sig. (2-tailed)	0.316	0	0.027		0.631	0.633	0.012	0.328	0.139
	N	167	165	167	167	167	167	167	167	167
Bank Rate	Pearson Correlation	-.0018	-.0003	0.086	0.037	1	-0.13	0.078	-0.009	-.0033
	Sig. (2-tailed)	0.814	0.972	0.268	0.631		0.095	0.317	0.911	0.669
	N	167	165	167	167	167	167	167	167	167
Crude	Pearson Correlation	.294*	-.0071	-.0008	-.0037	-0.13	1	-.271*	.199*	.292*
	Sig. (2-tailed)	0	0.363	0.92	0.633	0.095		0	0.01	0
	N	167	165	167	167	167	167	167	167	167
Exch Rate	Pearson Correlation	-.422*	0.114	0.088	-.194*	0.078	-.271*	1	.281**	-.410*
	Sig. (2-tailed)	0	0.143	0.259	0.012	0.317	0		0	0
	N	167	165	167	167	167	167	167	167	167
Forex Reser v	Pearson Correlation	-.171*	-.182*	-.0089	-.0076	-.009	.199*	.281*	1	-.181*
	Sig. (2-tailed)	0.027	0.019	0.254	0.328	0.911	0.01	0		0.019
	N	167	165	167	167	167	167	167	167	167
Spot nifty	Pearson Correlation	.983*	-.162*	-.0007	-.0115	-.0033	.292*	-.410*	-.181*	1
	Sig. (2-tailed)	0	0.038	0.933	0.139	0.669	0	0	0.019	
	N	167	165	167	167	167	167	167	167	167
*. Correlation is significant at the 0.05 level (2-tailed).										
**. Correlation is significant at the 0.01 level (2-tailed).										

Table 5 Multiple Regression output- nifty ETF

A value of 0.984 indicates good level of prediction. The R square column represents coefficient of determination, which is the proportion of variance in the dependent variable that can be explained by the independent variables (technically, it is the proportion of variation accounted for by the regression model above and beyond the mean model). Here, the value of 0.969 indicates that independent variables explain 96.9% of the variability of the dependent variable (nifty ETF).

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.984 ^a	0.969	0.967	1.14309	0.969	602.114	8	156	0
a. Predictors: (Constant), Spot nifty, CPI, Bank Rate, IIP, Forex Reserv, Crude, Exch Rate, WPI									

The F-ratio in the ANOVA table test whether the overall regression model is good fit for the data. The table shows that the independent variables statistically significantly predict the dependent variable, $F(8, 156) = 602.114$, $P = 0.000$ (i.e. the regression model is good fit of the data). The regression and residual sums of squares indicate the variation in depend variable that is explained by the model.

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6294.039	8	786.755	602.114	.000 ^b
	Residual	203.838	156	1.307		
	Total	6497.877	164			
a. Dependent Variable: Nifty ETF						
b. Predictors: (Constant), Spot nifty, CPI, Bank Rate, IIP, Forex Reserv, Crude, Exch Rate, WPI						

Unstandardized coefficients indicate how much the dependent variable varies with an independent variable when all other independent variables are held constant. For example: spot nifty (B1) is equal to 0.942. This means that for each one percent increase in the spot nifty, there is increase in nifty ETF of 0.942. Looking at the statistical significance of each independent variables, only spot nifty and IIP are most significant variables to nifty ETF as the value of $P < 0.05$. Here, there is variation in beta coefficient of independent variables.

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-0.496	0.485		-1.024	0.307	-1.454	0.461
	WPI	-0.043	0.03	-0.026	-1.418	0.158	-0.103	0.017
	CPI	0.021	0.035	0.01	0.61	0.543	-0.048	0.09
	IIP	0.033	0.013	0.04	2.51	0.013	0.007	0.059
	Bank Rate	0.056	0.065	0.013	0.871	0.385	-0.072	0.185
	Crude	-5.02E	0.01	0	-0.005	0.996	-0.02	0.019
	Exch Rate	-0.041	0.056	-0.013	-0.727	0.468	-0.151	0.07
	Forex Res	0.028	0.04	0.011	0.698	0.486	-0.051	0.107
	Spot nifty	0.942	0.016	0.981	58.363	0	0.91	0.974
a. Dependent Variable: Nifty ETF								

The result summarises, that there is correlation between ETF and macro-economic variables and as a result null hypothesis is rejected. However, the extent of significance is only for few variables in both gold ETF and nifty ETF. But all the variables do influence the gold ETF and nifty ETF in one or other way.

Granger Causality between ETF and Macro Economic variables

It deals with granger causality between monthly economic variables and monthly ETF return. The economic variables taken for the test are: Wholesale Price Index (WPI), Consumer Price Index (CPI), Index for Industrial Production (IIP), Bank rate, Crude oil, Exchange Rate, Forex Reserve and Spot Underlying asset (gold for gold ETF, nifty for nifty ETFs). The causality between the variables and ETF is ascertained by granger causality effect. In order to find causality, the data was first checked for stationarity by using Augmented Dickey-Fuller Test (ADF). By running the ADF test it was found that data has no unit root. It was hypothesized that variables do not granger cause ETF and ETF do not granger cause variables.

H02: Macroeconomic variables do not granger cause ETF.

Table 6 shows the causality result between variables and gold ETF. Table 7 shows the causality result between variables and nifty ETF. The study uses lag 1 and lag 2 values for the analysis.

Table 6 Causality Result- Gold ETF

In the first and second lag, only for bank rate not causing gold ETF, P value is less than 0.05 that means null hypothesis is rejected. It indicates that, bank rate granger cause and influence gold ETF. All other hypothesis are accepted as p value is more than 0.05 resulting no causality on either side for both the variables.

Pairwise Granger Causality Tests

Date: 05/18/21 Time: 16:59

Sample: 1 165

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
BANK RATE does not Granger Cause ETF	164	4.34810	0.0386
ETF does not Granger Cause BANK RATE		0.69844	0.4045
CPI does not Granger Cause ETF	164	0.00732	0.9319
ETF does not Granger Cause CPI		1.06980	0.3025
CRUDE does not Granger Cause ETF	164	1.33371	0.2499
ETF does not Granger Cause CRUDE		0.11395	0.7361
EXCRATE does not Granger Cause ETF	164	0.07191	0.7889
ETF does not Granger Cause EXCRATE		1.99178	0.1601
FOREX does not Granger Cause ETF	164	0.16694	0.6834
ETF does not Granger Cause FOREX		0.22133	0.6387
IIP does not Granger Cause ETF	164	0.07028	0.7913
ETF does not Granger Cause IIP		2.19320	0.1406
SPOT GOLD does not Granger Cause ETF	164	0.07098	0.7903
ETF does not Granger Cause SPOT GOLD		0.13242	0.7164
WPI does not Granger Cause ETF	161	0.01097	0.9167
ETF does not Granger Cause WPI		0.42633	0.5147

Pairwise Granger Causality Tests

Date: 05/18/21 Time: 17:01

Sample: 1 165

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
BANK RATE does not Granger Cause ETF	163	4.13391	0.0178
ETF does not Granger Cause BANK RATE		5.07467	0.0073
CPI does not Granger Cause ETF	163	0.34007	0.7122
ETF does not Granger Cause CPI		0.36440	0.6952
CRUDE does not Granger Cause ETF	163	0.60542	0.5471
ETF does not Granger Cause CRUDE		0.40132	0.6701
EXCRATE does not Granger Cause ETF	163	1.20776	0.3016
ETF does not Granger Cause EXCRATE		2.74178	0.0675
FOREX does not Granger Cause ETF	163	0.65660	0.5200
ETF does not Granger Cause FOREX		1.28467	0.2796
IIP does not Granger Cause ETF	163	0.10568	0.8998
ETF does not Granger Cause IIP		1.04248	0.3550
SPOT GOLD does not Granger Cause ETF	163	0.41911	0.6584
ETF does not Granger Cause SPOT GOLD		0.70304	0.4966
WPI does not Granger Cause ETF	159	0.17143	0.8426
ETF does not Granger Cause WPI		0.23830	0.7883

Table 7 Causality Result- Nifty ETF

In the first and second lag, four variables (crude oil, exchange rate, forex reserve and IIP) have causality with nifty ETF. And in all four cases, ETF causes and influences these variables. Incase of ETF not causing crude- p value is 0.0009(lag 1) and 0.0021(lag2), ETF not causing exchange rate- p value is 0.0009(lag1) and 0.0011(lag2), ETF not causing forex reserve- p value

is 0.0120(lag1) and 0.026(lag2) and ETF not causing IIP- p value is 0.0001(lag1) and 0.0003(lag2). Therefore, in all four cases p value is less than 0.05 which means null hypotheses are rejected and alternate hypotheses are accepted. It indicates that ETF do causes and influences these variables.

Pairwise Granger Causality Tests

Date: 05/18/21 Time: 17:04

Sample: 1 167

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
BANK_RATE does not Granger Cause ETF ETF does not Granger Cause BANK_RATE	166	0.22179 1.11784	0.6383 0.2919
CPI does not Granger Cause ETF ETF does not Granger Cause CPI	166	0.00080 0.39344	0.9774 0.5314
CRUDE does not Granger Cause ETF ETF does not Granger Cause CRUDE	166	0.91212 11.4550	0.3410 0.0009
EXCRATE does not Granger Cause ETF ETF does not Granger Cause EXCRATE	166	0.49617 11.4293	0.4822 0.0009
FOREX does not Granger Cause ETF ETF does not Granger Cause FOREX	166	0.00035 6.44939	0.9851 0.0120
IIP does not Granger Cause ETF ETF does not Granger Cause IIP	166	0.65361 15.3216	0.4200 0.0001
SPOT_NIFTY does not Granger Cause ETF ETF does not Granger Cause SPOT_NIFTY	166	1.28721 0.85751	0.2582 0.3558
WPI does not Granger Cause ETF ETF does not Granger Cause WPI	163	4.40759 1.67747	0.0373 0.1971

Pairwise Granger Causality Tests

Date: 05/18/21 Time: 17:04

Sample: 1 167

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
BANK_RATE does not Granger Cause ETF ETF does not Granger Cause BANK_RATE	165	0.86028 0.52075	0.4250 0.5951
CPI does not Granger Cause ETF ETF does not Granger Cause CPI	165	0.02528 0.12488	0.9750 0.8827
CRUDE does not Granger Cause ETF ETF does not Granger Cause CRUDE	165	0.98378 6.41750	0.3761 0.0021
EXCRATE does not Granger Cause ETF ETF does not Granger Cause EXCRATE	165	1.01308 7.11502	0.3654 0.0011
FOREX does not Granger Cause ETF ETF does not Granger Cause FOREX	165	0.35433 3.73319	0.7022 0.0260
IIP does not Granger Cause ETF ETF does not Granger Cause IIP	165	0.25456 8.43408	0.7756 0.0003
SPOT_NIFTY does not Granger Cause ETF ETF does not Granger Cause SPOT_NIFTY	165	0.83704 0.54224	0.4349 0.5825
WPI does not Granger Cause ETF ETF does not Granger Cause WPI	161	2.22127 0.69728	0.1119 0.4995

The correlation analysis shows that there is strong positive correlation between spot gold and gold ETF. Forex reserve, exchange rate, CPI, crude oil and WPI have positive relationship with gold ETF. IIP and bank rate have negative correlation with gold ETF. There is positive relationship between spot nifty, crude oil and nifty ETF. All other variables have negative correlation with nifty ETF.

R square value of 0.832 indicates that independent variables explain 83.2% of the variability of the dependent variable for gold ETF. Beta coefficient are similar to unstandardized coefficient for all variables except for IIP and spot gold where some variation is seen. For eg: Beta coeff of spot gold = 0.906 which means with every increase of one standard deviation in spot gold, the gold

ETF rises by 0.906 standard deviation. R square value of 0.969 indicates that independent variables explain 96.9% of the variability of the dependent variable for nifty ETF, with little variation in beta coefficient of independent variables.

The result of granger causality shows that only bank rate causes and influence gold ETF for both the lags as the p value is less than 0.05 rejecting null hypothesis. For all other variables there is no causality on either side. For nifty ETF, it causes and influences four variables (crude oil, exchange rate, forex reserve and IIP) as p value is less than 0.05 rejecting null hypothesis.

Conclusion

The movement of stock market is highly sensitive to the changes in fundamentals of the economy and to the changes in expectations about future prospects. Changes in economic variables have greater influence on stock prices. Many studies have been done in this regard. This paper focuses on mainly the influence of variables on ETF. It is evidenced that there exists relation between economic variables and ETF. Even changes in these variables causes change in ETF. Further research can be undertaken taking specific variables and its impact.

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