



SEASONAL ANOMALY EFFECT OF STOCK RETURN IN SELECT BANKS LISTED IN BSE AND NSE

Dr. M. JEGADEESHWARAN¹

Assistant Professor
Department of Commerce
Bharathiar University
Coimbatore , Tamil Nadu -641046

CO-AUTHOR: SIVA THIVYA.R²

M.Phil Research Scholar

Department of Commerce

Bharathiar University

Coimbatore , Tamil Nadu -641046

Abstract

This study is an attempt to assess the seasonal anomalies of stock return of select public and private sector banks listed in BSE and NSE. The analysis is based on the secondary data derived from the stock exchange websites for the period 2007 to 2017. Daily data of share price have been collected for analyzing the seasonal anomalies. The return of security prices was calculated in the study. Existence of seasonal anomalies was found through descriptive statistics and GARCH model. The result of the study concludes that there is seasonality effect in the month of February and October in select Banks stock returns listed in BSE and NSE.

Keywords: Anomalies, seasonality, months-of-the year effect.

Introduction

Seasonality refers to regular and repetitive fluctuation in a Time Series which occurs periodically over a span of less than a year. The main cause of seasonal variations in time series data is the change in climate. For example, sales of woollen clothes generally increase in winter season. Besides this, customs and tradition also affect economic variables for instance sales of gold increase during marriage seasons. Similarly, stock returns exhibits systematic patterns at certain times of the day, week or month. The most common of these are Monthly Patterns.

Certain Months provide better returns as compared to others i.e. the Month of the Year Effect. Similarly, some Days of the Week provide lower returns as compared to other trading days i.e. Days of the Week Effect. The existence of Seasonality in stock returns, however, violates an important hypothesis in finance called the Efficient Market Hypothesis (EMH). The Efficient Market Hypothesis is a central paradigm in finance. New Data constantly enter the market place via Economic Reports, Company Announcements, Political Statements, and or Public Surveys. If the market is Informationally Efficient then security prices adjust rapidly and accurately to new information. According to EMH, The security prices reflect fully all the information that is available in the market. Since all the information is already incorporated in prices, a trader cannot make any excess returns. Thus, EMH proposes that it is not possible to outperform the market through Market Timing or Stock Selection. The presence of Seasonality in stock returns violates the weak form of market efficiency because equity prices are no longer random and can be predicted based on past pattern. This facilitates market participants to devise trading strategy which could fetch abnormal profits on the basis of past pattern.

Review of Literature

Review of Literature refers to the collection of the results of the various researches relating to the present study. It takes into consideration the research of the previous researchers which are related to the present research in any way. Here are the reviews of the previous researches related with the present study:

Mihir Dash and Mohit Sabharwal (2011)¹ they aimed to explore the interplay between the month-of-the-year effect and market crash effects on monthly returns in Indian stock markets. The study uses dummy variable multiple linear regression to assess the seasonality of stock market returns and the impact of market crashes on the same. The results of their study provide evidence for a month-of-the-year effect in Indian stock markets, particularly positive November, August, and December effects, and a negative March effect. Further, the study concludes that the incidence of market crashes reduces the seasonal effects

P. Nageswari and M.Selvam (2011)² their study investigated the existence of seasonality effect on stock returns for BSE Sensex index. The study analyzes the day of the week effect and monthly effect in BSE Sensex index returns for the period from 1st April 2000 to 31st March 2010 through OLS regression. The regression results confirmed that there was maximum return earned on Wednesday and negative returns recorded on Monday

during the study period. The study further reveal that January, February and March have negative returns but these are the best months to buy the scrip (buy low) and November and December show significant positive high returns goading to conclude that these two months are the best period to sell the securities (sell high) and therefore their study reveals that the seasonal effect does not exist in stock returns in India.

Sevinc Guler (2013)³ his paper has investigated the existence of January effect in emerging markets with use of power ratio method. Annual data for five indices (Bovespa, Shanghai Stock Exchange, Sensex, Merval and BIST 100) have been derived. Monthly logarithmic returns of each market are used starting from the first transaction day of the stock exchange to the December 31, 2012. According to power ratio method abnormal January returns have been observed also within specified investigated periods for Brazil, Shanghai, Argentina and Turkey for 1994, 1993, 2002 and 1997 respectively. It is concluded that, there is existence of the January effect in China, Argentina and Turkey returns. However no evidence of a January effect is found at Brazil and India stock markets.

Manish R Pathak (2013)⁴ his paper aimed to examine stock market seasonality effect (month of the year effect and the day of the week effect) in Indian stock market for the S&P CNX Nifty (NSE). The data used in his study was daily closing prices of the market index (NSE-Index) over the period from 1st April 2002 to 31st March 2012 for Month of the year effect and 1st April 2007 to 31th march 2012 for Day of the week effect. Kruskal Walis test and one way ANOVA were used to examine the seasonality effect. The result of the study found that this non existence of the day effect and month of year effect means the seasonality is not present in Indian stock Market. He concluded by saying that , the reason behind this non existence of the day effect may be due to the increased volatility, increased awareness among Indian investors, Globalization of Indian Economy, reach of Media, emergence of Derivatives segment and Increase in disposable Income.

Shilpa Lodha, and G. Soral (2015)⁵ attempted to explore the existence of seasonality in Indian stock market. Four types of seasonal effects namely day-of-the-week effect, month-of-the-year effect, quarterly effect and monthly effect were explored and for this purpose daily close, open, high and low prices were collected from the date of launching of a particular index to 31st May, 2013. All BSE indices were taken as sample. For analysis of stock market data, techniques of time-series econometrics were used. After analyzing all the four calendar effects namely day-of-the-week effect, month-of-the-year effect, quarterly effects and monthly effects, it was found that all the four effects are present in the Indian stock market. In case of month-of-the-year effect, September and December were providing significant returns. First quarter was emerged as the most significant quarter, when quarterly effects were tested. In case of monthly effects, returns of first-half of the month were found to be significant.

Statement of the Problem

Banking sector acts as a nerve centre for Indian economy. The role of banking is immense in developing industry, agriculture, there by resulting in countries economic growth. Many investors prefer to invest their hard earned money in equity shares of banking sector. Considering banking sector shares are more profitable than other sectors. However, there are certain occasions where bank share prices travel towards south. Thus, investors are

to be more cautious while investing in banking sector too. Thus the present study has been carried out to assist investors in ascertaining the period to purchase and sale of shares.

Objective of the Study

To identify the existence of seasonal anomalies in the stock return of select Banks listed in BSE and NSE.

Hypothesis of the Study

H₀₁: There is no monthly effect in all the months of the year.

Research methodology

Collection of Data

The study is based on secondary data only. It has been collected from stock exchange websites, published and unpublished financial reports, journals, magazines and various other websites.

Sample design

The top five banks in public and private sector have been selected based on market capitalization for the study. These banks are listed in BSE and NSE.

List of selected Banks and their classification

S.No	Public sector banks	Private sector banks
1	Bank of Baroda (BOB)	Axis Bank
2	Bank of India(BOI)	HDFC Bank
3	Canara Bank(CAN)	ICICI Bank
4	Punjab National Bank(PNB)	Indusind Bank
5	State Bank of India(SBI)	Kotak Mahindra Bank(KMB)

Period of the Study and Tools used

The study covers a period of 10 years from April 2007 - March 2017. The collected data was analyzed through descriptive statistics and GARCH model.

Model

In testing for the monthly effect, binary dummy variables were also created for the monthly (January through December) stock returns as 12 independent variables (constant parameter would not be included in order to avoid dummy variable trap). Both the dummy variables (independent variables) and the monthly return series (dependent variables) are subjected to a regression model using GARCH specifications. The specifications of the models employed are given as:

$$R_t = \alpha_j D_{jt} + \alpha_f D_{ft} + \alpha_m D_{mt} + \alpha_a D_{at} + \alpha_{my} D_{myt} + \alpha_{jn} D_{jnt} + \alpha_{jy} D_{jyt} + \alpha_{au} D_{aut} + \alpha_s D_{st} + \alpha_o D_{ot}$$

$$+ \alpha_n D_{nt} + \alpha_d D_{dt} + \alpha R_{t-1} + \varepsilon_t$$

$$\sigma_t$$

$$= \alpha_j D_{jt} + \alpha_f D_{ft} + \alpha_m D_{mt} + \alpha_a D_{at} + \alpha_{my} D_{myt} + \alpha_{jn} D_{jnt} + \alpha_{jy} D_{jyt} + \alpha_{au} D_{aut} + \alpha_s D_{st} + \alpha_o D_{ot}$$

$$+ \alpha_n D_{nt} + \alpha_d D_{dt} + \alpha_1 \sigma_{t-1}^2 + \beta_1 \sigma_{t-1}^2$$

where R_t is the monthly stock return series under investigation, $D_{jt} + D_{ft} + D_{mt} + D_{at} + D_{myt} + D_{jnt} + D_{jyt} + D_{aut} + D_{st} + D_{ot} + D_{nt} + D_{dt}$ represents the binary dummy variables for January through December; for January returns the dummy variable is equal to 1 and all others are equal to zero and it goes the same way for the remaining months. The coefficients attached to the dummy variables measure the average deviation of a given month's mean return from other months' mean returns. If any coefficients found to be significant, then the monthly mean return attached to the coefficient has deviated from that of the others and thus, there is the existence of the monthly effect. The second equation is the generalized ARCH employed where t is the conditional variance, $t - 1$ is the ARCH term and $t-1$ is the generalized ARCH term. The coefficients of the ARCH and GARCH terms are referred to as alpha and beta, respectively.

Analysis for existence seasonal anomalies of Select Banks Stock return in India

Descriptive Statistics on stock returns of public and private sector banks listed in BSE and NSE for Various Months of Year for the period 2007-2017

Months	N	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
JAN	20	2.3986	0.2098	0.044	0.764	0.512	0.983	0.992
FEB	20	2.3831	0.2141	0.046	0.712	0.512	0.807	0.992
MAR	20	2.3942	0.2145	0.046	0.792	0.512	0.933	0.992
APR	20	2.3679	0.2016	0.041	0.803	0.512	1.161	0.992
MAY	20	2.3829	0.2070	0.043	0.681	0.512	0.958	0.992
JUN	20	2.3769	0.2104	0.044	0.708	0.512	1.093	0.992
JUL	20	2.3808	0.2092	0.044	0.882	0.512	1.428	0.992
AUG	20	2.3699	0.2128	0.045	0.864	0.512	1.283	0.992
SEP	20	2.3978	0.2110	0.045	0.854	0.512	1.201	0.992
OCT	20	2.4039	0.2114	0.045	0.787	0.512	1.065	0.992
NOV	20	2.4074	0.2063	0.043	0.808	0.512	0.956	0.992
DEC	20	2.4107	0.2059	0.042	0.796	0.512	0.961	0.992

Source: compiled and computed from secondary data

The table 1 elucidates the descriptive statistics on stock returns of public and private sector banks listed in both BSE and NSE for all the months in a year during the study period. The highest mean return was found in the month of December with 2.4107 and the lowest mean return was found in the month of April with 2.3699 which is lower when compared to the returns of other months. The highest standard deviation of 0.2145 and 0.2141 is found in the months of March and February which confirms high volatility. The lowest standard deviation is found in the months of April and

December i.e. 0.2016 and 0.2059 which means the volatility level is lower when compared to the other banks. All of the months are positively skewed and July month is highly skewed with 0.882. The positive skewness indicates the return of each month has high probability of earning positive returns. The kurtosis statistics is below 3 in all the months which connotes that months are platykurtic which means they have lower tail than normal distribution

Table 2 ADF Unit Root Test on Stock Returns of Public Sector Banks (BSE) for the period 2007-2017

	Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BOB(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-15.066	-16.223	-15.007	-14.063	-14.535	-13.584	-15.123	-8.8239	-13.284	-12.798	-14.207	-14.731
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BOI (BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-14.776	-16.737	-13.555	-13.588	-12.398	-12.692	-14.694	-14.446	-14.763	-12.969	-13.876	-13.945
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAN(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-12.76	-13.714	-13.215	-14.823	-13.096	-13.821	-14.689	-14.172	-14.518	-13.062	-13.598	-13.338
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PNB(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-14.611	-13.578	-13.644	-14.161	-12.993	-13.729	-15.714	-13.579	-15.256	-15.702	-14.156	-14.577
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SBI(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-13.414	-14.297	-13.669	-13.852	-11.398	-13.906	-14.581	-14.83	-14.287	-12.647	-14.805	-14.44
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: Computed data

It is found from the Table 2 the results of unit root tests on stock returns of public sector banks (BSE) for the study period. Only intercept was included in level. The level results indicate at 5 per cent significance level, there is no unit root among the variables and the data is stationary.

Table 3 ADF Unit Root Test On Stock Returns Of Public Sector Banks (NSE) for the period 2007-2017

	Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BOB(NSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-13.761	-15.964	-15.104	-13.731	-14.375	-13.879	-15.348	-13.413	-13.292	-12.844	-13.732	-14.201
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BOI(NSE)	Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-14.681	-16.55	-13.544	-13.764	-12.419	-11.3	-14.63	-14.509	-14.885	-12.903	-14.418	-13.447
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAN(NSE)	Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-13.078	-13.664	-13.236	-15.043	-13.333	-13.87	-4.8642	-14.049	-14.595	-13.33	-13.473	-13.279
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PNB(NSE)	Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-14.616	-13.747	-13.816	-14.16	-13.017	-13.709	-15.616	-13.513	-15.252	-15.569	-13.281	-12.029
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SBI(NSE)	Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-13.56	-14.253	-13.786	-13.874	-11.405	-13.822	-14.652	-14.888	-14.215	-12.532	-11.908	-14.425
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 3 elucidates the results of unit root tests on stock returns of public sector banks (NSE) for the study period. Only intercept was included in level. The level results indicate at 5 per cent significance level, there is no unit root among the variables and the data is stationary.

Table 4 ADF Unit Root Test on Stock Returns of Private Sector Banks (BSE) for the period 2007-2017

	Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AXIS(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-12.295	-14.084	-15.017	-15.43	-12.824	-11.966	-15.016	-13.012	-14.729	-17.087	-11.592	-11.467
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HDFC(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-14.808	-12.86	-11.955	-15.379	-11.709	-14.055	-15.025	-14.151	-12.365	-10.55	-7.3527	-13.548
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ICICI(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-13.518	-12.995	-13.599	-14.662	-11.946	-13.098	-14.258	-14.807	-13.407	-13.993	-13.134	-14.587
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INDUS(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-9.5877	-13.595	-13.927	-14.066	-13.497	-16.751	-15.762	-15.192	-16.159	-12.853	-12.858	-14.406
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
KMB(BSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-13.681	-13.464	-14.021	-5.6387	-13.551	-14.982	-14.869	-15.576	-16.133	-12.184	-10.998	-16.251
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 4 describes the results of the unit root tests on stock returns of private sector banks (BSE) for the study period. Only intercept was included in level. The level results indicate that 5 per cent significance level, there is no unit root among the variables and the data is stationary.

Table 5 ADF Unit Root Test on Stock Returns of Private Sector Banks (NSE) for the period 2007-2017

	Months	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AXIS(NSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-12.589	-14.369	-15.103	-15.235	-12.494	-12.096	-15.653	-13.109	-14.709	-13.181	-11.715	-11.587
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HDFC(NSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-43.829	-12.598	-12.194	-15.06	-11.678	-5.8656	-9.9655	-13.871	-12.627	-5.5888	-7.4126	-13.585
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ICICI(NSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-13.518	-12.995	-13.599	-14.662	-11.946	-13.098	-14.258	-14.807	-13.407	-13.993	-13.134	-14.587
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INDUS(NSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-9.9091	-13.487	-13.902	-14.273	-13.606	-16.431	-15.777	-15.139	-16.041	-12.951	-12.764	-14.155
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
KMB(NSE)	Test	level	level	level	level	level	level	level	level	level	level	level	level
	t-Statistic	-13.824	-13.235	-13.939	-5.6721	-13.754	-15.22	-15.493	-15.382	-14.507	-12.236	-11.281	-16.399
	Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5 reveals the results of the unit root tests on stock returns of private sector banks (NSE) for the study period. Only intercept was included in level. The level results indicate that 5 per cent significance level, there is no unit root among the variables and the data is stationary.

Table 6 GAARCH Effect of Stock Returns on Public Sector Banks (BSE) for the period 2007-2017

BOB(BSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.16894	0.53669	-0.53605	-0.01197	0.151575	-0.38671	0.00606
	Std. Error	0.27934	0.24788	0.491929	0.711754	0.411518	0.59022	0.71442
	z-Statistic	-0.60478	2.16512	-1.08968	-0.01681	0.368332	-0.6552	0.00849
	Prob.	0.5453	0.0304*	0.2759	0.9866	0.0126*	0.5123	0.9932
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.234418	0.75757	-0.04355	-0.06505	-0.11926	-0.00459	0.52942
	Std. Error	0.482249	0.58126	0.599757	0.514033	0.778796	0.012428	1.08493
	z-Statistic	0.486094	1.30333	-0.0726	-0.12654	-0.15314	-0.36902	0.48798
Prob.	0.6269	0.1925	0.9421	0.8993	0.8783	0.7121	0.6256	
BOI BSE	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.1899	-0.0062	0.10756	0.02841	-0.0277	-0.0457	-0.0176
	Std. Error	0.16642	0.06573	0.0551	0.08863	0.05956	0.06795	0.06346
	z-Statistic	-1.1409	-0.0949	1.95202	0.32052	-0.4647	-0.6731	-0.2767
	Prob.	0.2539	0.9244	0.0509*	0.7486	0.6421	0.5009*	0.782
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.00959	0.06608	0.10999	-0.0919	0.07658	0.19942	0.78915
	Std. Error	0.04934	0.06581	0.04495	0.07214	0.08988	0.069	0.07055
	z-Statistic	0.19432	1.0041	2.44698	-1.2745	0.85202	2.89002	11.1856
Prob.	0.8459	0.0353*	0.0144*	0.2025	0.3942	0.0039	0	
CAN(BSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.03864	0.182203	0.026697	-0.22834	0.034064	0.020437	0.096348
	Std. Error	0.166403	0.077521	0.091757	0.080523	0.059545	0.061262	0.058677
	z-Statistic	-0.23221	2.350383	0.290947	-2.83565	0.572076	0.333596	1.641993
	Prob.	0.8164	0.0188*	0.7711	0.0046	0.5673	0.7387	0.1006
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.146258	0.076125	0.033169	-0.09455	0.161079	0.161431	0.832581
	Std. Error	0.06	0.059361	0.078999	0.06511	0.083046	0.054383	0.046095
	z-Statistic	2.437644	1.282405	0.419863	-1.45212	1.939639	2.968421	18.0624
Prob.	0.0148	0.1997	0.0446*	0.1465	0.0524	0.003	0	
PNB(BSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.2306	0.10201	0.01418	-0.0176	0.00984	0.02916	0.04124
	Std. Error	0.18274	0.06491	0.0651	0.10247	0.05886	0.07644	0.05883

	z-Statistic	-1.262	1.57153	0.21779	-0.1719	0.16721	0.38142	0.70092
	Prob.	0.2069	0.0161*	0.8276	0.8635	0.8672	0.7029	0.4834
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.11455	0.10601	0.06029	-0.1298	-0.0082	0.28404	0.16287
	Std. Error	0.0561	0.07055	0.0701	0.06463	0.06757	0.10719	0.15615
	z-Statistic	2.04186	1.50253	0.86004	-2.0079	-0.1217	2.64994	1.04299
	Prob.	0.0412	0.133	0.0098*	0.0447	0.9031	0.0081	0.297
	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.06771	0.04977	0.01029	-0.09807	0.02476	-0.00353	0.04073
	Std. Error	0.16093	0.0507	0.06561	0.075557	0.04974	0.082114	0.07037
	z-Statistic	-0.42075	0.9817	0.1568	-1.29793	0.49781	-0.04297	0.57884
	Prob.	0.6739	0.0362*	0.8754	0.1943	0.6186	0.9657	0.0427*
SBI (BSE)	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.029544	0.03975	0.07187	0.002265	0.04182	0.101249	0.82109
	Std. Error	0.055957	0.07335	0.05719	0.038862	0.08012	0.044326	0.07807
	z-Statistic	0.52798	0.54184	1.25653	0.058276	0.5219	2.284178	10.5177
	Prob.	0.5975	0.5879	0.2089	0.9535	0.6017	0.0224	0

The results in Table 6 explains the monthly effect public sector banks listed in BSE of January through December on the stock returns of the select banks. Most of the monthly coefficients in the select banks were found insignificant at both 1 per cent and 5 per cent significant levels February, October and November coefficients were found to be highly significant at 1 per cent and 5 per cent level in most of the stock returns of banks. It shows the presence of October and February effects. India's largely celebrated festival such as Diwali and Navarathri are part of the reasons for October effects. February effect is due to central budget. May effects were also not a surprise. November effect could be due to the actions or inactions of investors to gain from the December anomaly. The null hypothesis is rejected. It is concluded that monthly returns of all the months are not equal.

Table 7 GAARCH Effect of Stock Returns on Public Sector Banks (NSE) for the period 2007-2017

BOB(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.027311	0.09901	-0.03	-0.08751	-0.00864	0.01546	0.03875
	Std. Error	0.170387	0.02969	0.060074	0.082392	0.066059	0.08448	0.07451
	z-Statistic	0.160291	3.33516	-0.49946	-1.06218	-0.13074	0.18296	0.52005
	Prob.	0.8727	0.0009*	0.6175	0.2882	0.896	0.0548*	0.603
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	-0.073	0.06041	0.13412	0.147887	0.026139	0.30511	0.48638
	Std. Error	0.063644	0.06871	0.061279	0.060884	0.115094	0.10293	0.14585
	z-Statistic	-1.14704	0.87925	2.188666	2.428971	0.227112	2.96429	3.3349
	Prob.	0.2514	0.3793	0.0286*	0.0151	0.8203	0.003	0.0009
BOI(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.04618	0.01347	0.02764	0.09296	-0.038	-0.0387	-0.0044
	Std. Error	0.16857	0.06421	0.06146	0.08249	0.06687	0.06231	0.06629
	z-Statistic	0.27392	0.20974	0.44967	1.12697	-0.5685	-0.6212	-0.0661
	Prob.	0.7841	0.8339	0.6529	0.2598	0.5697	0.5345	0.9473
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.01338	0.05545	0.12379	0.00172	0.08563	0.23029	0.73729
	Std. Error	0.05485	0.06668	0.04176	0.05808	0.09443	0.08469	0.09479
	z-Statistic	0.24387	0.83166	2.96451	0.02959	0.90678	2.71921	7.77837
	Prob.	0.8073	0.4056	0.003*	0.9764	0.0345*	0.0065	0
CAN(BSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.07526	0.23933	0.01502	-0.23039	0.008202	-0.01767	0.05362
	Std. Error	0.11938	0.07354	0.07546	0.069963	0.055334	0.054179	0.04427
	z-Statistic	0.6304	3.25462	0.19908	-3.29303	0.148226	-0.3261	1.21143
	Prob.	0.5284	0.0011*	0.8422	0.001*	0.8822	0.7443	0.2257
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1

	Coefficient	0.182	0.05573	0.02042	-0.08956	0.180156	0.196288	0.8386
	Std. Error	0.06002	0.05347	0.07992	0.063841	0.081918	0.054225	0.03988
	z-Statistic	3.03251	1.04229	0.25549	-1.4028	2.19923	3.619885	21.0259
	Prob.	0.0024*	0.2973	0.7983	0.1607	0.0279*	0.0003	0
PNB(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.2753	0.09257	0.03363	-0.01314	0.015532	0.04359	0.02633
	Std. Error	0.176131	0.06252	0.06457	0.096378	0.056983	0.07279	0.05898
	z-Statistic	-1.56304	1.48058	0.52085	-0.1363	0.272566	0.59881	0.44647
	Prob.	0.118	0.1387	0.6025	0.8916	0.7852	0.5493	0.6553
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.125013	0.10729	0.04236	-0.12074	-0.0959	0.35951	0.1061
	Std. Error	0.056031	0.06856	0.07115	0.070561	0.074526	0.11698	0.13379
	z-Statistic	2.231121	1.56477	0.59528	-1.71119	-1.28675	3.07336	0.79301
	Prob.	0.0257*	0.1176	0.5517	0.0437*	0.1982	0.0021	0.4278
SBI(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.06378	0.05402	0.01553	-0.07693	0.03012	0.04905	0.03778
	Std. Error	0.1677	0.04722	0.06713	0.076264	0.05039	0.08025	0.07238
	z-Statistic	-0.38033	1.14393	0.23129	-1.00867	0.59777	0.61123	0.52196
	Prob.	0.7037	0.2527	0.8171	0.3131	0.55	0.541	0.6017
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.045293	0.04546	0.06895	-0.02982	0.02303	0.11317	0.79972
	Std. Error	0.058035	0.07542	0.05908	0.059736	0.08082	0.04599	0.08436
	z-Statistic	0.78045	0.60274	1.16715	-0.49917	0.28494	2.46075	9.47967
	Prob.	0.4351	0.5467	0.0432*	0.6177	0.7757	0.0139	0

The results in Table 7 elucidate the monthly effect public sector banks listed in NSE of January through December on the stock returns of the select banks. Most of the monthly coefficients in the select banks were found to be insignificant at both 1 per cent and 5 per cent significant levels. February, October and November coefficients were found highly significant at 1 per cent and 5 per cent level in most of the stock returns of banks. It

shows the presence of October and February effects. India’s largely celebrated festival such as Diwali and Navarathri are part of the reasons for October effects. February effect is due to central budget. May effects were also not a surprise. November effect could be due to the actions or inactions of investors to gain from the December anomaly. The null hypothesis is rejected. It is concluded that monthly returns of all the months are not equal.

Table 8 GAARCH Effect of Stock Returns on Private Sector Banks (BSE) for the period 2007-2017

AXIS(BSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.0074	-0.0153	0.01088	0.00533	-0.0092	0.01754	0.02772
	Std. Error	0.02478	0.07689	0.05466	0.08968	0.06402	0.08906	0.0215
	z-Statistic	0.29875	-0.199	0.19904	0.05946	-0.1433	0.197	1.28942
	Prob.	0.7651	0.8422	0.8422	0.9526	0.8861	0.8438	0.1973
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	-0.0635	0.02708	0.11583	0.00463	0.15593	0.21048	0.73128
	Std. Error	0.07099	0.05615	0.04529	0.07566	0.0832	0.08041	0.09237
	z-Statistic	-0.8948	0.48232	2.55735	0.06118	1.87407	2.61757	7.91691
	Prob.	0.3709	0.6296	0.0105*	0.9512	0.0609	0.0089	0
HDFC(BSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.04577	-0.0845	-0.1031	-0.0355	0.11072	-0.0463	-0.0103
	Std. Error	0.04218	0.07113	0.05785	0.10684	0.03928	0.06612	0.06621
	z-Statistic	1.08526	-1.1885	-1.7814	-0.3323	2.81844	-0.6998	-0.1559
	Prob.	0.2778	0.2346	0.0748	0.7396	0.0048*	0.4841	0.8761
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.15496	0.04862	0.01243	-0.0152	0.15129	0.15771	0.86589
	Std. Error	0.05015	0.04309	0.0469	0.05149	0.07141	0.03647	0.02516
	z-Statistic	3.09014	1.12834	0.26506	-0.2944	2.11856	4.32395	34.4166
	Prob.	0.002*	0.2592	0.791	0.7684	0.0341*	0	0
ICICI(BSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.06616	-0.0642	-0.0604	-0.0016	-0.0496	-0.1084	-0.0105
	Std. Error	0.14671	0.06117	0.0554	0.07437	0.07526	0.06422	0.06588
	z-Statistic	0.45096	-1.0492	-1.0905	-0.0216	-0.6594	-1.6876	-0.1595
	Prob.	0.652	0.2941	0.2755	0.9828	0.5096	0.0415*	0.8733
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	-0.0189	0.00727	0.02824	-0.1401	0.05076	0.16515	0.79534
	Std. Error	0.05979	0.06611	0.05254	0.07679	0.03253	0.07824	0.08873
	z-Statistic	-0.3163	0.11003	0.53743	-1.824	1.56027	2.11094	8.96327

INDUSIND(BSE)	Prob.	0.7518	0.9124	0.591	0.0682	0.1187	0.0348	0
	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.1824	-0.1168	-0.1162	0.01682	-0.053	0.04073	-0.0254
	Std. Error	0.15952	0.07082	0.06107	0.06617	0.04909	0.05952	0.06199
	z-Statistic	1.14344	-1.6497	-1.9031	0.25425	-1.0801	0.68429	-0.4101
	Prob.	0.2529	0.099	0.0057*	0.7993	0.2801	0.4938	0.6818
	Variable	AUG	SEP	OCT	NOV	DEC	α_1	β_1
	Coefficient	-0.1588	-0.0215	-0.0034	0.08998	0.03611	0.44848	0.53239
	Std. Error	0.06235	0.05074	0.04208	0.06366	0.07642	0.11058	0.07585
	z-Statistic	-2.5471	-0.4242	-0.08	1.4134	0.47255	4.05567	7.01892
Prob.	0.0109*	0.6714	0.9362	0.1575	0.6365	0	0	
KMB(BSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.0619	-0.0157	-0.1095	0.12108	-0.0386	-0.0251	-0.0506
	Std. Error	0.12431	0.0619	0.0453	0.07184	0.04426	0.05337	0.02149
	z-Statistic	-0.4983	-0.2536	-2.4173	1.68536	-0.8726	-0.4695	-2.3525
	Prob.	0.6183	0.7998	0.0156*	0.0919	0.0329*	0.6387	0.0187*
	Variable	AUG	SEP	OCT	NOV	DEC	α_1	β_1
	Coefficient	-0.0657	0.00287	0.06887	0.02072	0.03426	0.55668	0.41485
	Std. Error	0.05402	0.05631	0.04815	0.05288	0.0713	0.12066	0.08164
	z-Statistic	-1.2166	0.05091	1.43037	0.39185	0.48048	4.61362	5.08122
	Prob.	0.2237	0.9594	0.0126*	0.6952	0.6309	0	0

The results in Table 8 reveals the monthly effect private sector banks listed in BSE of January through December on the stock returns of the select banks. Most of the monthly coefficients in the select banks were found to be insignificant at both 1 and 5 per cent significance levels. February, October and November coefficients were found highly significant at 1 per cent and 5 per cent level in most of the stock returns of banks. It shows the presence of October and February effects. India's largely celebrated festival such as Diwali and navarathri are part of the reasons for October effects. February effect is due to central budget. May effects were also not a surprise. November effect could be due to the actions or inactions of investors to gain from the December anomaly. The null hypothesis is rejected. It is concluded that monthly returns of all the months are not equal.

Table 9 GAARCH Effect of Stock Returns on Private Ector Banks (NSE) for the period 2007-2017

AXIS(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.08634	-0.0137	0.07073	0.00309	-0.0551	-0.0318	-0.1261
	Std. Error	0.18105	0.06453	0.06269	0.09351	0.06611	0.09071	0.08334
	z-Statistic	0.47687	-0.2126	1.12821	0.03302	-0.8341	-0.35	-1.5137
	Prob.	0.6335	0.8317	0.2592	0.9737	0.4042	0.7263	0.1301
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	-0.0317	0.01691	0.08097	0.02837	0.15118	0.08555	0.87556
	Std. Error	0.06998	0.05485	0.04978	0.08087	0.08993	0.04325	0.05967
	z-Statistic	-0.4532	0.30827	1.62654	0.35081	1.68116	1.97795	14.6739
Prob.	0.6504	0.7579	0.1038	0.7257	0.0427*	0.0479	0	
HDFC(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	0.0831	0.02483	-0.1041	-0.1546	-0.0499	-0.0016	-0.0615
	Std. Error	0.11224	0.06992	0.07177	0.0704	0.02823	0.06148	0.04838
	z-Statistic	0.74042	0.35508	-1.4503	-2.196	-1.7668	-0.0261	-1.2705
	Prob.	0.0439*	0.7225	0.147	0.0281*	0.0773	0.9792	0.2039
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	0.10441	-0.041	0.09702	0.12954	0.04172	0.61873	0.22176
	Std. Error	0.03619	0.05987	0.05976	0.04932	0.06542	0.16036	0.10221
	z-Statistic	2.88545	-0.6852	1.6235	2.62667	0.63772	3.85835	2.16958
Prob.	0.0039*	0.4932	0.0045*	0.0086	0.5237	0.0001	0.03	
ICICI(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.0223	-0.0841	-0.0558	-0.0238	-0.0776	-0.0504	-0.049
	Std. Error	0.18874	0.07042	0.06564	0.07952	0.08439	0.0797	0.09005
	z-Statistic	-0.1182	-1.1944	-0.8507	-0.2993	-0.9191	-0.6321	-0.5445
	Prob.	0.9059	0.2323	0.3949	0.7647	0.0358*	0.5273	0.5861
	Variable	AUG	SEP	OCT	NOV	DEC	α1	β1
	Coefficient	-0.0202	0.0004	0.10212	-0.1466	0.2077	0.12979	0.82324
	Std. Error	0.06451	0.07445	0.06287	0.08819	0.07142	0.08079	0.11192
	z-Statistic	-0.3137	0.00538	1.62429	-1.6622	2.90816	1.60652	7.35554
Prob.	0.7537	0.9957	0.0043*	0.0965	0.0036	0.1082	0	
IINDUSIND(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JULY
	Coefficient	0.03934	0.0983	7.01E-05	-0.0106	0.05618	0.01266	-0.0367
	Std. Error	0.03031	0.05601	0.05741	0.04459	0.04893	0.0303	0.04347

	z-Statistic	1.29812	1.75502	0.00122	-0.2369	1.14822	0.41788	-0.8441
	Prob.	0.1942	0.0793	0.999	0.8127	0.2509	0.676	0.3986
	Variable	AUG	SEP	OCT	NOV	DEC	α_1	β_1
	Coefficient	-0.0213	-0.0672	0.09218	0.12128	-0.1472	0.48558	0.63175
	Std. Error	0.05206	0.03111	0.05684	0.04855	0.05891	0.13021	0.06005
	z-Statistic	-0.4089	-2.1609	1.62157	2.49779	-2.4982	3.72925	10.5203
	Prob.	0.6826	0.0307	0.1049	0.0125	0.0125	0.0002	0
KMB(NSE)	Variable	JAN(C)	FEB	MAR	APR	MAY	JUN	JUL
	Coefficient	-0.0494	-0.048	-0.1231	0.12611	-0.0177	-0.0165	-0.171
	Std. Error	0.11906	0.06672	0.04954	0.06595	0.05842	0.05352	0.05213
	z-Statistic	-0.4151	-0.7191	-2.485	1.91233	-0.3023	-0.3083	-3.2805
	Prob.	0.6781	0.4721	0.013	0.0558	0.7625	0.7579	0.001
	Variable	AUG	SEP	OCT	NOV	DEC	α_1	β_1
	Coefficient	-0.0574	-0.0229	0.0391	0.06592	0.07639	0.5464	0.40441
	Std. Error	0.05928	0.058	0.04959	0.05763	0.07076	0.13627	0.09381
	z-Statistic	-0.9689	-0.3945	0.78841	1.14389	1.07953	4.00962	4.31084
	Prob.	0.3326	0.6932	0.4305	0.2527	0.2804	0.0001	0

The results in Table 9 shows the monthly effect private sector banks listed in NSE of January through December on the stock returns of the select banks. Most of the monthly coefficients in the select banks were found to be insignificant at both 1 and 5 per cent significance levels. February, October and November coefficients were found to be highly significant at 1 per cent and 5 per cent level in most of the stock returns of banks. It shows the presence of October and February effects. India's largely celebrated festival such as Diwali and navarathri are part of the reasons for October effects. February effect is due to central budget. May effects were also not a surprise. November effect could be due to the actions or inactions of investors to gain from the December anomaly. The null hypothesis is rejected. It is concluded that monthly returns of all the months are not equal.

Findings of the study

1. Both BSE and NSE listed banks stock returns are stationary and significant at test level.
2. The stock returns of banking companies were found to be sensitive to October and February effects in both BSE and NSE.
3. There is high level of significance in October and February and lower level of significance in May, June and November.

Conclusion

From the findings, it is obvious that some kind of seasonal anomalies are persistent in the markets of both advance and emerging countries for instance India. There is seasonality effect in February and October month in the select Banks stock returns listed in BSE and NSE. Hence, despite the use of sophisticated information technology and after introducing many reforms, the securities are not fully efficient. The presence of anomalies indicates stock market inefficiency and therefore, In order to curb price return and volatility, market intervention by the regulatory authority should be strengthened.

Reference

1. Mihir Dash, Anirban Dutta, Mohit Sabharwal(2011) "Seasonality and Market Crashes in Indian Stock Markets" Asian Journal of Finance & Accounting, Vol. 3, No. 1: E11, ISSN 1946-052X.
2. P. Nageswari, Dr.M.Selvam (2011) "An Empirical Study on Seasonal Analysis in the Indian Stock Market", International Journal of Management & Business Studies, Vol. 1, Issue 4, Oct-Dec 2011, ISSN : 2330-9519 (Online) | ISSN : 2231-2463 (Print).
3. Dr. Sevinc Guler (2013) "January Effect in Stock Returns: Evidence from Emerging Markets", Interdisciplinary Journal Of Contemporary Research In Business, Vol 5, No 4.pp 641-648.
4. Manish R Pathak (2013) "Stock Market Seasonality: A Study of the Indian Stock Market (NSE)" Paripex - Indian Journal Of Research, Volume : 2 , Issue : 3, ISSN - 2250-1991.pp 200-202.
5. Shilpa Lodha, Prof. G. Soral (2015) "Seasonal Patterns in Indian Stock Markets: An Application of GARCH (1, 1) Model", American International Journal of Research in Humanities, Arts and Social Sciences, ISSN (Print): 2328-3734, ISSN (Online): 2328-3696, ISSN (CD-ROM): 2328-3688.