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Impact of budget announcement on stock returns: An Event Study in Pharmaceutical and Automobile sector

Sadia Shafiq¹, Saiqa Saddiqa Qureshi²

Abstract

This study explains the budget announcement impact on automobile and pharmaceutical sectors stock returns. We have observed whether there is any significant effect of budget announcement events in stock returns during the window period or not. It is a quantitative study and event-study methodology is adopted. The event window consists of 15 days, including seven pre-event days, one event day and seven post-event days, while the estimation window consists of 230 pre-event window days. As per knowledge of researcher, no study in Pakistan has specifically studied the budget announcement event impact on stock returns of automobile and pharmaceutical sectors by using event study methodology. This study will be beneficial for market participants of pharmaceutical and automobile sectors because of its consideration to dynamics in stock market after the budget event announcement. The findings of current study revealed that Pakistan's stock market is found to be semi strong efficient. Volatility in returns was observed but no significant impact was found in the automobile sector while in pharmaceutical sector, significant impact was observed for two years. Results indicate that there is very low chance to earn abnormal returns as all the information related to the budget immediately absorbed by market forces.

Keywords: Event study, budget announcement, efficient market hypothesis (EMH), stock returns, pharmaceutical sector, automobile sector.

¹Department of Business Administration, Fatima Jinnah Women University, Rawalpindi, Pakistan,
E-mail: sadiashafiq191998@gmail.com

² Assistant Professor, Department of Business Administration, Fatima Jinnah Women University, Rawalpindi, Pakistan,
E-mail: saiqa@fjwu.edu.pk

1. Introduction

Stock markets give indication about the performance of an economy which is the reason that investors, economists and industrialists always observe stock prices closely. It is also referred as a barometer of a country's economy. It is quite difficult to predict the movements of the stock market as the stock market behavior is highly uncertain. Stock market reacts when any news and information enters the market. News related to different internal and external factors are considered to have a strong correlation with the stock market index (Raza, Sun & Khine, 2021). It depends on the level of market efficiency that how much the news will affect the stock market.

Fama (1970) introduced the concept of Efficient Market Hypothesis (EMH) which defines the stock market as a place where all the information is fully incorporated in the prices. This theory states that in an efficient market, when any new information arrives in the market regarding dividend announcement; annual report; earning announcement; political issues and economic policies: stock prices will immediately incorporate it and adjust accordingly. EMH has three forms including weak form, semi-strong form and strong form. Weak form assumes that all historical information is already incorporated in the market prices so abnormal returns can not be earned by using this information and only unique information can help investors to gain abnormal returns. Semi-strong form of hypothesis states that besides historical prices and return sequences, other information like annual reports, financial statements, are publicly available and all the investors have equal access to this information so it is not possible for investors to get benefits by using this information. While in strong form of

hypothesis, it is assumed that the market is highly efficient and prices are already updated according to latest information hence investors can earn unexpected returns only in the case if they get access to any private information, which is not available publicly. Followers of EMH argue that future prices of securities cannot be predicted by using historical data as prices change randomly and investors cannot earn any abnormal return.

It is a well-known phenomenon that announcement of any new information or news will cause variation in stock returns. There are several macroeconomic events that cause variation in stock prices like dividend announcement, federal budget announcement, interest rate announcement, inflation rate changes, and so on. Announcement of the federal budget is a very important event which influences the financial market. Federal budget acts as a roadmap of the economy through which the government introduces their financial policies for economy's growth. According to Thaker, Maisuria & Jariwala (2019), some negative sentiments are associated with the budget announcement event that causes investors to postpone their trading decisions around the budget event. Federal budget introduces new regulations, strategies, subsidies, laws and taxes, which will ultimately have a favorable or adverse effect on stock returns because these changes will influence the investor's decisions and cause variation in stock prices (Sathyanarayana & Gargesa, 2019).

Pakistan Stock Exchange (PSE) was established in 1947 by the name of Karachi Stock Exchange (KSE) which was named as PSE later in 2016. PSE is a forefront of the country's economy which is likely to be highly affected by different government events especially budget announcement events. Many studies have measured the impact of federal

budget announcements on stock exchanges. Globally Kalainathan (2018), Maheshwari., Johri & Kute (2020), Erfanian et al., (2020), Ochieng & Otieno (2016) had studied the impact of budget event while in Pakistani context, many researchers had used this technique to study the impact of political factors (Khan et al., 2017), Panama leak, CPEC and drone strike impacts (Rehman, Burhan & Khan, 2016), but very little or no attention is given to the budget announcement event in Pakistan.

In this paper, we have explored the budget announcement event's impact on pharmaceutical and automobile sectors stock returns. The objective of this study was to explore the presence of abnormality in returns due to the announcement of budget and to examine whether Pakistani stock market is semi strong efficient in nature or not. Focus area of this paper was to study the dynamics of Pakistan Stock Exchange during last decade in response to the budget announcement. This study will add up in the field of literature by investigating how federal budget announcement event affect the stock returns of Pakistan's automobile and pharmaceutical sector.

2. Literature Review

There is ample empirical evidence found that studied the behavior of stock markets in response to the budget announcement event. Event study is a widely used technique which basically measures the magnitude of abnormal returns in response to the occurrence of any event.

Khan et al. (2017) examined the impact of political and budget events on the stock returns of Pakistani stock market and examined which hypothesis is consistent with the stock market behavior out of EMH,

over/under-reaction hypothesis and uncertain information hypothesis. Study confirms that in response to expected political-budget events, stock markets exhibit weak form of EMH while results of unexpected political events are consistent with the uncertain information hypothesis.

Maheshwari., Johri & Kute (2020) explored the union budget announcement impact on the sector indices NSE of Indian stock market and found no statistical significant impact of budget event on stock prices. Abnormal returns were reported in just two sectors e.g banking sector and automobile sector. It was concluded that Indian stock market is semi strong efficient in nature.

Jha & Basnet (2020) examined the Nepal Stock Exchange reaction in response to the announcement of government budget by using the event study methodology. It was found that budget announcement event had a positive effect on stock returns of Nepalis companies.

Kalainathan (2018) studied the impact of budget announcement events on the behavior of Sri Lankan stock price indices and found that event had a significant impact in the post event window. It was concluded in the study that Sri Lankan stock market efficiency level is high so it is impossible that investors could earn any abnormal returns around the event of budget announcement.

Sathyanarayana & Gargesa (2019) observed the union budget announcement event's impact in Indian stock market to get information about market efficiency level. Study revealed that a degree of volatility has been observed but the market absorbs all the information very quickly so the returns volatility does not get affected by budget and Indian

stock market efficiently processes the information of the union budget.

Patel, Dave & Shah (2016) tested the semi strong form of efficient market hypothesis in response to the budget announcement event and concluded that no significant variation in returns was found hence investors wouldn't earn abnormal returns which implies high level of efficiency in Indian stock market.

Thaker, Maisuria & Jariwala (2019) investigated the effect of union budget on the performance of BSE's Nifty and Sensex index for five years from 2015-19 and concluded that more volatility has observed in moderate term period but in short and long term period volatility does not increase while no significant impact of budget event had observed.

Erfanian et al., (2020) studied the speed of reaction of stock markets of five Middle-eastern and North African countries in response to the budget and general election results announcement during the last five years. Study found that budget announcements had a significant impact which lasted for two days around the announcement day while stock indexes rapidly adjusted the information related to the announcement of the results of general elections in all the five countries.

Gayathir & Ganesamoorthy (2018) examined the effect of union budget announcement event 2018 on stock returns of Sensex by using event study methodology. Study revealed that no significant impact was observed on the returns of Sensex companies around the event but a slightly negative trend in the cumulative average abnormal returns was observed due to the announcement on event day and one pre and post event day.

Edirisinghe (2017) investigated the impact of budget announcement on five

sectors of Colombo stock exchange during 2002-2013. Results of the study revealed all the sectors showed a negative trend around the event but the magnitude of volatility varies while the automobile sector is the one which is highly affected due to the budget announcement event.

Ochieng & Otieno (2016) observed the reaction of equity returns in response to the budget reading event at Nairobi stock exchange over five years' time period 2009-13. It was found in the study that other than 2010, budget events had a negative significant impact on the returns.

Ahmad et al. (2021) studied the impact of local and global terrorist activities on Pakistan stock indices and concluded that major terrorist attacks have a significant impact on stock performance. Findings suggest that local event effects more severely as compared to global terrorist events.

Hira (2016) investigated the relationship between political instability, stock market volatility and stock market performance in Pakistan. Findings of the study revealed that political instability, interest rate and inflation have a negative relationship while industrial production have a positive relationship with stock returns.

Abakah & Poku (2016) studies the changes in stock prices caused because of changes in budget deficits and confirmed the presence of a significantly positive relationship between real budget deficits and real stock returns.

Adnan (2019) investigated the capital market reaction on the announcement of tax reduction news in Bangladesh. Study concluded that statistically significant abnormal returns have observed in the insurance and banking sector of Bangladesh on the event day

while during the rest of event window, insignificant abnormal returns were observed.

Ali & Saha (2021) explored the reaction of Indian stock market on the announcement of Lok Sabha Elections 2019 and results revealed that consistent negatively insignificant returns were observed that validates the presence of semi strong form of efficient market hypothesis.

Oliveria (2014) studied the impact of Portuguese legislative & presidential elections and government budget announcement on the performance of stock market during the period 1998-2013. It was found that the government budget publication tends to have a significant and positive impact on the overall stock market performance but at the same time stock returns of consumer services sectors including financial and health sectors were found to be more volatile and affected negatively.

Gakhar, Kushwaha & Ashok (2015) examined the union budget impact on NSE's CNX and NIFTY index to measure the volatility in stock returns over short, medium and long term periods. Study concluded that budget events cause more volatility in the short term period which decreases with time period.

Rehman, Burhan & Khan (2016) investigated the affect of mega events including CPEC, Panama paper leaks and Surgical strikes on stock returns of China, Pakistan, India, US, UK and Saudi Arabia. It was concluded that CPEC significantly affected the stock returns of all countries except India, Panama leak had significant impact on stock exchanges of all countries other than Saudis Arabia while surgical strike event had significant impact just on Pakistani stock market. In light of above-mentioned studies, the hypotheses for present study are:

H₁: Stock market exhibits a semi strong form of efficiency in response to the federal budget announcement event.

H₂: Budget events have a significant impact on abnormal returns of the automobile and pharmaceutical sector.

3. Data and Methodology

This study examined the budget announcement event effect on pharmaceutical and automobile stock returns over the decade. Pharmaceutical sector was chosen on the basis of assumption that allocation of health budget and changes in governmental health policies may affects the returns of pharmaceutical sector while automobile sector was assumed to get affected by changes in tax policies for import and export of automobile. In this study, Methodology of event study is adopted and the federal budget announcement by finance minister is the event under study. Population of study is comprised of all listed firms of the automobile and pharmaceutical sector of KSE 100 index while the sample period of the study consists of ten years from 2011 till 2020. During this timeframe total 10 budgets were announced by government. Data collected for the study is secondary in nature. Information regarding announcement of budget was taken from Ministry of Finance's website and daily stocks closing prices data was gathered from Pakistan Stock Exchange's website. An event window of 15 days, consisting of 7 pre event days, 1 event day and 7 post event days was taken while the estimation window consists of 120 days prior to the event window.

Actual returns were calculated by using a continuous compounding method as recommended by Fama (1976). Actual return

was computed using the equation stated below:

$$R_{it} = \ln (P_t / P_{t-1}) \quad I$$

In this equation, R_{it} represents actual returns, current closing prices are denoted by P_t and P_{t-1} represents closing prices of previous day. After calculating actual returns, expected returns were calculated which will help to measure abnormal returns. Market model of event study is used to calculate the expected returns of the firms. Market model by Mackinlay (1997, p 18) is

$$R_{it} = \alpha + \beta_i R_{mt} + \varepsilon_{it} \quad II$$

$$E(\varepsilon_{it} = 0) \text{var}(\varepsilon_{it}) = \sigma_{\varepsilon}^2 \quad III$$

Here R_{it} and R_{mt} are the returns of security i during period t and market portfolio, respectively. The base stock index i.e. KSE 100 index is used as market portfolio while α_i , β_i and σ_{ε}^2 are market model parameters.

Abnormal return is the difference of actual return of the security and expected/normal returns over the event window. Mackinlay (1997, p20) explained that by using market model for measuring normal returns, calculation of abnormal returns will be done as

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt} \quad IV$$

Here AR_{it} is an abnormal return, R_{it} is the actual return and ER_{it} is the expected or normal return.

Average abnormal returns measures the abnormal returns pattern of securities. In this study, cross sectional aggregation was done for averaging the sector wise returns of different firms across the event window to observe the impact of budget announcement event. Cross sectional mean abnormal returns were computed in the event window by using the equation stated below:

$$AAR_{it} = \sum AR_{it} / n \quad V$$

Here AR_{it} is the abnormal returns, AAR_{it} is the average abnormal returns, and n is the numbers of events.

CARR is the mean of cumulative abnormal returns over the event window period. It will be used as a measuring tool to measure the stock market reaction due to the announcement of budget. Equation used to calculate CAAR is given below:

$$CAAR_i(t_1 t_2) = \sum AAR_{it} \quad VI$$

Test for significance measures the research reliability by observing the changes in the results. Significance level is something that is used for measuring the probability of an error of occurrence of an error. In this paper, t-test is used for testing the significance of budget announcement event at 5% significance level. These t-statistics are computed by using equation stated below:

$$t\text{-statistics} = AAR_{it} / S((AAR_{it})) \quad VII$$

Results of the study will be considered statistically significant only in the case if the absolute t-statistics are greater than 1.96 and if t value is less than 1.96 results will assumed to be statistically insignificant.

4. Results and Discussion

This chapter presents the empirical findings of the study. Here, responses of the automobile and pharmaceutical sector were accessed towards the event of federal budget announcement during 2020-2011 on a yearly basis. Table I presents the AAR and CAAR values with their t test-statistics of automobile and pharmaceutical sector for the budget announcement event of 2020. On event day, t-statistics of AAR and CAAR for the automobile sector are -0.016 and 0.323 respectively. These statistics shows that returns on event day were negative but overall budget had a positive but insignificant impact on the automobile sector. While in the pharmaceutical

sector, t-statistics of AAR and CAAR were 0.167 and 0.623 respectively which shows a positive but non-significant impact on the returns of the pharmaceutical sector. In the rest of the event window, volatility had observed but no significant impact of the event had observed.

Table I

Returns of automobile and pharmaceutical sector of 2020

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	0.0126	1.0301	0.0126	0.1378	-0.0171	-1.1054	-0.0171	-0.1874
-6	0.0203	1.6584	0.0328	0.3596	0.0131	0.8462	-0.0040	-0.0440
-5	-0.0010	-0.0803	0.0319	0.3489	0.0105	0.6755	0.0064	0.0706
-4	-0.0033	-0.2667	0.0286	0.3132	0.0259	1.6738	0.0324	0.3544
-3	0.0009	0.0713	0.0295	0.3227	0.0163	1.0559	0.0487	0.5334
-2	-0.0092	-0.7565	0.0202	0.2215	0.0031	0.1989*	0.0518	0.5671
-1	0.0095	0.7756	0.0297	0.3253	0.0025	0.1617	0.0543	0.5946
0	-0.0002	-0.0169	0.0295	0.3230	0.0026	0.1679	0.0569	0.6230
1	-0.0232	-1.8984	0.0063	0.0691	0.0197	1.2710	0.0766	0.8385
2	-0.0040	-0.3266	0.0023	0.0254	-0.0087	-0.5588	0.0680	0.7438
3	0.0043	0.3499	0.0066	0.0722	0.0207	1.3362	0.0886	0.9704
4	-0.0033	-0.2691	0.0033	0.0362	0.0129	0.8347	0.1015	1.1119
5	-0.0031	-0.2497	0.0003	0.0028	-0.0069	-0.4486	0.0946	1.0358
6	0.0092	0.7549	0.0095	0.1038	-0.0135	-0.8740	0.0810	0.8876
7	0.0022	0.1821	0.0117	0.1281	0.0097	0.6245	0.0907	0.9935

Note: t-statistics with * denotes statistical significance at 5% level of significance.

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Source: Authors own computation in MS Excel

Table II shows the impact of the budget event of 2019 on the returns of the automobile and pharmaceutical sector. Average abnormal returns of the automobile sector is -0.42, showing a negative insignificant impact of budget on event day but two days before the event, t-value of AAR shows a positive significant impact while after two days of event it shows a negative significant impact. In the pharmaceutical sector, on event days, t-statistics of AAR and CAAR are -1.002 and 0.214 respectively. T-statistics of average abnormal returns shows a positive significant impact two days after the event day. T-statistics of cumulative average abnormal returns remains positive for both sectors throughout the event window that confirms the presence of volatility in response to the announcement of budget but no significant impact has been observed.

Table II

Returns of automobile and pharmaceutical sector of 2019

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	0.0014	0.1308	0.0014	0.0151	0.0020	0.1832	0.0020	0.0221
-6	0.0149	1.4135	0.0163	0.1785	0.0208	1.8876	0.0228	0.2499
-5	0.0203	1.9202	0.0366	0.4005	0.0020	0.1832	0.0248	0.2720
-4	-0.0013	-0.1267	0.0352	0.3859	0.0020	0.1832	0.0268	0.2941
-3	-0.0144	-1.3611	0.0209	0.2285	0.0020	0.1832	0.0289	0.3162
-2	0.0290	2.7467*	0.0498	0.5460	0.0020	0.1832	0.0309	0.3383
-1	-0.0012	-0.1151	0.0486	0.5327	-0.0023	-0.0202	0.0307	0.3359
0	-0.0045	-0.4219	0.0442	0.4840	-0.0110	-1.0022	0.0196	0.2149
1	0.0025	0.2353	0.0467	0.5112	0.0052	0.4746	0.0249	0.2722
2	-0.0326	-3.0867	0.0141	0.1543	0.0245	2.2224*	0.0493	0.5404
3	0.0100	0.9519	0.0241	0.2644	0.0138	1.2529	0.0631	0.6916
4	0.0102	0.9653	0.0343	0.3760	-0.0128	-1.1592	0.0504	0.5517
5	-0.0103	-0.9775	0.0240	0.2630	-0.0064	-0.5783	0.0440	0.4819
6	-0.0121	-1.1504	0.0119	0.1300	0.0047	0.4303	0.0487	0.5339
7	0.0108	1.0256	0.0227	0.2485	0.0162	1.4702	0.0649	0.7113

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Average abnormal return and cumulative average abnormal return, with their t-statistics of automobile and pharmaceutical sector in response to the budget announcement event of 2018 are shown in table III. In the automobile sector, t-values of AAR and CAAR are 0.85 and 0.29 respectively while in the rest of event window, returns remain fluctuating but without having any significant impact. On the other hand, in pharmaceutical sector, a positive significant impact is noticed in average returns of the sector on seven and two days before the event. But on event day and during the rest of event window, no significant impact was observed. On event day, t-values of AAR and CAAR are -0.26 and 0.098 respectively. Overall a negative insignificant impact has been observed in the pharmaceutical sector.

Table III

Return of Automobile and pharmaceutical sector of 2018

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	0.0043	0.5482	0.0043	0.0472	0.0245	2.4110*	0.0245	0.2681
-6	0.0110	1.3977	0.0153	0.1677	-0.0036	-0.3525	0.0209	0.2289
-5	0.0092	1.1697	0.0245	0.2685	0.0043	0.4200	0.0252	0.2756
-4	-0.0010	-0.1286	0.0235	0.2574	-0.0099	-0.9720	0.0153	0.1675
-3	-0.0048	-0.6159	0.0187	0.2043	-0.0073	-0.7153	0.0080	0.0880
-2	-0.0009	-0.1150	0.0177	0.1944	0.0224	2.2067*	0.0304	0.3334
-1	0.0022	0.2836	0.0200	0.2188	-0.0187	-1.8438	0.0117	0.1284
0	0.0067	0.8555	0.0267	0.2926	-0.0027	-0.2662	0.0090	0.0987
1	-0.0024	-0.3068	0.0243	0.2661	-0.0021	-0.2059	0.0069	0.0759
2	0.0005	0.0631	0.0248	0.2716	-0.0005	-0.0485	0.0064	0.0705
3	-0.0012	-0.1576	0.0236	0.2580	-0.0130	-1.2810	-0.0066	-0.0720
4	-0.0017	-0.2187	0.0218	0.2392	0.0017	0.1660	-0.0049	-0.0536
5	0.0077	0.9788	0.0295	0.3235	-0.0025	-0.2463	-0.0074	-0.0809
6	0.0003	0.0429	0.0299	0.3272	-0.0136	-1.3414	-0.0210	-0.2301
7	-0.0057	-0.7206	0.0242	0.2651	-0.0091	-0.8945	-0.0301	-0.3296

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Table IV shows the returns and their t-statistics of the automobile and pharmaceutical sector in result of the budget announcement event in 2017. In automobile sector, AAR and CAAR remain insignificant on event day with t-values of 1.58 and -0.008 respectively. On the fifth day after the event, a significant impact of the event was observed in the average abnormal returns. While in the pharmaceutical sector, t-statistics of AAR and CAAR were -0.26 and -0.06 respectively on the event day. CAAR value gets negative two days before the event in pharmaceutical sector which remains negative till the end of the event window but no significant impact has been observed because of the announcement of the budget in 2017.

Table IV

Return of automobile and pharmaceutical sector of 2017

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	0.0052	0.5902	0.0052	0.0571	0.0155	1.2056	0.0155	0.1699
-6	-0.0035	-0.3946	0.0017	0.0189	0.0187	1.4564	0.0343	0.3752
-5	-0.0026	-0.2962	-0.0009	-0.0097	0.0026	0.2019	0.0369	0.4037
-4	-0.0043	-0.4848	-0.0052	-0.0567	-0.0106	-0.8225	0.0263	0.2878
-3	-0.0027	-0.3074	-0.0079	-0.0864	-0.0128	-0.9956	0.0135	0.1474
-2	-0.0082	-0.9285	-0.0161	-0.1763	-0.0208	-1.5681	-0.0067	-0.0736
-1	0.0013	0.1519	-0.0147	-0.1616	0.0045	0.3533	-0.002	-0.0238
0	0.0140	1.5844	-0.0008	-0.0082	-0.0035	-0.2697	-0.0056	-0.0618
1	0.0117	1.3280	0.0110	0.1203	-0.0129	-1.0022	-0.0185	-0.2031
2	-0.0041	-0.4615	0.0069	0.0756	0.0053	0.4109	-0.0133	-0.1452
3	0.0099	1.1201	0.0168	0.1840	0.0031	0.2406	-0.0102	-0.1113
4	0.0019	0.2168	0.0187	0.2050	-0.0084	-0.6547	-0.0186	-0.2035
5	-0.0217	-2.4657*	-0.0031	-0.0336	-0.0057	-0.4444	-0.0243	-0.2662
6	0.0102	1.1622	0.0072	0.0788	0.0026	0.1993	-0.0217	-0.2381
7	0.0101	1.1400	0.0173	0.1891	0.0106	0.8262	-0.0111	-0.1216

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Table V depicts the reaction of the automobile and pharmaceutical sector on the announcement of budget in 2016. On the

event day, AAR and CAAR's t-statistics were 1.47 and 0.203 respectively, showing a positive but non-significant impact of the event. A significant impact of the budget event is just seen on the fourth day after the event. High volatility was observed in the automobile sector throughout the window. While in the pharmaceutical sector a negative trend was observed in the return pattern. On event day t-values of AAR and CAAR were negatively insignificant with -0.399 and -0.068. One day after the event, significant impact was observed with t-value of 2.27 but this impact fades away very quickly and returns become insignificant in the rest of the event window.

Table V

Return of automobile and pharmaceutical sector of 2016

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	0.0073	1.1237	0.0073	0.0804	0.0034	0.3235	0.0034	0.0372
-6	-0.0048	-0.7400	0.0025	0.0274	0.0046	0.4357	0.0080	0.0872
-5	-0.0025	-0.3792	0.0000	0.0003	-0.0057	-0.5466	0.0022	0.0244
-4	0.0094	1.4433	0.0095	0.1035	0.0016	0.1490	0.0038	0.0415
-3	0.0022	0.3311	0.0116	0.1272	0.0001	0.0136	0.0039	0.0431
-2	-0.0016	-0.2492	0.0100	0.1094	-0.0049	-0.4651	-0.0009	-0.0103
-1	-0.0010	-0.1524	0.0090	0.0985	-0.0012	-0.1099	-0.0021	-0.0229
0	0.0096	1.4725	0.0186	0.2038	-0.0042	-0.3999	-0.0063	-0.0689
1	-0.0033	-0.5032	0.0153	0.1678	0.0239	2.2778*	0.0176	0.1928
2	0.0060	0.9134	0.0213	0.2331	0.0127	1.2075	0.0303	0.3315
3	-0.0012	-0.1773	0.0201	0.2204	-0.0101	-0.9624	0.0202	0.2209
4	-0.0174	-2.6586*	0.0028	0.0303	0.0000	0.0023	0.0202	0.2212
5	-0.0096	-1.4748	-0.0069	-0.0751	-0.0084	-0.7995	0.0118	0.1294
6	0.0009	0.1386	-0.0060	-0.0652	0.0028	0.2640	0.0146	0.1597
7	-0.0018	-0.2720	-0.0077	-0.0847	-0.0016	-0.1552	0.0130	0.1419

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Table VI shows how budget of 2015 affects the return pattern of the automobile and pharmaceutical sector. In the automobile sector, t-value of AAR and CAAR were 0.081 and -0.181 on the event day. The only significant impact had just been observed on the fourth day before the event with t-value of -2.27. Returns remain fluctuating in the event window. CAAR t-statistics of the automobile sector shows a negative trend during five days around the event. On the other hand, in the pharmaceutical sector, on the event day t-values of AAR and CAAR were 0.824 and -0.052 that shows insignificant effect of the

event. CAAR statistics showed a negative trend of returns during the pre-event window and on event day but after the event day, returns become positive but remain insignificant.

Table VI

Return of automobile and pharmaceutical sector of 2015

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	0.0004	0.0421	0.0004	0.0040	-0.0099	-0.6473	-0.0099	-0.1083
-6	0.0050	0.5795	0.0054	0.0586	0.0038	0.2481	-0.0061	-0.0668
-5	0.0015	0.1791	0.0069	0.0755	-0.0085	-0.5566	-0.0146	-0.1599
-4	-0.0196	-2.2785*	-0.0127	-0.1393	-0.0059	-0.3851	-0.0205	-0.2243
-3	0.0011	0.1305	-0.0116	-0.1270	0.0071	0.4640	-0.0134	-0.1467
-2	0.0002	0.0273	-0.0114	-0.1244	-0.0047	-0.3052	-0.0181	-0.1977
-1	-0.0059	-0.6881	-0.0173	-0.1893	0.0007	0.0430	-0.0174	-0.1905
0	0.0007	0.0818	-0.0166	-0.1816	0.0126	0.8244	-0.0048	-0.0526
1	0.0088	1.0176	-0.0078	-0.0857	0.0224	1.4655	0.0176	0.1925
2	-0.0090	-1.0481	-0.0168	-0.1845	-0.0107	-0.6987	0.0069	0.0756
3	-0.0010	-0.1164	-0.0178	-0.1954	0.0024	0.1596	0.0093	0.1023
4	-0.0012	-0.1414	-0.0191	-0.2088	-0.0027	-0.1765	0.0067	0.0728
5	0.0063	0.7323	-0.0128	-0.1397	0.0001	0.0042	0.0067	0.0735
6	0.0155	1.8026	0.0028	0.0302	-0.0064	-0.4219	0.0003	0.0029
7	-0.0005	-0.0586	0.0023	0.0247	0.0126	0.8251	0.0129	0.1409

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Fluctuations in stock returns of the automobile and pharmaceutical sector in response to budget announcement event in 2014 are reported in table VII. In the automobile sector, on event day, t-value of AAR and CAAR were -1.008 and -0.129 respectively which shows that budget has a negative impact on the returns. Returns were mostly negative in the pre event window but after the budget event, returns became positive in the post event window. In the pharmaceutical sector, on event day, budget had a negative impact on returns but overall CAAR values show a positive trend. AAR and CAAR values were -0.196 and 0.362 respectively. A mix of positive and negative trends had been observed in the returns but remains insignificant.

Table VII

Return of automobile and pharmaceutical sector of 2014

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	0.0008	0.0870	0.0008	0.0090	-0.0075	-0.4716	-0.0075	-0.0821
-6	0.0018	0.1915	0.0026	0.0288	0.0231	1.4558	0.0156	0.1713
-5	-0.0009	-0.0976	0.0017	0.0187	-0.0168	-1.0598	-0.0012	-0.0132
-4	0.0099	1.0535	0.0117	0.1276	0.0200	1.2602	0.0188	0.2062
-3	-0.0095	-1.0081	0.0021	0.0234	-0.0213	-1.3433	-0.0025	-0.0276
-2	-0.0222	-2.3481*	-0.0200	-0.2194	0.0331	2.0831*	0.0306	0.3350
-1	0.0177	1.8751	-0.0023	-0.0255	0.0057	0.3561	0.0362	0.3969
0	-0.0095	-1.0082	-0.0118	-0.1297	-0.0031	-0.1969	0.0331	0.3627
1	0.0114	1.2063	-0.0005	-0.0050	0.0011	0.0713	0.0342	0.3751
2	0.0106	1.1279	0.0102	0.1116	-0.0025	-0.1557	0.0318	0.3480
3	-0.0056	-0.5940	0.0046	0.0502	-0.0114	-0.7193	0.0203	0.2228
4	0.0053	0.5581	0.0099	0.1079	0.0013	0.0793	0.0216	0.2366
5	0.0042	0.4472	0.0141	0.1541	-0.0109	-0.6890	0.0107	0.1168
6	0.0162	1.7145	0.0303	0.3314	-0.0086	-0.5389	0.0021	0.0230
7	0.0071	0.7472	0.0373	0.4086	-0.0124	-0.7827	-0.0103	-0.1132

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Table VIII presents the average abnormal returns and cumulative average abnormal returns of both the sectors in response of the budget event in 2013. Event day returns of the automobile sector showed a negative but non-significant impact of the event with t-values of AAR and CAAR, -1.30 and -0.411 respectively. Returns get significant on just one day in the entire window, on the first day after the event day. CAAR statistics remain negative in the entire window. While in the pharmaceutical sector, budget event has a negative significant impact on returns. On event day, AAR and CAAR values were -3.09 and 1.527 respectively. Significant impact of the event was also observed on the third and fourth day before and after the event. In short, the budget announcement had a positively significant impact on stock returns of the pharmaceutical sector.

Table VIII

Return of automobile and pharmaceutical sector of 2013

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	-0.0119	-1.3661	-0.0119	-0.1304	0.0035	0.3003	0.0035	0.0380
-6	0.0052	0.5932	-0.0067	-0.0738	0.0194	1.6747	0.0228	0.2502
-5	-0.0079	-0.9119	-0.0147	-0.1608	0.0169	1.4621	0.0397	0.4354
-4	-0.0103	-1.1781	-0.0249	-0.2732	0.0228	1.9742*	0.0626	0.6854
-3	-0.0065	-0.7461	-0.0314	-0.3444	0.0445	3.8496*	0.1071	1.1730
-2	0.0009	0.1079	-0.0305	-0.3341	0.0473	4.0929	0.1544	1.6914
-1	0.0043	0.4929	-0.0262	-0.2871	0.0209	1.8078	0.1753	1.9204
0	-0.0114	-1.3083	-0.0376	-0.4119	-0.0358	-3.0982*	0.1395	1.5280
1	-0.0283	-3.2465*	-0.0659	-0.7217	-0.0170	-1.4657	0.1225	1.3423
2	-0.0053	-0.6077	-0.0712	-0.7797	-0.0184	-1.5909	0.1041	1.1408
3	0.0013	0.1465	-0.0699	-0.7658	0.0263	2.2736*	0.1304	1.4288
4	0.0042	0.4837	-0.0657	-0.7196	0.0349	3.0178*	0.1653	1.8110
5	0.0015	0.1755	-0.0642	-0.7028	0.0035	0.2993	0.1688	1.8489
6	-0.0102	-1.1711	-0.0744	-0.8146	-0.0233	-2.0146*	0.1455	1.5938
7	0.0001	0.0106	-0.0743	-0.8136	-0.0001	-0.0112	0.1454	1.5923

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Returns of the automobile and pharmaceutical sector in response to the budget event of 2012 are shown in table IX. Budget events showed a negative impact of event on returns of the automobile sector. On event day, AAR and CAAR statistics were -0.58 and -0.25 respectively. T-statistics of AAR was negatively significant on the fourth day after the event but in rest of event window returns were insignificant. CAAR statistics show that budget event had negatively but impacted the automobile sector. While in the pharmaceutical sector, event had a significant impact on the returns of event day with AAR value of 2.50. Event also had a significant impact on the third and fourth day of the post event window while CAAR statistics showed a negative trend of returns. Overall, the event had a significant impact on the stock returns of the pharmaceutical sector.

Table IX

Return of automobile and pharmaceutical sector of 2012

EVENT DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	-0.0047	-0.5857	-0.0047	-0.0509	0.0007	0.0806	0.0007	0.0075
-6	-0.0110	-1.3862	-0.0157	-0.1715	-0.0049	-0.5721	-0.0042	-0.0459
-5	-0.0019	-0.2368	-0.0175	-0.1921	-0.0107	-1.2533	-0.0149	-0.1629
-4	-0.0009	-0.1121	-0.0184	-0.2018	0.0064	0.7494	-0.0085	-0.0929
-3	-0.0028	-0.3573	-0.0213	-0.2329	-0.0071	-0.8360	-0.0156	-0.1709
-2	0.0032	0.4058	-0.0180	-0.1976	0.0060	0.7089	-0.0096	-0.1048
-1	-0.0008	-0.0975	-0.0188	-0.2061	-0.0149	-1.7466	-0.0245	-0.2678
0	-0.0046	-0.5847	-0.0235	-0.2569	0.0214	2.5052*	-0.0031	-0.0340
1	-0.0084	-1.0618	-0.0319	-0.3493	0.0054	0.6302	0.0023	0.0249
2	0.0001	0.0124	-0.0318	-0.3482	-0.0107	-1.2604	-0.0085	-0.0928
3	0.0018	0.2199	-0.0300	-0.3291	0.0188	2.2070*	0.0103	0.1132
4	-0.0183	-2.3052*	-0.0483	-0.5295	-0.0215	-2.5265*	-0.0112	-0.1226
5	0.0074	0.9310	-0.0410	-0.4486	0.0040	0.4717	-0.0072	-0.0786
6	-0.0124	-1.5608	-0.0533	-0.5843	0.0034	0.3972	-0.0038	-0.0415
7	0.0014	0.1777	-0.0519	-0.5688	-0.0007	-0.0848	-0.0045	-0.0494

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Table X shows the impact of the budget event of 2011 on the returns of the automobile and pharmaceutical sector. On event day, AAR and CAAR statistics showed positive but non-significant impact on automobile sector's returns with t-value of

0.187 and 0.078 respectively. No significant impact was observed in the automobile sector during the whole event window. In the pharmaceutical sector, AAR and CAAR values were -0.293 and -0.021 on the event day that shows a negative and non-significant impact of the event. In the pharmaceutical sector, a negative trend had been observed in the returns while CAAR statistics suggest that event had positive impact in pre event window but on event day and in post event window event shows a negative trend.

Table X

Return of automobile and pharmaceutical sector of 2011

EVEN DAY	Automobile sector				Pharmaceutical sector			
	AAR	t-stats	CAAR	t-stats	AAR	t-stats	CAAR	t-stats
-7	-0.0043	-0.6055	-0.0043	-0.0471	0.0083	0.8795	0.0083	0.0905
-6	-0.0009	-0.1315	-0.0052	-0.0573	-0.0003	-0.0320	0.0080	0.0872
-5	0.0037	0.5243	-0.0015	-0.0165	0.0046	0.4853	0.0125	0.1371
-4	-0.0039	-0.5436	-0.0054	-0.0588	-0.0073	-0.7770	0.0052	0.0572
-3	0.0034	0.4835	-0.0019	-0.0212	-0.0027	-0.2829	0.0026	0.0281
-2	0.0100	1.4074	0.0081	0.0882	-0.0018	-0.1921	0.0008	0.0083
-1	-0.0022	-0.3152	0.0058	0.0637	0.0000	0.0017	0.0008	0.0085
0	0.0013	0.1875	0.0071	0.0783	-0.0028	-0.2933	-0.0020	-0.0217
1	0.0040	0.5594	0.0111	0.1217	0.0057	0.6022	0.0037	0.0403
2	-0.0022	-0.3110	0.0089	0.0976	-0.0094	-0.9982	-0.0057	-0.0624
3	-0.0035	-0.4927	0.0054	0.0593	-0.0007	-0.0700	-0.0064	-0.0696
4	0.0050	0.7061	0.0104	0.1142	-0.0021	-0.2191	-0.0084	-0.0921
5	0.0018	0.2548	0.0122	0.1340	0.0049	0.5171	-0.0036	-0.0390
6	-0.0006	-0.0857	0.0116	0.1273	-0.0052	-0.5505	-0.0087	-0.0956
7	-0.0004	-0.0521	0.0113	0.1232	0.0124	1.3193	0.0037	0.0401

Note: t-statistics with * denotes statistical significance at 5% level of significance.

Source: Authors own computation in MS Excel

Results of the study indicate that volatility had observed in the returns of both sectors but its magnitude varies during all the years. In the automobile sector, Budget announcement events during all the years have no significant impact on the sectoral performance. While results of pharmaceutical sectors indicate that in 2020, 2019, 2018, 2017, 2016, 2015, 2014 and 2011, budget events had impacted the sectoral performance positively and negatively but no significant effect is observed on event day. While in 2013, budget event had a significant negative impact and in 2012, a positive significant impact was found on pharmaceutical stock returns. Hence, a significant effect of the budget event has just been observed in the pharmaceutical sector

only for 2 years. Figure I and II below shows the trend of AAR t-statistics of automobile and pharmaceutical sector.

Figure I

Automobile sector AAR t-statistics

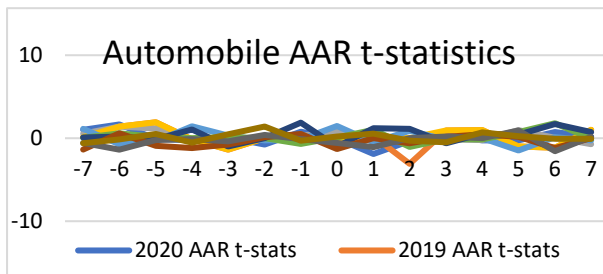
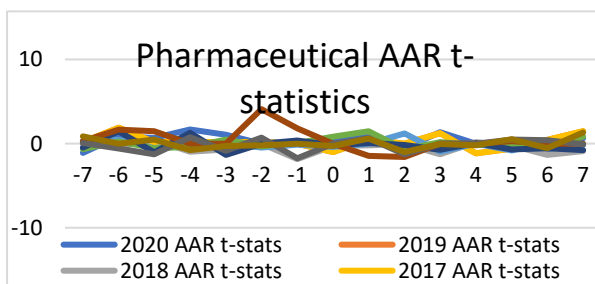


Figure II

Pharmaceutical sector AAR t-statistics



By analyzing the returns of automobile sector it is found that abnormal returns were reported but they are not statistically significant. Hence hypothesis 1 will be accepted for automobile sector as market do exhibits semi-strong form of EMH and hypothesis 2 would be rejected because in automobile sector insignificant impact on abnormal returns has been observed. In pharmaceutical sector, during 2012 and 2013 significant impact of event is found hence market does not exhibit semi-strong form of EMH, so in these years hypothesis 1 will be rejected and hypothesis 2 will be accepted while for rest of the period hypothesis 1 will be accepted and hypothesis 2 will be rejected. Then, findings of our study are consistent with Sathyanarayana & Gargesa (2019); Khan et al.

(2017); Maheshwari (2020) that budgetary events do not have any significant impact on returns and market is semi-strong efficient. Below Table XI shows the hypothesis acceptance/rejection for automobile and pharmaceutical sector.

Table XI

Results of Hypothesis

Hypothesis	Auto sector (2011-2020)	Pharma sector (2012-2013)	Pharma sector (2011, 2014-2020)
H ₁ Stock market exhibits semi strong form of efficiency in response to the federal budget announcement event.	Accept	Reject	Accept
H ₂ Budget event have a significant impact on abnormal returns of automobile and pharmaceutical sector.	Reject	Accept	Reject

5. Conclusion

Purpose of current study was to observe federal budget announcement event's impact on pharmaceutical and automobile stock returns during last ten years from 2011-2020. This study examines the efficiency of stock market as a result of budget announcement events by incorporating the methodology of event study. Findings of study confirms that the response of the pharmaceutical sector is more volatile as compared to automobile sector and there is an opportunity for investors to earn abnormal profit as it is significantly affected by the budget of 2012 and 2013. While in the remaining years, no significant effect is found in the pharmaceutical sector. On the other hand, returns of automobile sector does not exhibit any significant impact of event. Hence, chances for investors to gain abnormal return are very minimal and market is semi-strong efficient where market forces instantly incorporate new information. Increased volatility in stock prices around the event suggests that when the information related to the budget becomes public, market tends to react accordingly. Study confirms the validity of EMH, thus, suggesting it is not possible to earn

large significant abnormal returns in Pakistani stock market.

In the light of findings, it is suggested to the traders to get insight from this study around the budget announcement event to make their strategies. It is recommended to the stock market participants to consider budget announcement as an important event. Traders should form their market strategy and tactical positioning according to their individual risk and return expectations. As high volatility is expected around the event so risk averse investors should hedge their portfolio to protect themselves from the expected downside risk. It is also recommended to policy makers to consistently monitor the market and accordingly take corrective measures.

This study contributes to the field of literature by exploring the impact of budget announcement event on automobile and pharmaceutical sector's stock performance. It is an implication of market efficiency, also it can be beneficial for making trading strategies. Like any other study, it also has some limitations so it can not be considered ultimate. This study is just limited to the pharmaceutical and automobile sector of the KSE 100 index. It is proposed to the future analysts to test market proficiency in different areas also like correspondence, development, farming, material, and so forth. Budget declaration is one variable that might influence the stock, so future researchers can notice market patterns because of other political and monetary events. KSE-all share index, KMI-30 index and KSE-30 index can also be incorporated in future studies.

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