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Week-End Anomaly and Stock Market Volatility Analysis of Indian Sustainability Indices

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Abstract
The most widely accepted rational theory, known as the efficient market hypothesis, holds that share prices accurately reflect all important information available in the market. However, the occurrence of the stock market anomaly challenges the efficient market hypothesis. A stock market anomaly is any variation in the market's typical behavior; there are several kinds of abnormalities. While certain abnormalities recur frequently, others only emerge once. Globally, enormous studies have been conducted to examine the many kinds of anomalies. The objective of this paper is to investigate the weekend anomaly and stock market volatility analysis with respect to Indian Sustainability indices. Weekend anomaly is tested with the simple liner regression model and the volatility is tested with GARCH (1,1) model.

Introduction

A phenomenon that casts doubt on the efficient market hypothesis (EMH) is the stock market anomaly or market inefficiency. Stated differently, an anomaly in the stock market pertains to the way assets behave when compared to the efficient market hypothesis. Such abnormalities occur as a result of a variety of behavioural factors and biases. There are a number of different market anomalies; some emerge once and then vanish, while others are constantly noted. Numerous calendar anomalies exist, such as the weekend, month-end, year-end, and holiday effects; other anomalies are associated with specific announcements, such as the P/E ratio effect, stock split effect, dividend yield effect, and earnings surprise effect; low beta firm effect, weather effect, and so on are examples of other market anomalies. "In emerging economies, where economic, financial, and political instability are among the factors reducing growth and development indicators, stock market volatility undercuts the financial market's ability to effectively and efficiently mobilise and allocate financial resources into profitable investments to encourage economic growth and development" (Muhtaseb & Al-Assaf, 2017). This paper is aimed to study the week-end anomaly and volatility analysis of Indian sustainability indices.

Literature Review

Taufiq Choudhry (2000) proved that the notion of day of the week effect is not just features of the stock markets of the United States and other developed countries but also of the emerging Asian stock

markets. Amanulla S, Thiripalraju (2001) evidenced that there is a reversal in Week-End Effects (i.e., positive Monday return and negative Friday return) in Indian stock market. Monday returns are negative in Day-of-the Week effect. As the week progresses the mean tends to increase with the highest returns on the last day of the week. (Wong, Agarwal, & Wong 2006). Cho, Linton, & Whang (2007) prove that there was a strong evidence of the Monday effect specifically in the second order dominance of Monday by other days and also strong evidence of first order dominance in the CRSP indexes. The study concludes that the effect has weakened for some large cap series like the DJIA and the S&P500 post 1987 but remains strong for more broadly based indexes. "During the trading days unlike other markets, Muscat stock market starts with positive and ends positive with downturn during rest of the trading days. The GARCH model proves that it has a high degree of persistent in the conditional volatility of stock returns." (Al-Jafari 2012). Singh & Das 2020 concluded that the Banking and Information Technology sectors does not observe Day of the week effect. Thrusday effect shows negative relationship with volatility but not significant. The index volatility reduces due to derivatives settlements. "The GARCH results show significant asymmetric shocks and persistence of conditional volatilities present in the daily returns of the SRI indices, the EGARCH measure shows that the returns of the SRI indices were free from leverage effects" (Subrata Roy 2021).

Methodology

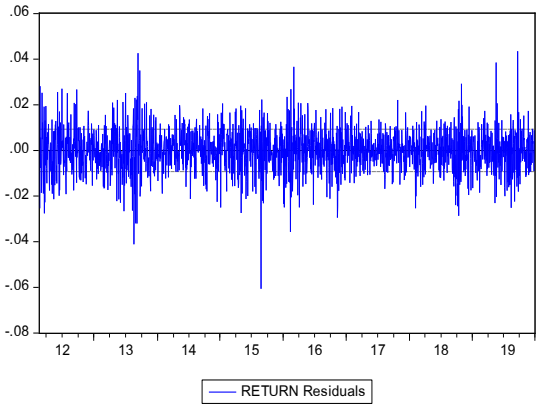
The data collected from two largest India's leading stock exchanges of Bombay Stock Exchange (BSE)). The daily data of three thematic indexes of BSE namely BSE Greenex Index, BSE Carbonex Index and BSE 100 ESG Index were considered in this study. Summary statistics, unit-root problem is detected using Augmented Dickey-Fuller test. Before applying ARCH family models it is essential to check for ARCH effect in the data set, hence ARCH LM test is calculated. After finding ARCH effect in the residuals the ARCH family model of GARCH (1, 1) model is applied to check the volatility.

Table 1 The Results of Linear Regression Model

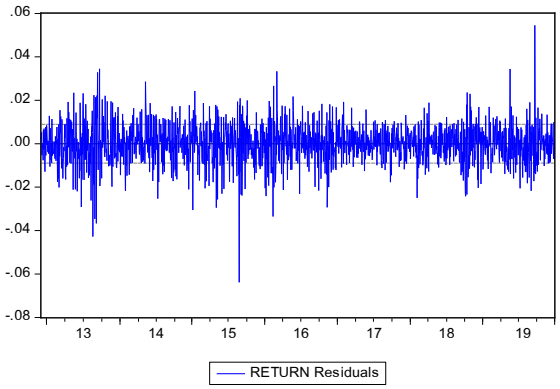
Weekdays	Greenex		Carbonex		BSE 100 ESG Index	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
C	0.000515	0.2766	0.00084	0.0807	0.00073	0.3743
Tuesday	-0.00047	0.4864	-0.0012	0.0823	-0.00066	0.5701
Wednesday	-0.0004	0.5543	-0.0005	0.4441	-0.00096	0.4108
Thursday	-0.00025	0.7128	-0.0005	0.4718	-0.00088	0.4484
Friday	0.000117	0.8616	1.59E-05	0.9814	0.000266	0.8178
F-Statistics	0.279866		1.037102		0.448947	
Prob. (F-Stat)	0.891131		0.386627		0.773189	
R-Squared	0.000580		0.002383		0.003435	
DW Statistics	1.868527		1.824268		1.875366	

Source: Computed data

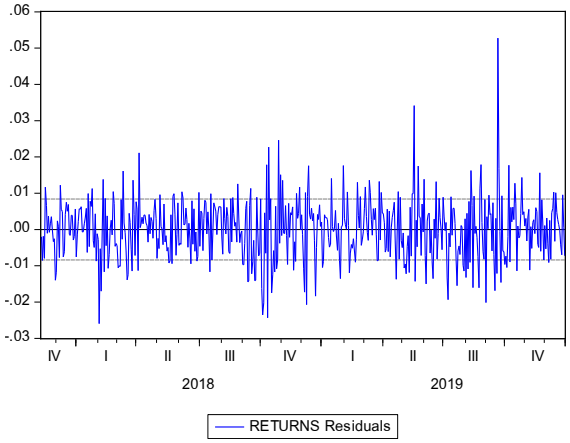
Table no 1 indicates the linear regression results indicate that the coefficients of Mondays and other days coefficient are not statistically significant at 5% level, it shows that there exist no weekend effect in the returns.



Graph no: 1 Residual Graph of BSE Greenex



Graph no: 2 Residual Graph of BSE Carbonex



Graph no: 3 Residual Graph of BSE 100 ESG Index

Table 2 Garch (1, 1) model results of BSE Greenex

Mean Equation				
Weekdays	**Coefficient**	**Std.Error**	**Z-Stat**	**Prob.**
C	0.000840	0.000460	1.826175	0.0678
Return(-1)	0.083058	0.025198	3.296189	0.0010
Tuesday	-0.000555	0.000628	-0.883733	0.3768
Wednesday	-0.000575	0.000632	-0.909153	0.3633
Thursday	-0.000551	0.000624	-0.882304	0.3776
Friday	-0.000410	0.000635	-0.645520	0.5186

Variance Equation				
	Coefficient	**Std.Error**	**Z-Stat**	**Prob.**
C	7.08E-06	4.66E-06	1.520372	0.1284
ARCH	0.068480	0.012554	5.454766	0.0000
GARCH	0.890019	0.020065	44.35642	0.0000

Tuesday	-9.14E-06	7.74E-06	-1.181737	0.2373
Wednesday	-1.01E-05	7.08E-06	-1.425645	0.1540
Thursday	-2.41E-06	7.10E-06	-0.339819	0.7340
Friday	3.67E-06	7.70E-06	0.477006	0.6334

Table 3 GARCH (1, 1) model results of BSE Carbonex

Mean Equation				
Weekdays	**Coefficient**	**Std.Error**	**Z-Stat**	**Prob.**
C	0.001076	0.000462	2.329689	0.0198
Return(-1)	0.088071	0.028260	3.116418	0.0018
Tuesday	-0.000891	0.000629	-1.416936	0.1565
Wednesday	-0.000572	0.000623	-0.918465	0.3584
Thursday	-0.000624	0.000613	-1.017754	0.3088
Friday	-0.000375	0.000637	-0.589558	0.5555

Variance Equation				
	Coefficient	**Std.Error**	**Z-Stat**	**Prob.**
C	5.35E-06	4.30E-06	1.244967	0.2131
ARCH	0.072874	0.012879	5.658190	0.0000
GARCH	0.895017	0.018559	48.22650	0.0000
Tuesday	-1.07E-05	7.36E-06	-1.453232	0.1462
Wednesday	-1.02E-05	6.21E-06	-1.649812	0.0990
Thursday	4.24E-06	6.29E-06	0.674254	0.5001
Friday	3.42E-06	6.74E-06	0.506918	0.6122

Table 4 GARCH (1, 1) model results of BSE 100 ESG Index

Mean Equation				
Weekdays	**Coefficient**	**Std.Error**	**Z-Stat**	**Prob.**
C	0.001103	0.000805	1.370579	0.1705
Return(-1)	0.067263	0.052287	1.286422	0.1983
Tuesday	-0.000157	0.001097	-0.142798	0.8864
Wednesday	-0.001412	0.001046	-1.349782	0.1771
Thursday	-0.000316	0.001076	-0.293945	0.7688
Friday	-0.000369	0.001197	-0.308219	0.7579

Variance Equation				
	Coefficient	**Std.Error**	**Z-Stat**	**Prob.**
C	1.90E-05	1.21E-05	1.572411	0.1159
ARCH	0.176335	0.055578	3.172737	0.0015
GARCH	0.660829	0.108098	6.113244	0.0000
Tuesday	-2.79E-05	1.66E-05	-1.675507	0.0938

Wednesday	-2.00E-05	1.40E-05	-1.424978	0.1542
Thursday	3.03E-06	1.42E-05	0.212357	0.8318
Friday	8.90E-06	1.58E-05	0.563307	0.5732

Source: Computed data

Conclusion

"ARCH and GARCH models have emerged as crucial tools for time series data analysis, these models are predominantly beneficial for analyzing and forecasting volatility" (Engle, 2001). Volatility analysis is done through the help of GARCH (1, 1) model. The coefficient is positive and statistically significant at 10% level. The coefficient of lagged value of return indicates "the past values have very strong predictive ability on current stock". Similarly, in the variance equation the coefficient of constant variance term, the ARCH term is and the GARCH term are positive and statistically significant at 1% level. β1 lies between 0 and 1 and positive, α1 also lies between 0 and 1 and positive. The ARCH (α1) and GARCH (β1) value together are also less than l. This satisfies the stability conditions. These results clearly establish the presence of time varying conditional volatility in the stock returns.

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