The Month of the Year Anomaly in Bangladesh's Stock Market: Impact of Stock Market Crash 2010 and Covid-19 Pandemic

Aklima Akter
Graduate Student
Dept. of Accounting & Information Systems
University of Dhaka

Dr. Minhaj Ferdous
Associate Professor
Dept. of Accounting & Information Systems
University of Dhaka
minhaj@du.ac.bd

Abstract

This paper investigates the existence of the month of the year anomaly in the stock market of Bangladesh from 2007 to 2021. To consider the impact of the stock market crash 2010 and Covid-19 pandemic, the whole research period is divided into four periods namely pre-crisis period, crisis period, post-crisis period, and covid-19 period. Closing stock price from 2007 to 2021 of 80 selected companies listed in Dhaka Stock Exchange under the index DSEX are collected to conduct the investigation. The investigation shows that there exist January and May effects in the stock market of Bangladesh during the pre-crisis period. There were March, June, July, November, December effects during the crisis period; February, May, August, September, December effects during the post-crisis period; and May, July, August, September, December effects during the covid-19 period in the stock market of Bangladesh. The results found from the study suggest that no implication of the tax-loss selling hypothesis in the stock market of Bangladesh, which is consistent with previous study done from the perspective of Bangladesh.

Key Words: Stock market anomaly, Month of the year effect, Bangladesh Stock Market.

1. Introduction

The world is getting complex day by day and the distributions of data within the world are becoming irregular, extreme values, which is also known as an anomaly, within a distribution always dominate the distribution. An anomaly without any influence keeps the concept of average worthwhile; otherwise, it becomes worthless (Dobelli, 2013, pp.117-119). Stock market investors or analysts need to be concerned about anomalies while making decisions. Because investors in the stock markets tend to interpret or predict the market based on the concept of average. So, the investors need to know if there is any anomaly in the stock market and be aware of anomalies.

The month of the year effect, also known as the month of the year anomaly, reflects statistically significant variation in different months' returns (Gultekin and Gultekin, 1983). The month of the year effect is a phenomenon of a stock's tendency to produce an abnormal return during any particular month of the year. This anomaly has an essential impact on the investors of the market. The month of the year effect enables investors to gain abnormal returns by taking advantage of the price change pattern. The weak form of efficiency claims that the market's future performance cannot be predicted based on past information (Fama, 1991). On the other hand, the calendar anomaly assumes that the future stock price is predictable based on past behavior. In this paper, the terms "Effect" and "Anomaly" are used interchangeably.

The monthly effect was first introduced in 1942 by Wachtel. Latif et al. (2011); Singh (2014); Agathee (2008); Keong et al. (2010); Chen and Singal (2004); Moller and Zilca (2008); Marrett and Worthington (2011) suggested tax-loss selling hypothesis as one of the reasons behind monthly anomalies in the stock market. The window dressing hypothesis is also argued to cause monthly anomalies in the stock market by Moller and Zilca (2008) and Haugen and Lakonishok (1988).

In different periods, many researchers found the monthly effect in many financial markets like the USA, the UK, Australia, Japan, etc. For example, Ahsan and Sarkar (2013), Bepari and Mollik (2009), Rahman and Amin (2011) investigated the existence of monthly anomalies in the stock market of Bangladesh. But they did not consider the effect of the stock market crash in 2010 in Bangladesh's stock market.

The primary purpose of this paper is to investigate the existence of the month of the year anomaly in Dhaka Stock Exchange, considering the impact of the stock market crash of 2010 and the Covid-19 pandemic. Section 2 presents a brief discussion on Dhaka Stock Exchange and the stock market crash of 2010. Section 3 reviews the literature done at different times on the month of the year anomaly and highlights the research gap that motivates the authors to conduct this research. Section 4 describes the data, hypothesis and model development. Finally, section 5 and 6 offer the results and concluding remarks, respectively.

2. Literature Review

2.1 Theoretical Background

Fama (1970) introduced the **Efficient Market Hypothesis** to traditional financial theories. Almost all relevant information is available to the investors in an efficient market (Fama, 1970). There are three forms of an efficient market: strong, semi-strong, and weak-form efficient market. The stock price reflects all relevant past, public and private data in a strong form efficient market. The stock price reflects past and publicly available data in the semi-strong form of an efficient market. Only past data is reflected in the current stock price in the weak form of an efficient market. The weak form of efficiency follows the assumption that stock price change is independent, and future stock prices cannot be predicted based on past information (Latif et al., 2011). But the market anomaly indicates that investors can predict the future price and gain abnormal returns by this prediction. In this point of view, the market anomaly contradicts the weak form of market efficiency. But the existence of an anomaly in the stock market refers to market inefficiency or imperfection (Officer, 1975). This paper aims at investigating the existence of the month-of-the-year anomaly in the stock market of Bangladesh.

The **Tax-Loss Selling Hypothesis** states that investors tend to sell stocks with a negative return before tax return submission to get tax benefits (Brown et al., 1983). Wachtel (1942), who first discovered monthly anomalies in the stock market, found that investors prefer to wait for the next fiscal year to sell the stocks with negative returns to show less capital gain to pay less tax, which was also supported by Dyl (1977) and Branch (1977). Agrawal and Tandon (1994), Latif et al. (2011); Singh (2014); Agathee

(2008); Keong et al. (2010); Chen and Singal (2004); Moller and Zilca (2008); Marrett and Worthington (2011) also considered the tax-loss selling hypothesis as one of the causes of the monthly anomaly. On the other hand, Brown et al. (1983) found no implication of the tax-loss selling hypothesis in Australia as they found the January effect while Australias' tax date was in October. Fountas and Segredakis (2002), Poterba and Weisbenner (2001), Berges (1984), and Ho (1990) also found no implication of the tax-loss selling hypothesis.

The **Window Dressing Hypothesis** is the tendency of the investors to sell stocks with a negative return to make a more profitable portfolio in the next year (Moller and Zilca, 2008). Haugen and Lakonishok (1988) found that the investors sell stocks with a negative return to avoid showing stocks with losses in their portfolios at the end of the year. Haugen and Lakonishok (1988) also stated that investors re-purchase those stocks and start selling stocks with a positive return in January. As per Ahsan and Sarkar (2013), "the downward pressure in December because of low return and upward pressure in January because of a high return is created artificially by the managers' window-dressing activities."

The **Liquidity Hypothesi**s indicating the increase in cash flows for annual bonuses or gifts may also cause monthly anomalies (Ogden, 1990). Rozeff and Kinney (1976) suggested that positive or negative **new information** might push the stock prices upward or downward, respectively.

2.2 The Month of The Year Anomaly in International Stock Market

Though Watchel first introduced the stock market anomaly (1942), Rozeff and Kinney (1976) brought it to modern finance. Rozeff and Kinny (1976) found the January effect in the New York Stock Exchange from 1904 to 1974. They found that the average return of January was eight times higher than that of the other eleven months of the year. The January effect in the US Stock market was also found by Dyl (1977), Haugen and Jorion (1996), Branch (1977), Moosa (2007), Reinganum (1983), Mehdian and Perry (2002), Schwert (2003), Keim (1983). Likewise, Moosa (2007) found a negative July effect from 1990 to 2005 in the US stock market.

Gultekin and Gultekin (1983) found the January effect in the stock market of sixteen countries, among which the effect was really strong in fifteen countries. April, July, and December effect was found in the Australian Stock Market by Marrett and Worthing (2011). January effect was also detected in London Stock Exchange by Mills and Coutts (1995).

Ignatius (1998) found the December effect from 1979 to 1990 in the Bombay Stock Exchange and April and June effect in the Indian Stock Exchange. On the other hand, Raj and Kumari (2006) found no positive January effect in the Indian stock market. Pandey (2002) found an abnormal return in April in the Indian stock exchange contradicted by others. Yakob et al. (2005) found stability in ten Asian markets from January 2000 to March 2005. Kling and Gao (2005) found February and November effects in Shanghai Stock Exchange. Joshi and Kc (2005) found the January effect in the Nepal stock market. Kato and Schallheim (1985) found the January effect in the Japanese stock market. Anjum (2020) found the December effect in Karachi Stock Exchange and March effect in Pakistan Stock Exchange.

Asteriou and Kavetsos (2006) found a strong January effect in Slovakia, Hungry, Romania, and Poland from 1991 to 2003 after studying eighteen European countries. Fountas and Segredakis (2002) found the October effect in the Athens stock market. Balaban (1995) also found the October effect in the Turkish stock market. Kuria and Riro (2013) found the December effect in the Nairobi securities exchange. The January effect is also found in Argentina by Rossi (2008). Fountas and Segredakis (2002) found the January effect in Chile, Taiwan, Korea, Greece, and Turkey, which was later contradicted by Rossi (2007) and Floros (2008), who founded no January effect in Chile and Greece, respectively. The January effect was found in the Canadian stock market by Berges et al. (1984). Hellstrom (2002) found the January effect in Sweden. The studies suggested the tax-loss selling hypothesis, window-dressing hypothesis, liquidity hypothesis, the release of new information, etc., as the rationale behind the month of the year anomaly in different stock markets.

2.3 Month of The Year Anomaly in Bangladesh Stock Market

Very few research studies examined stock market anomalies in the Bangladesh stock market. Rahman

(2009) found the Thursday effect by studying the Day of the Week effect in Dhaka Stock Exchange from April 2005 to October 2008. The reason behind this effect can be the entry of new positive information in the market at the end of the week (Rahman, 2009). Iqbal and Roy (2015) had a consistent finding with Rahman (2009) for June 2004 to March 2015. As per Iqbal and Roy (2015), the Thursday effect occurs because of market inefficiency as Bangladesh's stock market is emerging. Ahsan and Sarkar (2013) found no January effect in the Dhaka stock exchange; instead, the June effect was found from 1987 to 2012. Ahsan and Sarkar (2013) stated that his findings contradicted the findings of Chowdhury (2005). The non-existence of the July effect causes the rejection of the tax-loss selling hypothesis as the Financial year of Bangladesh starts with July (Ahsan and Sarkar, 2013).

2.4 Bangladesh Stock Market Crash in 2010

Bangladesh stock market witnessed a crash in 2010. Many financial institutes invested in the stock market during 2010 as they had excess liquidity (Rahman, Hossain and Habibullah, 2017). The supply of money increased though the number of shares was limited. As per Bhuiyan (2011), the DSE General Index had 8918.51 points with a turnover of 32.50 billion BDT on 5th December 2010. Bangladesh Bank took the initiative to withdraw all money invested illegally into the market before 31st December. So the institutional investors started selling shares, which made investors panic. On 19th December 2010, the market witnessed the biggest fall of history. From January 2011, the share prices started to fall as the investors knew a liquidity crisis was going on in the market. The government formed a committee to investigate the reasons behind this fall. Reasons the committee found were the inefficient monitoring system of the Bangladesh Stock Exchange Commission, the act of market players as controllers, access of investment banks in the capital market, manipulation of share prices during pre-IPO and the IPO process, artificial trading, etc.

2.5 Research Gap

The objective of the author is to investigate the existence of anomalies in the stock market of Bangladesh. There is a paucity of research investigating stock market anomalies considering the impact of the stock market crash of 2010 and Covid-19.

Thus, this paper tends to show the month of the year effect on selected listed companies of Dhaka stock exchange considering the impact of the stock market crash of 2010 and Covid-19 pandemic to fill the gap.

3. Methodology

3.1 Data and Hypothesis Development

The closing stock price of the first trading day and the last trading day of each month of 80 listed companies included in the Dhaka Stock Exchange from 2007 to 2021 is collected to investigate from secondary sources. The companies are selected based on two criteria:

1. The company is listed before 2007, and
2. Stocks of that company are traded in each month of each year from 2007 to 2021.

The list of the selected companies is included in the Appendix. The overall period is divided into four (04) sub-periods to consider the impact of the stock market crash in December 2010 and Covid-19 in 2020. The sub-periods are:

I. The pre-crisis period from 2007 to November 2010

II. The crisis period from December 2010 to 2011

III. The post-crisis period from 2012 to 2019

IV. The Covid-19 period from 2020 to 2021.

The following hypothesis is developed to test:

The null hypothesis, **H0**: There is no Month of the Year effect in the Dhaka Stock Exchange

3.2 Model Development

To examine the seasonality, Ordinary Least Square Regression could be used (Cooper et al., 2006). The simple linear regression equation (OLS) with dummy variables, suggested by Gujarati et al. (2012, pp.308), is used to test the hypotheses to find the month of the Year effect.

The regression equation used is as follows:

$$=\alpha++$$

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$$=\alpha++$$

$$0r, =\alpha++$$

Where,

R_i= Company's monthly return for the period i

α = Mean monthly return of non- X months [X= January, February,……., December]

β_X = Difference between the mean of month X and that of the other non- X months

D_X= Dummy variable, which is 1 (One) for return of month X, and 0 (Zero) for other 11 months

ε_i = The random error term for period i

Raj and Thurston (1994); Rozeff and Kinney (1976); Reinganum and Gangopadhyay (1991); Holden et al. (2005); Haugen and Jorion (1996); Cheung Andrew (1999); Bhabra et al. (1999); Rashid and Kausar (2019) used stock return to test month of the year anomalies in different countries. One way to measure the stock return is the Cumulative Raw return (Reilly and Brown, 2011, pp.158) and (Frank and Goyal, 2009). The equation used to calculate monthly return using stock price is given below:

$$R_i = \frac{Price_1 - Price_0}{Price_0}$$

Where,

R_i= Monthly return

$Price_0$ = closing stock price for the first trading day of the month

$Price_t$ = closing stock price for the last trading day of the month

Stata 13 is used to run the regression equations mentioned above. The estimated level of significance is 5%. The null hypothesis will be rejected if the p-value of the developed model is found to be less or equal to 5% and β coefficient is positive. Ifis statistically significant and positive, then the result will suggest the existence of the month of the year effect in the DSE market.

This paper includes a line chart showing the daily trend in the index point from 2007 to 2021 to justify the results found from regression analysis. Daily and average index points of DSEX, representing 97% of the whole DSE, are plotted in two separate lines to compare and find the index trend. The General Index is considered DSEX for the days before 28th January 2013, as DSEX is considered the General Index's benchmark (Ahmed, 2013).

4. Results and Analysis

4.1 Descriptive Statistics

Descriptive statistics for each sub-period is as follows:

Table 1: Descriptive Statistics

Month	Pre-Crisis Period				Crisis Period			
	Mean	Maximum	Minimum	Std. Dev	Mean	Maximum	Minimum	Std. Dev
January	0.084047	1.137931	-0.38803	0.151084	-0.11135	0.288182	-0.47282	0.084035
February	0.022564	0.888489	-0.43404	0.176749	-0.3352	-0.15666	-0.64294	0.102006
March	0.039912	1.586713	-0.59711	0.232092	0.276016	1.123632	-0.41893	0.310333
April	0.024644	1.84131	-0.46451	0.192226	-0.07354	0.245403	-0.35223	0.097345
May	0.077366	1.06049	-0.56248	0.197705	-0.08276	0.05563	-0.40067	0.084538
June	0.046175	0.727088	-0.26338	0.161827	0.05474	0.316667	-0.08391	0.087098
July	0.058987	1.291862	-0.42362	0.186228	0.072827	0.310762	-0.09097	0.086466
August	0.045048	0.699763	-0.39724	0.146113	-0.03621	0.205067	-0.39101	0.071205
September	0.059916	0.940487	-0.25693	0.139374	-0.05206	0.139388	-0.33881	0.068315
October	0.055091	0.815763	-0.38797	0.162221	-0.20385	0	-0.54515	0.109825
November	0.018499	1.111628	-0.4847	0.200559	0.036944	0.522388	-0.19347	0.104935
December	0.060532	0.608659	-0.27298	0.119548	-0.01856	0.507317	-0.31468	0.119241

Table: 1 shows that during the pre-crisis and crisis period, January (8.40%) and March (27.60%) had the highest average return, respectively. And November (1.85%) and February (-33.52%) had the lowest average return during pre-crisis and crisis periods, respectively.

The descriptive statistics for the post-crisis and covid-19 periods are:

Table 2: Descriptive Statistics

Month	Post-Crisis Period				Covid-19 Period			
	Mean	Maximum	Minimum	Std. Dev	Mean	Maximum	Minimum	Std. Dev
January	0.001735	1.375575	-0.48752	0.157108	-0.02258	0.397222	-0.25298	0.097392
February	0.017763	0.488717	-0.89559	0.121004	-0.01989	0.281513	-0.27341	0.076815
March	-0.02881	0.981289	-0.32967	0.106762	-0.0642	0.315436	-0.65783	0.096841
April	-0.04541	1.039933	-0.69803	0.13282	0.056164	0.651351	-0.29388	0.159574
May	0.017013	0.541045	-0.34091	0.122888	0.095753	0.709677	-0.13086	0.154991
June	0.005542	0.848338	-0.24642	0.099984	0.027125	0.594181	-0.11724	0.093957
July	-0.00466	0.587302	-0.31905	0.099762	0.06094	0.607955	-0.08108	0.106338
August	0.04106	1.080645	-0.27244	0.114937	0.120127	0.867133	-0.1234	0.139532
September	0.024979	1.60223	-0.24	0.129831	0.060115	0.79562	-0.17608	0.153482
October	-0.036	0.595745	-0.45946	0.094988	-0.06097	0.637405	-0.3271	0.123198
November	-0.00159	0.534442	-0.42898	0.102918	-0.02924	0.55814	-0.22082	0.096121
December	0.023154	0.959417	-0.38337	0.10284	0.063638	1.270916	-0.28866	0.152156

Table: 2 shows that during the post-crisis and Covid-19 period, August, 4.11% and 12.01%, had the highest average return. And April (-4.54%) and March (-6.42%) had the lowest average return respectively, during post-crisis and Covid-19 periods.

4.2 Regression Results

The Durbin-Watson test is conducted to test the autocorrelation in the residuals. The Breusch-Pagan Godfrey test is conducted to test the existence of heteroskedasticity in the regression model. Autocorrelation and heteroskedasticity are adjusted where needed. The results of the Durbin-Watson test and the Bruesch-Pagan test are included in the Appendix.

To test monthly anomaly, the regression equation (OLS), suggested by Gujrati et al. (2012, pp.308), is used:

$$R\_i=\alpha+\beta\_X\ D\_X+\varepsilon\_i$$

The regression results for the pre-crisis and crisis periods are given in the table below:

Table 3: Regression Result

Month		Pre-Crisis Period				Crisis Period			
		n=3760				n= 1040			
		Coeff.	p	t	F- value	Coeff.	p	t	F- value
January	β(Jan)	0.03813		4.25	18.08	-0.07967		-7.10	50.46
	α	0.04592	0.000	15.09		-0.03169	0.000	-5.11	
February	β(Feb)	-0.02907		-2.82	7.95	-0.32217		-25.55	652.69
	α	0.05164	0.000	17.16		-0.01303	0.000	-2.37	
March	β(Mar)	0.00054	0.971	0.04	0.00	0.33998		9.76	95.28
	α	0.04912	0.000	17.01		-0.06397	0.000	-13.64	
April	β(Apr)	-0.02680		-2.41	5.79	-0.03871		-3.10	9.61
	α	0.05144	0.000	17.24		-0.03484	0.000	-5.61	

May	β(May)	0.03083		2.70	7.27	-0.04869		-4.32	18.64
	α	0.04654	0.000	15.66		-0.03407	0.000	-5.47	
June	β(Jun)	-0.00326	0.732	-0.34	0.12	0.10027		8.73	76.21
	α	0.04944	0.000	16.29		-0.04553	0.000	-7.38	
July	β(Jul)	0.01074	0.298	1.04	1.08	0.11986		10.5	110.32
	α	0.04825	0.000	16.02		-0.04703	0.000	-7.65	
August	β(Aug)	-0.00450	0.606	-0.52	0.27	0.00173	0.864	0.17	0.03
	α	0.04954	0.000	16.21		-0.03795	0.000	-6.07	
Sepetmber	β(Sep)	0.01175	0.16	1.41	1.98	-0.01544	0.117	-1.57	2.46
	α	0.04816	0.000	15.72		-0.03663	0.000	-5.85	
October	β(Oct)	0.00648	0.497	0.68	0.46	-0.17987		-13.22	174.79
	α	0.04861	0.000	16.02		-0.02398	0.000	-4.00	
November	β(Nov)	-0.03351		-2.89	8.37	0.08099		6.13	37.64
	α	0.05201	0.000	17.53		-0.04404	0.000	-7.14	
December	β(Dec)	0.01215	0.142	1.47	2.15	0.02275		1.98	3.90
	α	0.04839	0.000	15.96		-0.04131	0.000	-6.22	

*** and ** indicate significant at 1% and 5% level respectively

Table 3 shows that, during the pre-crisis period, January (3.81%) and May (3.08%) had positive mean differences. And March (33.99%), June (8.03%), July (11.99%), November (8.10%), and December (2.28%) had statistically significant and positive mean differences during the crisis period.

The regression results for the post-crisis and Covid-19 periods are given in the table below:

Table 4: Regression Result

Month		Post-Crisis Period				Covid-19 Period			
		n= 7680				n= 1920			
		Coeff.	P	t	F- value	Coeff.	p	t	F- value
January	β(Jan)	0.00055	0.932	0.09	0.01	-0.04382		-5.29	27.98
	A	0.00119	0.387	0.87		0.02124	0.000	6.84	
February	β(Feb)	0.01803		3.66	13.40	-0.04088		-5.99	35.92
	A	-0.00027	0.851	-0.19		0.02099	0.000	6.69	
March	β(Mar)	-0.03278		-7.36	54.16	-0.08922		-10.85	117.64
	A	0.00397	0.006	2.77		0.02502	0.000	8.18	
April	β(Apr)	-0.05088		-9.37	87.82	0.01145	0.280	1.08	1.17
	A	0.00548	0.000	3.92		0.01663	0.000	5.44	
May	β(May)	0.01721		3.49	12.21	0.03304		3.12	9.76
	A	-0.00020	0.889	-0.14		0.01483	0.000	4.86	
June	β(Jun)	0.00470	0.264	1.12	1.25	0.01041	0.196	1.29	1.68
	A	0.00084	0.558	0.59		0.01672	0.000	5.35	
July	β(Jul)	-0.00643	0.125	-1.53	2.35	0.04730		5.29	28.02
	A	0.00177	0.219	1.23		0.01364	0.000	4.42	
August	β(Aug)	0.04345		8.86	78.44	0.11186		9.82	96.50
	A	-0.00238	0.092	-1.68		0.00826	0.005	2.81	

Sepetmber	β(Sep)	0.02594		4.88	23.80	0.04640		3.72	13.85
	A	-0.00093	0.511	-0.66		0.01372	0.000	4.6	
October	β(Oct)	-0.04062		-10.11	102.12	-0.08569		-8.22	67.62
	A	0.00462	0.001	3.21		0.02473	0.000	8.22	
November	β(Nov)	-0.00308	0.475	-0.71	0.51	-0.05108		-6.24	38.91
	A	0.00149	0.300	1.04		0.02184	0.000	7.04	
December	β(Dec)	0.02391		5.55	30.79	0.05024		4.06	16.51
	A	-0.00076	0.599	-0.53		0.01340	0.000	4.49	

*** and ** indicate significant at 1% and 5% level respectively

According to Table 4, there were February (1.80%), May (1.72%), August (4.35%), September (2.59%), and December (2.39%) effects in DSE during the post-crisis period. During the Covid-19 period, May (3.30%), July (4.73%), August (1.12%), September (4.64%), December (5.02%) effects are found in DSE.

4.3 Trend in Index

The trend in DSEX from 20017 to 2021 are shown in the figure below:

Figure 1: Trend in Index

Figure: 1 shows that daily index points have high deviations from the average index points in almost all years. For example, from December 2010 to 2011, which is the crisis period of our regression analysis, daily index points have a huge deviation from the average index point that is indicative of the existence of anomalies in the market during that period. And our regression analysis also found several monthly anomalies, especially, a very high march effect during the crisis period, where the mean stock return of March was almost 34% higher than that of the other eleven months. Moreover, daily index points also deviate from the average index point from 2012 to 2016, which lies within the post-crisis period. So, the trend indicates that there are chances of monthly anomalies to exist in DSE.

Another important finding is that in all months, in Table: 4, the average stock returns of the other eleven months were positive and statistically significant. So, it is an indication that, during the Covid-19 period, the overall market was in an upward dimension.

The summary of the findings after considering the regression analysis and trend in the index points is shown in the table below:

Period	Effects
Pre-Crisis Period	January, May.
Crisis Period	March, June, July, November, December.
Post-Crisis Period	February, May, August, September, December.
Covid-19 Period	May, July, August, September, December.

5. Conclusion

The main objective of this paper was to find out the existence of the month of the year anomaly in the Dhaka Stock Exchange. By adopting regression analysis and comparing the regression analysis results with the trend in index points during the sample period, different monthly anomalies are found in DSE. From the above study, it can be concluded that the January and May effect was in DSE during the pre-crisis period. The presence of March, June, July, November, and December effects in DSE during the crisis period. February, May, August, September, and December effect was found during the post-crisis period. There exist May, July, August, September, Decembe effects in DSE during the Covid-19 period.

As concluded by Ahsan and Sarkar (2013), the tax-loss selling hypothesis cannot be considered as one of the reasons behind monthly anomalies in the stock market of Bangladesh. Because statistically significant and positive July effect is absent, July is the first month of a new financial year in the market. Though the July effect was found during the crisis period, it represents a minor portion (only two years) of the whole sample period.

Further studies can be conducted to find the existence of the month of the year anomaly in the stock market of Bangladesh as a whole by including both DSE and CSE. Investigating the reasons behind the presence of anomalies in the stock market of Bangladesh can also be an area of conducting future research. Another scope of further research is to find if window dressing is being practised in Bangladesh's stock market and can result in monthly anomalies.

The findings of this study can benefit the investors and analysts of the stock market. Investors can make appropriate investment decisions to gain more returns by considering the existence of the month of the year anomaly. Stock market analysts can also think twice before predicting the market's future performance based on the concept of average.

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Appendix

Companies selected for this paper:

Table: A1

SI	TRADING CODE	Company Name	Listing Year
1	ABBANK	AB Bank Limited	1983
2	ACI	ACI Limited	1976
3	AFTABAUTO	Aftab Automobiles Limited	1987
4	AGNISYSL	Agni Systems Ltd.	2003
5	AGRANINS	Agrani Insurance Co. Ltd.	2005
6	ALARABANK	Al-Arafah Islami Bank Ltd.	1998
7	AMBEEPHA	Ambee Pharmaceuticals Ltd.	1986
8	AMCL(PRAN)	Agricultural Marketing Company Ltd. (Pran)	1996
9	ANLIMAYARN	Anlimayarn Deying Ltd.	1997
10	ANWARGALV	Anwar Galvanizing Ltd.	1996
11	APEXFOODS	Apex Foods Limited	1981
12	APEXFOOT	Apex Footwear Limited.	1993
13	APEXSPINN	Apex Spinning & Knitting Mills Limited	1994
14	APEXTANRY	Apex Tannery Limited	1985
15	ARAMIT	Aramit Limited	1984
16	ASIAPACINS	Asia Pacific General Insurance Co. Ltd.	2006
17	ATLASBANG	Atlas Bangladesh Ltd.	1988
18	BATASHOE	Bata Shoe Company (Bangladesh) Limited	1985
19	BATBC	British American Tobacco Bangladesh Company Limited	1977
20	BDCOM	BDCOM Online Ltd.	2002
21	BEACHHATCH	Beach Hatchery Ltd.	2002
22	BEXIMCO	Bangladesh Export Import Company Ltd	1989
23	BGIC	Bangladesh General Insurance Company Ltd.	1989
24	BRACBANK	BRAC Bank Ltd.	2007
25	BXPHARMA	Beximco Pharmaceuticals Ltd.	1986
26	CENTRALINS	Central Insurance Company Ltd.	1995
27	CITYBANK	The City Bank Ltd.	1986
28	CONFIDCEM	Confidence Cement Ltd.	1995
29	DAFODILCOM	Daffodil Computers Ltd.	2006
30	DELTASPINN	Delta Spinners Ltd.	1995
31	DESCO	Dhaka Electric Supply Company Ltd.	2006
32	DUTCHBANGL	Dutch-Bangla Bank Ltd.	2001
33	EASTLAND	Eastland Insurance Company Ltd.	1994
34	EASTRNLUB	Eastern Lubricants Ltd.	1976
35	EBL	Eastern Bank Ltd.	1993
36	EXIMBANK	Export Import (Exim) Bank Of Bangladesh Limited	2004
37	FAREASTLIF	Fareast Islami Life Insurance Co. Ltd.	2005
38	FINEFOODS	Fine Foods Limited	2002
39	FUWANGFOOD	Fu Wang Food Ltd.	2000
40	GREENDELT	Green Delta Insurance Ltd.	1989
41	HEIDELBCEM	Heidelberg Cement Bangladesh Ltd.	1989
42	HRTEX	H.R.Textile Ltd.	1997

43	ICB	Investment Corporation Of Bangladesh	1977
44	IDLC	IDLC Finance Ltd.	1992
45	IFIC	IFIC Bank Ltd.	1986
46	INTECH	Intech Limited	2002
47	IPDC	IPDC Finance Limited	2006
48	ISNLTD	Information Services Network Ltd.	2002
49	KARNAPHULI	Karnaphuli Insurance Company Ltd.	1995
50	KEYACOSMET	Keya Cosmetics Ltd.	2001
51	LANKABAFIN	LankaBangla Finance Ltd.	2006
52	LHBL	LafargeHolcim Bangladesh Limited	2003
53	LINDEBD	Linde Bangladesh Limited	1976
54	MIRACLEIND	Miracle Industries Ltd.	2000
55	MONNOCERA	Monno Ceramic Industries Ltd.	1983
56	MTB	Mutual Trust Bank Ltd.	2003
57	NATLIFEINS	National Life Insurance Company Ltd.	1995
58	NBL	National Bank Ltd.	1984
59	NITOLINS	Nitol Insurance Co. Ltd.	2005
60	OLYMPIC	Olympic Industries Ltd.	1989
61	ONEBANKLTD	One Bank Limited	2003
62	PEOPLESINS	Peoples Insurance Company Ltd.	1990
63	PHENIXINS	Phoenix Insurance Company Ltd.	1994
64	PRIMEBANK	Prime Bank Ltd.	2000
65	PRIMEFIN	Prime Finance & Investment Ltd.	2005
66	PRIMEINSUR	Prime Insurance Company Ltd.	2001
67	PRIMETEX	Prime Textile Spinning Mills Limited	1995
68	PUBALIBANK	Pubali Bank Ltd.	1984
69	QUASEMIND	Quasem Industries Ltd.	1989
70	RANFOUNDRY	Rangpur Foundry Ltd.	1999
71	RENATA	Renata Ltd.	1979
72	SAIHAMTEX	Saiham Textile Mills Ltd.	1988
73	SINGERBD	Singer Bangladesh Limited	1983
74	SINOBANGLA	Sinobangla Industries Ltd.	1999
75	SQUARETEXT	Square Textile Ltd.	2002
76	SQURPHARMA	Square Pharmaceuticals Ltd.	1995
77	SUMITPOWER	Summit Power Limited	2005
78	USMANIAGL	Usmania Glass Sheet Factory Ltd.	1987
79	UTTARABANK	Uttara Bank Ltd.	1984
80	UTTARAFIN	Uttara Finance And Investments Limited	1997

The result of the Durbin-Watson test to test autocorrelation is given below:

Autocorrelation Test (Durbin-Watson)				
Month	**Pre-crisis period**	**Crisis period**	**Post-crisis period**	**Covid-19 Period**
January	2.024	2.417	2.083	1.854
February	2.020	2.161	2.077	1.909
March	2.024	1.966	2.096	1.884
April	2.021	2.389	2.095	1.851

May	2.019	2.423	2.075	1.864
June	2.023	2.475	2.084	1.865
July	2.023	2.302	2.080	1.912
August	2.023	2.433	2.095	1.963
September	2.024	2.444	2.085	1.869
October	2.023	2.424	2.075	1.863
November	2.017	2.411	2.084	1.875
December	2.021	2.423	2.083	1.813

The range for normal values in the case of serial autocorrelation is 1.5 to 2.5 (Field, 2009)

The null hypothesis tested in the Breusch-Pagan Godfrey test, heteroskedasticity test, is:

H0: Constant Variance

The results of the Breusch-Pagan Godfrey test is given below:

Heteroskedasticity (Breusch-Pagan Test)												
Month	**Pre-crisis period**			**Crisis period**			**Post-crisis period**			**Covid-19 period**		
		p	**Hetero.**		**p**	**Hetero.**		**p**	**Hetero.**		**p**	**Hetero.**
January	12.53	0.0004	Yes	27.60	0.0000	Yes	185.24	0.0000	Yes	15.59	0.0001	Yes
February	0.00	0.9926	No	17.09	0.0000	Yes	0.26	0.6124	No	35.89	0.0000	Yes
March	114.24	0.0000	Yes	282.05	0.0000	Yes	13.58	0.0002	Yes	14.85	0.0001	Yes
April	5.87	0.0154	Yes	23.20	0.0000	Yes	22.29	0.0000	Yes	3.10	0.0784	No
May	11.14	0.0008	Yes	27.55	0.0000	Yes	1.22	0.2688	No	1.62	0.2024	No
June	4.64	0.0312	Yes	26.46	0.0000	Yes	31.39	0.0000	Yes	19.05	0.0000	Yes
July	2.07	0.1499	No	26.54	0.0000	Yes	32.03	0.0000	Yes	8.42	0.0037	Yes
August	17.64	0.0000	Yes	31.82	0.0000	Yes	1.50	0.2213	No	5.32	0.0211	Yes
September	25.10	0.0000	Yes	32.66	0.0000	Yes	11.90	0.0006	Yes	16.55	0.0000	Yes
October	4.41	0.0358	Yes	17.51	0.0000	Yes	45.88	0.0000	Yes	0.24	0.6264	No
November	14.64	0.0001	Yes	20.33	0.0000	Yes	23.28	0.0000	Yes	16.57	0.0000	Yes
December	37.87	0.0000	Yes	33.51	0.0000	Yes	23.08	0.0000	Yes	14.90	0.0001	Yes