

Effects of Index Reconstitution under Different States of Market^{*}

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ABSTRACT

To analyze the response of stock prices on announcement of initially addition and deletion of the firms in the index (KSE) in different states of market, the sample of 104 for added firms and 103 for deleted firms for the period of 10-years 2001- 2010 is covered by this study. Karachi Stock Exchange, KSE, has been witnessed to face different states of market: Normal, Boom & Recession due to many macro-economic factors. The event study methodology is employed by using three models; capital asset pricing model (CAPM), Market Model (MM) and Market Adjusted Model (MAM) to confine the index reconstitution effects as regards to ARs, Abnormal Returns, CARs, Cumulative Abnormal Returns and Volume Ratio. This study divulges that under normal state of market, the added firms showed significant +ve ARs of 1.14% and 1.10% by using MAM and MM respectively, while insignificant abnormal returns of 0.96% by the CAPM on the event day. Likewise, under boom state of market, these ARs were also observed to a little bit stumpy but remained significant by using CAPM, MAM & MM. Interestingly, under recession state of market, by using CAPM, MAM & MM, the added firms in the index witness with improved significant +ve abnormal returns of around 2%, on the event day window. In contrast, for deleted firms, no significant ARs were examined by CAPM, MAM & MM under normal, boom & recession states of market, except significant +ve ARs of 0.85% by MM under normal state of market. Various event days like 15th, 10th, 5th before or after showed no significant ARs & CARs under different states of market Oexcept few one. Conversely, CAPM, MAM & MM showed few contradictory and few consistent results for CARs & ARs under different states of market and in different event window days. Unexpectedly, volume ratio (VR) was unable to show any abnormality of trading volume on the event day

Keywords: Market adjusted model, CAPM, KSE, Market model, Normal, Boom and Recession.

I. INTRODUCTION

In the last decade KSE has experienced with disproportionate performances. To confine this effect, the data of stock's addition / deletion in the KSE-100 index is divided into three different states of market: Recession, Boom and Normal. To represent, normal state of market sample Jan-2000-to-Aug- 2005 is selected, because in this period stock market remains at normal and no major significant volatility is observed. Although it was military regime, the stock market did not show any uneven performance and remains at normal. To represent boom state of market, sample Sep-2005-to-Apr-2008 is selected as in this period index remains at most in upward trend and cross the barrier of 14000 points. On the other hand for Recession state of market, sample May-2008-April-2010 is selected as in this period overall economy remains at recession. Different macro economic factors (war against terrorism, political instability, murder of ex-prime minister etc) badly affected the stock market performance.

The effects of index reconstitution have motivated the researchers & rich studies are existing and most of the cases the methodology of event study are adopted to examine the behavior of share prices after addition / deletion in the index. In south Asian countries and in particularly Pakistan, the existing literature is deficient. There are only few studies that are relevant to Pakistan [1, 2, and 3]. But none of the study has captured the index reconstitution effects in different state of market. So the study is interesting in the way and expected that it will fill the gap that that how firm's stock prices react on the event of index reconstitution in state of market normal, boom and recession.

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The foremost objectives of this study consist of:

- To examine the index reconstitution effects in different states of market recession, boom & normal and to corroborate about investor's abnormal returns by using different models.
- To examine the trading volume ratio in the different event window of 5th, 10th, 15th trading day after / before addition / deletion of these stocks in the index under different market circumstances.
- To examine the CARs and ARs in 15th, 10th, 5th day event window before/after addition / deletion of these stocks in the index.
- To facilitate the investors to encase the opportunity due to index reconstitution under different market circumstances.

II. LITERATURE REVIEW

The main studies witnessed the mixed results on the event of index reconstitution [4, 5, 6, 7, 8, 9, 10, 11 and 12]. A marvelous fact is about yahoo stock, which rewarded 24% of Abnormal Return, when it was added to the index [7]. Most of the studies covered five different hypotheses: price pressure hypothesis, downward-sloping hypothesis, liquidity cost hypothesis, investor awareness hypothesis & information content hypotheses. However, mainstream of these studies showed +ve ARs on the event of declaration day for the firms added to index and -ve ARs for the firms deleted from the index. On the other hand majority of the previous research work except a small number, concerned only with the developed markets [6, 9, 10, 11, 13, 14, 15 and 16]. As, in response to index reconstitution for added and deleted firms on the event day, diverse results of Abnormal & Cumulative Abnormal Returns and normality / abnormality of volatility ratio are to be observed in the globe, so this will also contribute theses effects of index reconstitution under different states of market by using MAM, MM & CAPM.

Recently, it is observed that firms can earn significant excess returns of -1.5% during the event week as a result of S&P 500 index reweighting that is decreases in index weight on the full float implementation date, the return is reversed during one month period as trading volume returns to its normal levels [17]. These results are found to contrary to the earlier studies. A statistically significant +ve (-ve) ARs for declaration day of added / deleted firms are observed and temporary price effects are reported. The average CARs of .048 for added firms while -0.14 for deleted firms after index reconstitution validated by volume ratio [11]. In the same line +ve abnormal returns on stock inclusion and -ve abnormal returns on stock exclusion is reported also powerfully supported the price pressure hypothesis [18]. In contrast, the rejection of price pressure hypothesis by using 3-factor Fama French model and support of the Information Content Hypothesis is also made [19]. The same findings with no abnormality of trading volume are reported [20 and 21]. The rejection of price pressure hypothesis and volume ratio for Singapore market is also observed [22].

III. MATERIAL AND METHODS

As the sample is divided into three subgroup samples covering three different state of market, accordingly the main idea of this study is to examine trading volume and ARs, as a result of index reconstitution in KSE in the light of trading volume ratio and three different models.

3.1 Sample and Data Set

For normal state of market, 50 added firms and 45 deleted firms, for boom state of market 25 added firms and 28 deleted firms, while for recession state of market 29 added firms and 30 deleted firms were selected, which covered 75 percent of the entire data. The total sample period covered all the firms that were deleted / added in the index during the 10 years period, except M&A of firms, delisting of firms & data problems of very few firms. Reconstitution of KSE-100 index takes place each year, on semi-annual basis and mostly in the month of February and September.

3.2 Research Methodology

This section describes models, variables used in the models & hypotheses. The effects of price pressure hypothesis as a result of index reconstitution are observed by abnormal & cumulative abnormal returns and volume ratio on the declaration day of event, pre and post declaration day of the event. To calculate ARs, first by MM to follow [11] methodology, then by MM to follow [13] methodology and lastly CAPM [23] methodology are employed. To estimate the parameters in CAPM and MM, stock daily data & index daily data for 6-months period before declaration day is used.

The variable DD is used as declaration date. DD is the subsequent day to the actual declaration day of index reconstitution. The overall analysis of ARs, CARs and AV to capture the changes in stock prices and volume on the event of index reconstitution are made according to the subsequent declaration date and three event windows: DD-15, DD-10, DD-5 before declaration, one event window DD on declaration day and three event windows DD+5, DD+10 & DD+15 are used.

$$A R_{it} = R_{it} - R_{mt} \tag{1}$$

$$\mathbf{K} I_{it} = \mathbf{p} \mathbf{0}_i + \mathbf{p} I_i \mathbf{K}_{mt} + \mathbf{\varepsilon}_{it}$$
(a)
$$\mathbf{A} \mathbf{R}_i - \mathbf{R}_i = \mathbf{R}_i \mathbf{1}_i$$
(2)

$$\hat{R} X_{it} - R_{it} - R_{it} - R_{it}$$

$$\hat{R} 2_{it} = R_f + (R_{mt} - R_f) \beta 2_I + \varepsilon_{it}$$
(2)

$$A R_{it} = R_{it} - \dot{R} 2_{it}$$
(3)

Where Abnormal Return of firm i at day t is represented by AR_{it} variable, actual return of firm i at day t is represented by variable R_{it} while variable R_{mt} is the market return. The expected returns $\hat{R}1_{it}$ equation (a) & $\hat{R}2_{it}$ equation (b) are projected by OLS regression model. After calculating ARs, the average ARs are computed as:

$$\overline{AR}_{t} = \frac{1}{n} \sum_{i=1}^{n} ar_{i,t}$$

The summation of the average ARs are represented by the CARs, cumulative abnormal returns & calculated as:

$$CAR_{q,s} = \sum_{t=q}^{s} AR_{t}$$

To capture the effect of volume ratio on index reconstitution in this study, methodology [6] is used and abnormal volume is calculated as:

$$AV = (V_{i,t} / V_i) / (V_{m,t} / V_m)$$

Where, V_{i,t} is the volume of firm i in day t, V_I is the average volume turnover for firm i, $V_{m,t}$ is the market volume in day t and V_m is the average market volume. Market volume is the volume of all the firms that are traded on KSE-100 index.

The hypothesis about the cross sectional returns, Abnormal Returns & Cumulative Abnormal Returns against zero, while AV against one is tested for different event windows by t-statistic. The trading volume is considered to be higher than normal level if AV indicates greater value than one.

IV. RESULTS AND DISCUSSION

The analysis of price pressure hypothesis on inclusion of firms in the index under different states of market is displayed in Table 1, 2 and 3 while the results of deleted firms from the index are displayed in Table 4, 5 & 6. The results of Abnormal Trading Volume are represented in Table 7. The graphical representation of all these results is displayed in Graph 1, 2 & 3. All these tables / graphs are presented in Appendix.

4.1Normal State of Market

Looking at Table 1, on declaration day of included firms, the significant +ve abnormal returns are to be observed by MAM and MM except CAPM. On the event day of addition, ARs of 1.14%, 1.10% & 0.96% are witnessed by using MAM, MM and CAPM respectively, however the ARs in case of CAPM is +ve but not significant. The ARs by MAM and MM on the event day are a little higher than that of CAPM and can be visualized by Graph 1. The price-pressure hypothesis reported in prior studies also validated in KSE-100 index. These results show that investors can avail the opportunity to earn ARs for added firms in the index.

Prior to declaration day for included stocks in KSE, ARs are observed to be -ve in the event window of 15^{th} , 10^{th} and 5^{th} day by MAM, MM and CAPM. However the only significant results are to be observed at the 15^{th} and 10^{th} day by MAM and at 5^{th} day by MM & CAPM. Conversely, price reversal of added firms in the index is also observed after the event day of declaration although insignificant in some event days. This also supports the evidence of price reversal as mentioned in majorities of the earlier studies. All the three models show fully reversal of prices within short event window of 5^{th} day then +ve at 10^{th} day and again turn to -ve at 15^{th} day. The price reversal effects can be visualized in Graph 1.

In CARs analysis no significant results are to be observed prior to the declaration day by using MAM, except by MM & CAPM. MM shows significant of CARs at day 6-1 (starts from 6th day and ends at 1st day) of - 3.00%, while CAPM shows significant CARs at day 15-10 (starts from 15th day and ends at 10th day) of 1.99% and at day 6-1 of -3.7% before declaration day of added firms in the index. Further, no Cumulative ARs are observed to be statistically significant after the declaration day.

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Further, no significant ARs are to be observed on declaration day of event for deleted stocks by applying MAM and CAPM except +ve significant ARs of 0.85% by the MM. The results are displayed in Table 4. These analyses are somewhat not confirming the previous research work regarding index reconstitution for deleted firms but, however, these analyses are observed to be almost insignificant, surprisingly.

As these analyses for the event day of deletion from the index are observed to be zero/+ve, unexpectedly, in the same way, price reversal in the form of -ve ARs are also witnessed for 5^{th} day and then continue to show +ve returns for 10^{th} day and again turn to -ve for 15^{th} day by MM & CAPM. However, MAM shows almost zero ARs in post deletion period of the event. Comparatively some contrary but insignificant results are to be observed by these models.

Conversely, significant -ve CARs are to be observed by MAM and MM while insignificant -ve CARs by CAPM before 5th day of declaration for deleted firms in the index. Mixed CARs are also observed after post deletion can be viewed in Graph 2.

4.2Boom State of Market

The analysis of added firms in the index under boom state of market on the declaration day, prior and post declaration day in the index are displayed in Table 2, while deleted firm's analysis are displayed in Table 5. The significant +ve ARs are to be observed by MAM, MM & CAPM on the declaration day. On the event day of addition, ARs of 1.07%, 0.98% & 1.07% are witnessed by using MAM, MM and CAPM respectively. The results of ARs by MAM & MM on the event day are almost same but a little higher than that of CAPM. The price-pressure hypothesis reported in prior studies also supported in KSE-100 index under boom sate of market. Although these ARs are a little bit lower than ARs by normal state of economy but significant agreed by all the three models. These results show that investor can avail the opportunity to earn ARs for added firms in the index under boom state of market.

Prior to declaration day of included stocks in KSE under boom state of market, no significant ARs are to be observed by MAM, MM & CAPM. This shows some consistent performance by all the three models. As Pakistani economy was progressing, the significant ARs at post event day of 5^{th} day are also observed by MM and CAPM. Anyhow MAM does not show significant ARs but still +ve as envisaged by other two models. On the other hand, the price reversal of added firms in the index is not observed sharply after the event day of declaration but to 10^{th} and 15^{th} day. This also supports the evidence of price reversal as mentioned in majorities of the earlier studies. All the three models show fully reversal of prices within event window of 10^{th} and 15^{th} day. In CARs analysis no significant results are to be observed prior / post to the declaration day of added firms in the index by using all the tree models.

On the other hand, no significant ARs are to be observed at the event day of declaration of deletion of firms from the index by using all the three models. The results are displayed in Table 5. Again, these results are contrary to the majority of the studies, but, nonetheless, these results are observed to be almost insignificant, surprisingly. Almost, the results for the event day of deletion from the index are observed to be zero/+ve, unexpectedly, in the same way, price reversal in the form of -ve ARs are also witnessed for 10^{th} and 15^{th} day but not at 5^{th} day of these deletions at KSE-100 index under boom state of market. Again, these models suggest some consistent performance. Under analysis of CARs no significant CARs are to be noticed by using CAPM but some significant -ve / +ve CARs are to be observed by MAM and MM at post / prior declaration of deletion of firms from KSE-100 index. The results of CARs are displayed in Table 5 as well as by graphically in Graph 2.

4.3 Recession State of Market

As in case of normal and boom states of market, in the same way, the analysis of added firms in the index under recession state of market on the declaration day, prior and post declaration day in the index are displayed in table 3, while deleted firm's analysis are displayed in Table 6. The significant +ve abnormal returns are to be observed by all the three models on the declaration day. On the event day of addition under recession state of market, +ve ARs of 2.09%, 2.10% & 2.12% are witnessed by using MAM, MM and CAPM respectively. Again, all the three models show consistent performance. Amazingly, these ARs are higher than ARs reported under normal and boom state of market. The price-pressure hypothesis reported in the earlier studies also validated in KSE-100 index under recession sate of market. These results also envisage that investor can avail the opportunity to earn ARs for added firms in the index even under recession state of market.

Prior to declaration day of the added firms in the index under recession state of market, no significant ARs are to be observed except by MM. This shows some inconsistent performance by all the three models. The price reversal of added firms in the index is not observed sharply after the event day of declaration but to the 10^{th} day. All the three models show fully reversal of prices within event window of 10^{th} day, but the only significant result of MAM is to be observed. In CARs analysis no significant results are to be observed prior / post to the declaration day of added firms in the index by using all the tree models except form day-15 to day+15 by MM.

On the other hand, no significant -ve ARs are to be observed at the event day of declaration of deletion of firms from the index by using all the three models. The results are displayed in table 6. But these ARs are at least -ve supported by all the three models. These results also confirm the results of the majority of the earlier studies, where - ve ARs were observed.

As the ARs for the event day of deletion from the index are observed to be -ve, in the same way, price reversal in the form of significant +ve ARs are also witnessed sharply at the 5^{th} day of event by marked adjusted and MMs. Anyhow no significant +ve ARs are to be observed by CAPM. Almost these models suggest, again, some consistent performance under recession state of market.

In analysis of cumulative abnormal returns, no significant CARs are to be observed by using MAM and CAPM but some significant +ve CARs are to be observed by the MM and MM at post / prior declaration of deletion of firms from KSE-100 index. The results of CARs are displayed in table 6 as well as by graphically in Graph 2.

4.4 Volume Ratio Results under different states of market

The effects of index reconstitution of KSE-100 index on the trading volume for added/deleted stocks are observed under different states of market by using [6] methodology. These results for added and deleted stocks are displayed in Table 7 and can be visualized graphically in graph 3.

No abnormality of trading volume is to be found significant i.e. different from one, at the event day, regarding additions of stocks to the index under different states of market; normal boom & recession. However the volume ratios are to be observed, near to one, i.e. 0.9692 under normal state of market, 0.8165 under boom state of market while 0.8660 under recession state of market. It envisages that the declaration for the included stocks, no extra ordinary trading volume to be observed these volume transactions remains at normal.

Similarly, no abnormal volume is witnessed at KSE-100 index additions on post / prior declaration day under different states of market and remains at normal level. Unexpectedly, these results suggest that the reaction to index reconstitution by additions of firms is not consistent with the price pressure hypothesis and validate the results incorporated by few of the prior studies. These results are also contrary to study that was conducted on KSE-100 index in which significant AV was reported [2].

In the same way, for excluded stocks from the index, no significant abnormality of volume ratio is to be found as in case of included stocks under different states of market. These results are agreed to the study that was also conducted on KSE-100 index in which no significant AV was reported for deleted stocks from the KSE-100 index [2]. Further, no abnormal volume is witnessed at KSE-100 index deletions on post / prior declaration day under different states of market and remains at normal level as in case of additions of firms to the index.

V. Conclusion

This study wraps up the application of price pressure hypothesis by applying three models; CAPM, MM, MAM and volume ratio, as a result of index reconstitution of added and deleted of new firms to the index under different states of market; normal, boom & recession and concludes with the mixed ARs & CARs at various event days. These results show that investors can avail the opportunity to earn ARs for added firms in the index.

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Table 1: Added Firms under Normal State of Market											
Event day(s)	Mean ARs	t-statistic	Sig. (2- tailed)	SD	CARs	t-statistic	Sig. (2- tailed)	SD			
	1-MAM, test value 0										
DD-15	(0.0101)	(2.1572)**	0.0359	0.0330	0.0080	0.7410	0.4622	0.0764			
DD-10	(0.0092)	(2.0647)**	0.0443	0.0316	(0.0017)	(0.1537)	0.8785	0.0769			
DD-5	(0.0072)	(1.5281)	0.1329	0.0333	0.0014	0.1160	0.9081	0.0873			
DD	0.0114	1.8653***	0.0681	0.0434	(0.0249)	(1.6106)	0.1137	0.1093			
DD+5	(0.0116)	(1.1110)	0.2720	0.0740	0.0040	0.3175	0.7522	0.0882			
DD+10	0.0083	1.7474***	0.0868	0.0336	(0.0145)	(1.5177)	0.1355	0.0677			
DD+15	(0.0027)	(0.4650)	0.6440	0.0407	(0.0163)	(0.6792)	0.5002	0.1692			
			2-N	IM, test value	0						
DD-15	(0.0050)	(1.1908)	0.2395	0.0297	(0.0112)	(1.0924)	0.2800	0.0723			
DD-10	(0.0057)	(1.4446)	0.1549	0.0280	0.0034	0.2368	0.8138	0.1021			
DD-5	(0.0118)	(2.4523)**	0.0178	0.0340	(0.0052)	(0.4562)	0.6503	0.0809			
DD	0.0110	1.8061***	0.0770	0.0431	(0.0300)	(2.4954)**	0.0160	0.0850			
DD+5	(0.0129)	(1.6195)	0.1118	0.0561	0.0165	1.4824	0.1446	0.0785			
DD+10	0.0048	1.0365	0.3050	0.0327	(0.0057)	(0.6817)	0.4986	0.0591			
DD+15	(0.0002)	(0.0419)	0.9667	0.0300	(0.0212)	(1.0755)	0.2874	0.1393			
			3-CA	PM, test valu	ie O						
DD-15	(0.0017)	(0.4321)	0.6675	0.0279	0.0054	0.5269	0.6006	0.0718			
DD-10	(0.0024)	(0.6507)	0.5183	0.0262	0.0199	1.7606***	0.0845	0.0800			
DD-5	(0.0085)	(1.9072)**	0.0624	0.0315	0.0113	0.9661	0.3387	0.0827			
DD	0.0096	1.5803	0.1205	0.0430	(0.0370)	(2.6083)**	0.0120	0.1002			
DD+5	(0.0142)	(1.7662)**	0.0836	0.0570	0.0095	0.7173	0.4766	0.0935			
DD+10	0.0034	0.7307	0.4685	0.0329	(0.0126)	(1.3142)	0.1949	0.0678			
DD+15	(0.0016)	(0.3396)	0.7356	0.0325	0.0061	0.2424	0.8095	0.1787			

APPENDIX

		Table 2: A	dded Firm	is under Bo	om State of	Market				
Event day(s)	Mean ARs	t-statistic	Sig. (2- tailed)	SD	CARs	t-statistic	Sig. (2- tailed)	SD		
1-MAM, test value 0										
DD-15	(0.0036)	(0.6402)			0.0027	0.1987				
			0.5281	0.0278			0.8442	0.0685		
DD-10	0.0027	0.5719			(0.0065)	(0.5558)				
			0.5727	0.0235			0.5835	0.0582		
DD-5	(0.0059)	(0.8707)		0.0000	(0.0081)	(0.7377)				
DD	0.0107		0.3925	0.0338	(0.0012)	(0.07(1)	0.4679	0.0551		
DD	0.0107	2 5464**	0.0177	0.0210	(0.0013)	(0.0761)	0.0400	0.0828		
DD+5	0.0067	2.3404	0.0177	0.0210	(0.0077)	(0.5119)	0.9400	0.0020		
DD+3	0.0007	1.5259	0 1406	0.0218	(0.0077)	(0.3113)	0.6134	0.0755		
DD+10	(0.0055)	(1.0943)	011100	0.0210	(0.0229)	(1.0747)	0.0101	0.0722		
	(010100)	()	0.2847	0.0251	(000)	()	0.2932	0.1067		
DD+15	(0.0206)	(1.1891)			(0.0331)	(1.0873)				
	. ,		0.2460	0.0865	· · ·	. ,	0.2877	0.1521		
	-		2-N	IM, test value	0					
DD-15	(0.0053)	(1.2034)			0.0080	0.7057				
			0.2406	0.0221			0.4872	0.0566		
DD-10	(0.0007)	(0.1545)			(0.0159)	(1.1387)				
	(0.0000)	(0.440.0)	0.8785	0.0224			0.2661	0.0697		
DD-5	(0.0030)	(0.4406)	0.((25	0.0227	0.0037	0.2416	0.0111	0.07((
DD	0.0008		0.0035	0.0557	0.0052	0.2450	0.8111	0.0700		
עע	0.0098	2 3535**	0.0271	0.0200	0.0055	0.5459	0 7324	0.0771		
DD+5	0.0081	2.5555	0.0271	0.0207	0.0168	0 9864	0.7524	0.0771		
0015	0.0001	1.8030***	0.0840	0.0225	0.0100	0.2004	0.3338	0.0852		
DD+10	(0.0051)	(1.0116)			(0.0042)	(0.2162)				
	, ,	, í	0.3218	0.0251	, í		0.8306	0.0962		
DD+15	(0.0123)	(0.7603)			0.0236	0.7568				
			0.4545	0.0808			0.4565	0.1562		
	1	n	3-C A	PM, test valu	ie 0			r		
DD-15	(0.0048)	(1.0365)			0.0104	0.7836				
DD 10	(0.0000)	(0.0.101)	0.3103	0.0233	(0.010.0)	(1.100.0)	0.4409	0.0664		
DD-10	(0.0002)	(0.0481)	0.0(00	0.0010	(0.0134)	(1.1036)		0.0700		
DD 5	(0.0025)	(0.2870)	0.9620	0.0212	0.0061	0 4570	0.2807	0.0608		
DD-5	(0.0025)	(0.3879)	0 7015	0.0310	0.0001	0.4570	0.6518	0.0667		
DD	0.0106		0.7013	0.0319	0.0090	0 6194	0.0318	0.0007		
	0.0100	2.7703**	0.0106	0.0191	0.0070	0.0174	0.5415	0.0728		
DD+5	0.0088				0.0205	1.1421				
-		2.0462***	0.0518	0.0216			0.2647	0.0896		
DD+10	(0.0043)	(0.8293)			(0.0005)	(0.0237)				
			0.4151	0.0261			0.9813	0.1038		
DD+15	(0.0116)	(0.7083)			0.0427	**				
	1		0.4856	0.0816		1.7079^{**}	0.1006	0.1249		

]	Fable 3: Add	ed Firms u	under Rece	ssion State o	f Market		
Event day(s)	Mean ARs	t-statistic	Sig. (2- tailed)	SD	CARs	t-statistic	Sig. (2- tailed)	SD
			1-M/	M, test value	0			
DD-15	0.0141	1.4307	0.1636	0.0530	(0.0013)	(0.0927)	0.9268	0.0731
DD-10	(0.0051)	(0.9906)	0.3304	0.0277	(0.0098)	(0.8241)	0.4169	0.0639
DD-5	(0.0080)	(1.5353)	0.1359	0.0279	0.0244	0.9500	0.3502	0.1383
DD	0.0209	1.8426***	0.0760	0.0611	0.0065	0.3357	0.7396	0.1037
DD+5	0.0088	1.7849****	0.0851	0.0264	(0.0011)	(0.0639)	0.9495	0.0945
DD +10	(0.0097)	(2.0343)***	0.0515	0.0258	(0.0108)	(0.6757)	0.5048	0.0864
DD+15	0.0075	1.2556	0.2196	0.0320	0.0288	0.6267	0.5359	0.2473
			2-M	M, test value	0			
DD-15	0.0159	1.8226 ***	0.0791	0.0471	0.0108	0.9350	0.3578	0.0621
DD-10	(0.0033)	(0.6625)	0.5130	0.0270	0.0067	0.5460	0.5894	0.0658
DD-5	(0.0004)	(0.0670)	0.9470	0.0288	0.0330	1.3368	0.1920	0.1328
DD	0.0210	1.9989***	0.0554	0.0564	0.0162	1.2938	0.2063	0.0676
DD+5	0.0079	1.7517***	0.0908	0.0242	0.0042	0.2563	0.7996	0.0873
DD+10	(0.0088)	(1.3428)	0.1901	0.0352	(0.0152)	(1.4457)	0.1594	0.0568
DD+15	0.0069	1.1895	0.2442	0.0310	0.0765	2.2638**	0.0315	0.1820
			3-CA	PM, test value	e 0			
DD-15	0.0139	1.4948	0.1462	0.0500	0.0004	0.0331	0.9738	0.0723
DD-10	(0.0054)	(1.0343)	0.3099	0.0281	(0.0037)	(0.3124)	0.7571	0.0630
DD-5	(0.0024)	(0.4028)	0.6901	0.0325	0.0226	0.9039	0.3738	0.1347
DD	0.0212	1.9032 ***	0.0673	0.0599	0.0174	1.0366	0.3088	0.0903
DD+5	0.0081	1.6181	0.1169	0.0270	0.0053	0.2398	0.8122	0.1180
DD+10	(0.0085)	(1.2826)	0.2101	0.0359	(0.0141)	(0.7915)	0.4353	0.0962
DD+15	0.0071	1.1905	0.2439	0.0320	0.0491	0.8771	0.3879	0.3013

		Table 4:	Deleted Firi	ns under Nor	mal State of Mar	:ket		
Event day(s)	Mean ARs	t-statistic	Sig. (2- tailed)	SD	CARs	t-statistic	Sig. (2- tailed)	SD
			1-M	AM, test valu	ie 0			
DD-15	(0.0055)	(1.0279)	0.3096	0.0358	0.0059	0.4575	0.6495	0.0865
DD-10	(0.0016)	(0.1983)	0.8437	0.0542	0.0271	0.9274	0.3588	0.1961
DD-5	(0.0070)	(1.4421)	0.1564	0.0326	(0.0298)	(1.9918)**	0.0526	0.1003
DD	0.0049	1.3300	0.1904	0.0245	0.0234	1.7612***	0.0851	0.0891
DD+5	0.0024	0.4691	0.6413	0.0339	(0.0076)	(0.4892)	0.6271	0.1041
DD+10	0.0054	1.1553	0.2542	0.0315	(0.0065)	(0.8197)	0.4168	0.0533
DD+15	(0.0004)	(0.0803)	0.9364	0.0303	0.0174	0.6085	0.5460	0.1918
2-MM, test value 0								
DD-15	(0.0023)	(0.2787)	0.7818	0.0565	(0.0377)	(1.0902)	0.2816	0.2320
DD-10	(0.0013)	(0.1306)	0.8967	0.0647	0.0152	0.3717	0.7119	0.2735
DD-5	(0.0158)	(2.1526)**	0.0369	0.0493	(0.0568)	(1.7824)***	0.0816	0.2137
DD	0.0085	2.0663**	0.0447	0.0275	0.0094	0.8893	0.3787	0.0708
DD+5	(0.0024)	(0.5600)	0.5783	0.0289	0.0014	0.1181	0.9066	0.0790
DD+10	0.0034	0.8028	0.4264	0.0285	(0.0109)	(1.2688)	0.2112	0.0576
DD+15	(0.0013)	(0.4194)	0.6770	0.0214	(0.0710)	(0.7719)	0.4443	0.6172
	1	1	3-C A	APM, test valu	1e 0	1		
DD-15	0.0060	1.2100	0.2327	0.0332	0.0040	0.3304	0.7426	0.0802
DD-10	0.0071	0.9435	0.3506	0.0503	0.0568	1.9354***	0.0594	0.1968
DD-5	(0.0075)	(1.7185)**	0.0927	0.0293	(0.0152)	(0.9710)	0.3368	0.1047
DD	0.0067	1.6571	0.1046	0.0270	0.0005	0.0409	0.9676	0.0883
DD+5	(0.0042)	(0.8960)	0.3751	0.0313	(0.0074)	(0.4948)	0.6232	0.1009
DD+10	0.0017	0.3791	0.7064	0.0292	(0.0196)	(2.2974) **	0.0264	0.0573
DD+15	(0.0031)	(0.9157)	0.3648	0.0227	0.0257	0.8725	0.3877	0.1977

1										
Event dav(s)	Mean ARs	t-statistic	Sig. (2- tailed)	SD	CARs	t-statistic	Sig. (2- tailed)	SD		
	Mean ARs t-statistic Sig. (2- tailed) SD CARs t-statistic Sig. (2- tailed) SD 0.0009 0.1695 0.8667 0.0271 (0.0017) (0.1685) 0.8674 0.054 0.0009 0.1695 0.8667 0.0271 (0.0017) (0.1685) 0.8674 0.054 0.0001 1.0576 0.2996 0.0257 0.0019 0.1624 0.8722 0.062 (0.0068) (1.4096) 0.1701 0.0254 (0.0192) (2.6922)** 0.0120 0.037 0.0029 0.8056 0.4275 0.0189 (0.0074) (0.8250) 0.4166 0.047 0.0054 0.7641 0.4515 0.0371 (0.0225) (2.2168)** 0.0352 0.053' (0.0007) (1.1595) 0.8744 0.0227 (0.0134) (1.1346) 0.2665 0.062' (0.00069) (1.5096) 0.1428 0.0224' 0.0322'** 2.6781 0.0124 0.063' 0.00064 1.3399 0.1914									
DD-15	0.0009	0.1695	0.8667	0.0271	(0.0017)	(0.1685)	0.8674	0.0546		
DD-10	0.0051	1.0576	0.2996	0.0257	0.0019	0.1624	0.8722	0.0624		
DD-5	(0.0068)	(1.4096)	0.1701	0.0254	(0.0192)	(2.6922)**	0.0120	0.0377		
DD	0.0029	0.8056	0.4275	0.0189	(0.0074)	(0.8250)	0.4166	0.0476		
DD+5	0.0054	0.7641	0.4515	0.0371	(0.0225)	(2.2168)**	0.0352	0.0537		
DD+10	(0.0007)	(0.1595)	0.8744	0.0227	(0.0134)	(1.1346)	0.2665	0.0624		
DD+15	(0.0069)	(1.5096)	0.1428	0.0243	(0.0594)	(3.2465)	0.0031	0.0968		
2-MM, test value 0										
DD-15	0.0036	0.7837	0.4400	0.0244	0.0322**	2.6781	0.0124	0.0637		
DD-10	0.0064	1.3399	0.1914	0.0253	0.0207	1.4778	0.1510	0.0741		
DD-5	0.0007	0.1614	0.8730	0.0244	0.0191	1.7101**	0.0987	0.0590		
DD	0.0051	1.3002	0.2045	0.0208	(0.0026)	(0.2844)	0.7783	0.0478		
DD+5	0.0039	0.5746	0.5703	0.0357	0.0015	0.1653	0.8699	0.0471		
DD+10	(0.0016)	(0.3881)	0.7010	0.0216	0.0048	0.5215	0.6063	0.0489		
DD+15	(0.0003)	(0.0756)	0.9403	0.0198	0.0808	3.3096*	0.0027	0.1292		
3-CAPM, test value 0										
DD-15	(0.0010)	(0.2272)	0.8220	0.0241	0.0090	0.8515	0.4020	0.0562		
DD-10	0.0018	0.3805	0.7066	0.0244	(0.0025)	(0.1976)	0.8448	0.0676		
DD-5	(0.0039)	(0.9376)	0.3568	0.0220	(0.0041)	(0.5098)	0.6143	0.0430		
DD	0.0063	1.6363	0.1134	0.0204	0.0034	0.3774	0.7088	0.0472		
DD+5	0.0051	0.7527	0.4581	0.0356	0.0075	0.7933	0.4345	0.0497		
DD+10	(0.0004)	(0.0941)	0.9257	0.0211	0.0108	0.8415	0.4074	0.0678		
DD+15	0.0009	0.2014	0.8419	0.0237	0.0303	1.4809	0.1502	0.1082		

Table 5. Deleteu Firilis under Boolii State of Marke
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Event dav(s)	Mean ARs	t-statistic	Sig. (2- tailed)	SD	CARs	t-statistic	Sig. (2- tailed)	SD	
()		· statistic	1-M	AM, test value	e 0	• Statistic	unit u)	02	
DD-15	(0.0010)	(0.1573)	0.8761	0.0333	(0.0141)	(0.7790)	0.4423	0.0991	
DD-10	(0.0030)	(0.3016)	0.7651	0.0544	(0.0188)	(1.0222)	0.3151	0.1010	
DD-5	(0.0020)	(0.3965)	0.6946	0.0270	0.0346	1.6923***	0.1013	0.1118	
DD	(0.0024)	(0.3169)	0.7536	0.0413	0.0081	0.3182	0.7526	0.1390	
DD+5	0.0173	1 8603***	0.0730	0.0510	0.0065	0.4510	0.6554	0.0787	
	(0.0014)	(0.2368)	0.8145	0.0310	0.0003	0.1424	0.8877	0.0883	
	0.0027	0.4527	0.6541	0.031	0.0025	0.3406	0.7292	0.0005	
2-MM, test value 0									
DD-15	0.0015	0.2685	0.7902	0.0301	0.0188	1.2819	0.2100	0.0805	
DD-10	0.0019	0.1781	0.8599	0.0575	0.0218	1.3318	0.1933	0.0895	
DD-5	0.0120	2 2421**	0.0328	0.0292	0.0596	2 5701**	0.0156	0 1270	
DD-3	(0.0026)	(0.3240)	0.0320	0.0431	0.0336	1 7202***	0.0130	0.0747	
	(0.0020)	(0.3340)	0.7408	0.0451	0.0230	0.0410	0.0942	0.0747	
DD+5	0.0150	1.7621	0.0886	0.0467	0.0108	0.8410	0.4072	0.0706	
DD+10	0.0010	0.1791	0.8591	0.0306	(0.0143)	(1.2245) 3.2006	0.2306	0.0640	
DD+15	0.0007	0.1100	0.9131	0.0348	0.1177	*	0.0033	0.2014	
			3-CA	PM, test valu	e 0				
DD-15	(0.0036)	(0.6091)	0.5472	0.0320	(0.0063)	(0.3545)	0.7255	0.0981	
DD-10	(0.0032)	(0.3007)	0.7658	0.0579	(0.0034)	(0.1700)	0.8662	0.1091	
DD-5	0.0069	1.1076	0.2771	0.0343	0.0344	1.5933	0.1219	0.1184	
DD	(0.0017)	(0.2236)	0.8247	0.0407	0.0284	1.3857	0.1764	0.1123	
DD+5	0.0160	1.7847***	0.0848	0.0490	0.0156	1.1131	0.2748	0.0770	
DD+10	0.0020	0.3518	0.7275	0.0306	(0.0095)	(0.9020)	0.3745	0.0576	
DD+15	0.0017	0.2591	0.7974	0.0351	0.0576	1.3535	0.1863	0.2331	

 0.0017
 0.2591
 0.7974
 0.0351
 0.0576
 1.3535

 *significant at 1% level, **significant at 5% level & ***significant at 10% level

Event	Mean		Sig. (2		Mean		Sig. (2			
day(s)	ARs	t-statistic	tailed)	SD	ARs	t-statistic	tailed)	SD		
			A. Norn	nal State of M	arket					
Added Firms, Test Value 1 Deleted Firms						Deleted Firms	, Test Value 1			
DD-15	0.7336	(3.3287)	0.0017	0.5660	0.7452	(3.8694)	0.0004	0.4418		
DD-10	0.7451	(3.1641)	0.0027	0.5696	0.8062	(2.2176)	0.0318	0.5862		
DD-5	0.7864	(2.4696)	0.0171	0.6115	0.7712	(2.7277)	0.0091	0.5626		
DD	0.9692	(0.3645)	0.7171	0.5980	0.8209	(1.8694)	0.0682	0.6427		
DD+5	0.7354	(3.2658)	0.0020	0.5729	0.8353	(2.1634)	0.0360	0.5106		
DD+10	0.8035	(2.3357)	0.0236	0.5947	0.7842	(2.4734)	0.0173	0.5853		
DD+15	0.8653	(1.6240)	0.1108	0.5864	0.7944	(2.3964)	0.0209	0.5755		
A. Boom State of Market										
	Added	Firms, Test Va	lue 1		Deleted Firms, Test Value 1					
DD-15	0.4882	(4.9319)	0.0000	0.5188	0.8310	(1.5319)	0.1372	0.5838		
DD-10	0.7567	(2.0389)	0.0526	0.5966	0.6104	(3.9614)	0.0005	0.5204		
DD-5	0.7036	(2.4771)	0.0207	0.5982	0.7261	(2.5416)	0.0171	0.5702		
DD	0.8165	(1.4859)	0.1503	0.6175	0.7311	(2.6012)	0.0149	0.5470		
DD+5	0.8548	(1.1587)	0.2580	0.6267	0.7061	(2.5739)	0.0159	0.6042		
DD+10	0.7286	(2.4940)	0.0199	0.5441	0.6949	(3.2464)	0.0031	0.4972		
DD+15	0.8544	(1.2013)	0.2414	0.6061	0.7192	(3.2332)	0.0032	0.4596		
A. Recession State of Market										
	Added	Firms, Test Va	lue 1	[Deleted Firms, Test Value 1					
DD-15	0.6406	(3.2376)	0.0031	0.5979	0.6246	(3.7981)	0.0007	0.5414		
DD-10	0.7169	(2.6269)	0.0138	0.5804	0.6832	(3.3586)	0.0022	0.5167		
DD-5	0.5343	(4.7478)	0.0001	0.5282	0.7460	(2.3778)	0.0242	0.5850		
DD	0.8660	(1.1494)	0.2601	0.6277	0.9306	(0.6251)	0.5368	0.6077		
DD+5	0.8129	(1.8670)	0.0724	0.5398	0.8186	(1.5936)	0.1219	0.6235		
DD+10	0.5733	(4.7604)	0.0001	0.4827	0.4700	(6.3074)	0.0000	0.4602		
DD+15	0.6039	(4.4912)	0.0001	0.4749	0.4605	(6.0628)	0.0000	0.4874		

Table 7: Trading Volume Ratio Results under Different states of market

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