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Kausar, Rabia and Qayyum, Abdul

Pakistan Institute of Development Economics (PIDE), Islamabad,
Pakistan, Pakistan Institute of Development Economics (PIDE),
Islamabad, Pakistan

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HOW CASH FLOW NEWS AND DISCOUNT RATE NEWS IMPACT THE UNEXPECTED STOCK RETURNS OF ENERGY FIRMS OF PAKISTAN

Rabia Kausar¹ and Abdul Qayyum²

Abstract

This study has used the model of Volunteeno (2000). The objective of this study is to analyse the impact of the cash flow news and discount rate news on stock returns of energy firms of Pakistan from 2000 to 2015. We used the balanced panel data technique. Estimated the random effect model after employing the Hausman Test. The results of this research show that only discount rate news is significance and positively related with unexpected stock return returns of energy firms which describe that increase in variability in the discount rate news increase the variability in unexpected stock returns. As cash flow news is insignificance which conclude that there is no permanent effect occur in the unexpected stock return due to change in book value and earning. Moreover these firms are large; it's also concluded that large firms are not affected by the cash flow news

Keywords: Cash Flow News; Discount Rate News; Unexpected Stock Returns; Energy Firms of Pakistan, Balance Panel Data

1. Introduction

Stock market is always a mystery for researchers. Sometimes it behaves randomly, sometimes it shows some pattern, sometime it move positively and sometimes it moves negatively. There are different theories for understanding and interpretation of the stock market.

This study has taken the 12 energy firms which had been listed in Pakistan Stock Exchange market since 1997. From the beginning many companies entered in the stock market but some firms merged into other companies whereas some were delisted from the stock market. There are very few companies which book values are positive and there assets are more than there liabilities. There are following companies which are chosen by this study has based on the positive book value. Companies are Mari Petroleum, Pakistan Refinery, Shell Pakistan Ltd, Attock Refinery, National Refinery LTD, Sui Northern Gas Pipelines, Sui Southern Gas Pipeline, Japan Power Generation LTD, Kohinoor Energy LTD, Altern Energy Limited, and S.G. Power Limited.

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1. Rabia Kausar, M. Phil Scholar, Economices and Finace Department, Pakistan Institute of Development Economics (PIDE), Islamabad, Pakistan; Email: rabiakausar_15@pide.edu.pk
 2. Dr. Abdul Qayyum, Joint Director, Pakistan Institute of Development Economics (PIDE), Islamabad, Pakistan; Email: qayyumdr@gmail.com

Prediction of stock return is done by the different methods. At first stock prices are predicted by the chartist and they predicted the stock price with past trend because they believed that history repeats itself and latter intrinsic value analysis was used to predict the stock returns. After that random walk theory shows that the stock prices have random behavior and efficient (Fama, 1965). As the time past the stock prices are predicted with different variables e.g. earning, GDP fluctuation, interest rate, loss, profitability, dividend yield ratio, book to market ratio and many others.

Different researchers explored firms past experiences and predicted the stock returns. As Banz (1981) explored that higher stock returns were earned by small firms as compare to large firms. DeBondt and Thaler (1985) explained better performance of long time loser as compare to long time winners while Jegadeesh and Titman (1993) explained that past short-term winners have outperformed past short term losers. Rosenberg, et. al., (1985) analyzed the market equity of companies and determined that greater average returns are earned by higher book value firms than low book value firms. Profitability and leverage are positively related with the stock returns which were checked by the Haugen and Baker (1996) and Bhandari (1988).

Dividend is one factor to predict the variation in the stock return of firms which is described by the random walk theory. With future news about the dividend growth rate the price of stock return can be predict. (Compbell, 1991) but Marsh and Merton (1986) and Fama and French (1988) estimated the correlation between the stock prices and dividend they concluded that the dividend only can predict one year prices.

As Compbell and Shiller (1988) decomposed the annual stock returns between two components with dividend ratio model then As cash flow news was used to predict the long terms impact on the aggregate stock return whereas discount rate news explained the short term variation but with analysis of various past literature, the importance of discount rate news was more enhanced than the cash flow news.

After using the log dividend price ratio model Vuolteenaurrho (2002) was used the new model which was not based on dividend but on Return over equity. Calculation of cash news was based on the book value and earning whereas discount rate news was based on interest rate and excess return of previous years instead of dividend. Cash flow news has everlasting shock on the stock returns, so it is more reliable for the small firms because these firms show more variability in earning and book value.

Cash flow news is more important in the reference of small firms because large firms have many advantages. As these firms had developed the trust in the market whereas new and small firms have to work hard to develop this trust. For this purpose these firms should have the smooth and positive cash flow. While due to new or small firm, discount rate also create the more volatility in these firms but discount rate news also create the volatility in large firms too.

Stock returns decomposition in two components was done with different methods. As Vuolteenaho (2002) and Cohen (2002) used the log dividend price ratio model for derivation of stock returns. Whereas Chen, et. al., (2013) used the implied cost of capital and found that cash flow news has more significance as compare to expected return news for investors and estimated that at the one-year horizon, 36% variation is recorded at aggregate level due to the cash flow news whereas 48% variation recorded at the firm level. Whereas in earlier research the expected return news had more importance than the cash flow news (Campbell and Shiller, 1988).

Cohen, et. al., (2002) was checked the importance of cash flow news and discount rate news at institution level and described that positive cash-flow has more significance because it increase the expected return news which inflate the risk and induces selling by individual to institutions. Moreover institutional reaction to cash flow news is lower among small firms. Whereas discount rate news/ Expected return news does not affect the stock return directly. As with increase or decline in the discount rate affect the commodity market which affect the money borrowing and lending and indirectly affect the stock market.

As these two variables is very important for explanation of stock returns and for the buy and sell of shares. As cash flow news impact the stock prices with link of book value and profitability and discount rate news impact the stock return with interest rate. Positive cash flow news boosts stock return and it may increase variability. Whereas as variation in discount rate spoil stability in stock return and it more volatile. This study has found out the answer about the importance and significance of these two variables on energy firms in Pakistan.

This study has used the energy firms because Pakistani market is observing energy crisis, so these firms are more volatile firms as compare to other firms. Moreover these firms need investment from public and with this it would provide the guide line to investors that how can they invest in these firm safely with optimally profit.

2. Literature Review

Campbell and Ammer (1993) checked the relationship of excess stock and long run bond return. After using VAR on long term monthly data from 1952 to1987, the result of this paper indicated that weak connection flanked by the stock market and bond market return. There were three reasons behind this result. Firstly only news about interest rate was common in both stock market and bond market but interest rate had the little variation. Second the assumption of strong association between news about future excess return about bond and stock, which was developed by Fama and French (1989), was not enough to create a large encouraging covariance between the two returns of asset

because news about future excess bond returns was not the key element of bond returns. Third, inflation inflates the stock return on upward whereas bond market to downward.

Firm level stock return was decomposed by the Vuolteenaho (2002). Significance of cash flow news and discount rate return news at firm level returns of stock was estimated with vector autoregressive model with panel data from 1954 to 1996. The results of paper indicated that firm-level stock returns were defined by cash-flow news whereas expected-return news was one-fifth of the cash-flow-news variance. Moreover estimation of data indicated the optimistic association between cash flow news and shocks to expected return. An expected return for typical stock was increased by the good news about cash flow. This connection appeared to be bigger for smaller stocks and approximately zero for the leading stocks. Last point, cash-flow news was effortlessly less its importance in portfolios than discount rate news. The discrepancy of discount rate news is around 0.5 of the discrepancy of cash-flow news.

Cohen (2002) explained the trading between individuals and institutions by using a vector auto regression. After analysis the fact indicated that with encouraging cash flow news, Institutions acquire shares from (sell shares to) individual which contradicts the under reaction phenomenon. Price momentum strategies were not followed by the Institutions. Whereas when prices are risen (fallen) without response of cash flow news, institutions trade (buy) share to individuals. Institutions show less response to cash flow news in the case of small stock. Institutions which grip on average 36% of a typical stock, procure an additional 4% of the outstanding shares in creates 1% shrewdness shock to expected future cash flows.

Vuolteenaho and Campbell (2004) divided the magnitude of stock return with the market portfolio into two beta model, one beta tells regarding future cash flow and other beta market's discount rate. After VAR analysis long run data US data from 1929 to 2001, the results defined that ICAMP explained that the "bad" cash-flow magnitude should have a superior value of risk than the "good" discount-rate and challenged the CAPM since 1963 which described that growth stock and greater past magnitude stock have predominately good beta with low risk price. High cash-flow betas were found in worth stocks and little stocks as compare to growth stocks and oversized stocks, and this can clarify their superior average returns. This research is very useful for rational investors who hold stock returns for long time.

Callen and Segal (2004) paper expanded the variance decomposition framework of Campbell (1991), Campbell and Ammer (1993), and Vuolteenaho (2002). After employing Ordinary least square and VAR technique from data 1962 to 2000, results of paper indicated following facts. Inclusion of new variable accrual news was significantly dominated over expected-return news in composing firm-level stock returns. Furthermore, estimation showed that the accrual news was more important than cash flow

news in composing current stock Overall, the three models investigated in this paper consistently indicated that variation in expected future accruals are a chief driver, if not the chief driver but the main composer of current stock returns.

Jiang and Lee (2007) investigated the three models to measure the cash flow news and expected return returns news and introduced the new model of log linear cointegration model. The research paper introduced new model which was mixture of log book-to market ratio and log dividend yield and explained upcoming productivity and excess stock returns. With data from 1946 to 2004 and run all model performance was checked. The performance of new model was better as compare to the previous two models log dividend yield model and the log book-to-market model in condition of cross-equation restriction tests and forecasting performance comparisons. It's indicated that the dispersion might contain helpful data that is not enclosed in either the dividend yield or the book-to-market ratio separately.

Eisdorfer (2007) reexamined Campbell's (1991) variance decomposition framework on financial distress firms. This study had taken the data from CRSP and COMPUSTAT for all companies which were registered on the American stock market between 1976 and 1996 and brought result which indicated that impact of cash-flow news and discount rate news with reference to real bankruptcies showed that cash flow news became more prominent for the most recent return before bankruptcy. Moreover, more bankruptcies happen after a market reduction due to negative shocks to expected cash flows news and encouraging shocks to discount rates news. The variability decomposition results, companies in financial distress showed the smaller sensitivity than strong companies to changes in short run equity volatility. Higher momentum prices are related with pervious non negative return and low sentiments.

Lin, et, al., (2009) investigated reason behind the fluctuation in stock return and excess stock return. After decomposed the stock return into cash flow news and discount rate news by Campbell's (1991), this study had also checked the reaction of liquidity risk, market liquidity and abnormal trading volume to cash-flow news, expected stock return news, expected excess stock return news and interest rate news. The finding demonstrated following four facts, firstly the main determinant of stock return and an excess return of stock in market was cash flow news. Second, the dividend payout ratio was able to forecast stock return and excess stock return. . Last, in the model of returns stock discrepancy, negative correlation was found among unexpected market liquidity, unexpected liquidity risk and expected stock return news, but not correlation found between the cash-flow news and expected stock return news. At the last under the model of unexpected market liquidity, excess stock return variance and unexpected liquidity risk were inversely associated to cash-flow news, interest rate news and expected excess stock return news.

Botshekan, et. al., (2010) developed newest four-fold beta breakdown and estimated cash flow and discount rate beta in up and down markets. The finding of the research by CRSP over 1963-2008 data demonstrated that down market cash flow magnitude and down market discount rate beta keep the chief importance. After different robustness checks, cash flow beta was related to small-sized companies and main determinant in pricing whereas for bigger companies, variability in the risk is not seem both in up and in down market case and the cash flow rate news element appeared to dominate to the discount rate element.

Garrett and Priestley (2012) examined new model which based dividend smoothing technique. After empirically exploration data of the S&P 500 from 1927 to 2009, many facts were declared by this research. Firstly dividend was strongly predicted and this predicted ability used to predict the cash flow news which was comparatively more significant in term of asset price variations. Secondly cash flow betas variability explained with the size as compare to the value premium puzzle if cash flow news is anticipated directly from the predicting dividend growth model. Thirdly more variability arose when cash flow directly estimated.

Chen, et. al., (2013) described significance of the cash flow news in the investment horizon. This research introduced the new method for calculation of discount rate news and cash flow news with the data 1985 to 2010 which was not relied on predictive regression but the forward looking method. This forward looking method was little affected with drawback of predictive regression. Secondly results of this research concluded that cash flow news was more vital than discount rate news beyond the two year horizon.

Lin, et. al., (2014) introduced new component for the explanation of unexpected stock returns and decomposed the unexpected stock return into expected return news and intellectual capital news. Intellectual capital news further divided into the two components recorded and unrecorded intellectual capital news. After exploration of annual and monthly Prices (CRSP) for 2002 to 2011, the finding of paper indicated that intellectual capital news was the key determinant of stock returns and excess stock returns. Moreover results showed that unrecorded intellectual capital news was the key determinant of stock returns and excess stock return. Overall, this study suggested that the U.S. stock market still underreacted to intellectual capital news; especially unrecorded intellectual capital news.

Umut, et. al., (2016) investigated the connection between aggregate cash-flow news, discount rate news and variation in stock prices with Panel Var. This research contributed new vision in this topic that Momentum profits were related to the optimistic cash flow news and remained higher still in down market and low sentiment period but it is poorly related to the discount rate new. This research rejected the Cooper, et. al.,

(2004) and Antoniou, et. al., (2013) who believed the significance momentum profits depended on non-negative past market returns and demonstrated momentum was weaker when sentiment was pessimistic.

2. Methodology

3.1. Balanced Panel Data Model

Panel data was come to known in 1940 when Paul F. Lazarsfeld (Lazarsfeld and Fiske, 1938; Lazarsfeld, 1940) defined this methodology in market research analysis of public opinion. As they check effect of the relationship between radio advertising and product sales, where they proposed to interview a ‘panel’ of consumer overtime. In the panel data OLS regression cannot obtain the “consistent” estimator because of specific effect of panel data, to obtain consistent estimators in the panel data two models are used one is fixed effect model and other is random effect model. The second half of the twentieth century was refined the Panel data modeling and estimation techniques. At the first time Fixed effect model was used by Kuh (1959), Mundlak (1961) whereas Hoch (1962) and Balestra and Nerlove (1966) and Wallace and Hussain (1969) were used the random effect model.

Panel data provides more information and can also estimate some unobserved effect. Panel data is more reliable data as compare to other two. On the bases of unobserved effect panel data model is distinguish in two methods one is random effect model and other is fixed effect model. Wooldridge (2002) states that the component c_i could be treated as a random variable or as a parameter that is to be estimated. Accordingly, c_i is divided into a “random effect” and a “fixed effect”. To measure the two unobserved effect, two methods are used to estimate the estimator, Fixed Effect Model and Random Effect Model

This study has developed the model on the bases of the Volunteeno (2002) and applied the econometric technique on the balanced panel data

$$r_{it} - E_{t-1}r_{it} = f(N_{rit}, N_{cfit})$$

This study is following balanced panel data model.

$$r_{it} - E_{t-1}r_{it} = \alpha + \beta_{it} N_{rit} + \gamma_{it} N_{cfit} + \mu_{it}$$

2.1.1 Cash Flow News

$$\Delta E_t \beta_i (e_{ti} - f)$$

$$e_{ti} = \log(1 + X_t/B_{t-1})$$

X_t = earnings

B_{t-1} = book equity

f_{t+j} = interest rate

Where ROE is denoted by $e_t \log(1 + X_t/B_t - 1)$. For earning of the firms, this study has taken the profit of the firm, shareholder equity (Total Asset – Total Liabilities) for the book equity and T.B rate for interest rate and calculated the $e_{t+j} = \log(1 + X_t/B_t - 1)$ and then minus the T.B rate from it. After taking the rational expectation it become the cash flow news. Here t is showing the time and j is showing the cross section firms.

2.1.2 Discount rate news

$$N_{rt} = \Delta E_t \gamma_i r_{ti}$$

$$r_{ti} = \log(1 + R_t) - ft$$

2.1.3 Stock Return

Stock return would be calculated by the fama(1965) method

$$\text{Log}P_t - \text{log}P_{t-1} = \Delta \text{log}P_t \times 100$$

2.2 Fixed Effect Model

A fixed effect model can be defined as statistical model which controls the unobserved heterogeneity when heterogeneity is constant over time and correlated with independent variables (Chen Hsiao 2003). For example if the research is done on customer choice in different region of a country then the people's religion, colour and height etc will not change with time, so fixed take it constant.

If the correlation between μ_{it} and Cash flow news and discount rate news is zero. The fixed model would be more appropriate model

2.3 Random Effect Model

Random effect model is applied on assumption of zero correlation between individual specific effect and independent variables. Random effects methods belong to the family of “general least squares” (GLS) estimators; techniques which utilize an unrestricted variance estimator as a transformer as a way to overcome problems related to serial autocorrelation. For example if the research is done on the effectiveness some certain drug on different region in a country then with time effectiveness of drug would change with weight and age, so the random effect model would be more appropriate.

If the correlation between μ_{it} and Cash flow news and discount rate news is not zero. The random model would be more appropriate model

2.4 Hausman Test

Hausman (1978) test is used to select the appropriate model in panel data. In pane data selection of model should be base on information about specific effect of components and exogeneity of the independent variables. With the Hausman test we can select the best model between the fixed effect model and random effect model. The null hypothesis of Hausman Test is

H_0 = The random effect model is appropriate and $\text{Cov}(\alpha_i, x_{it}) = 0$

H_1 = The Fixed effect model is appropriate and $\text{Cov}(\alpha_i, x_{it}) \neq 0$

The following Chi square test is used to test the appropriate model

$$H = (\beta^{RE} - \beta^{FE})' [Var(\beta^{RE}) - Var(\beta^{FE})]^{-1} (\beta^{RE} - \beta^{FE})$$

If probability of chi square test comes less than 0.05 then Null hypothesis will be rejected and appropriate model would be the fixed affect model vice versa. The following table is describing model selection according to the null hypothesis.

Model	Random effect model used	Fixed effect model used
Correct Hypothesis		
$H_0 = Cov(\alpha_i, x_{it}) = 0$ Exogeneity	Consistent, Efficient	Consistent, Inefficient
$H_0 = Cov(\alpha_i, x_{it}) \neq 0$ Endogeneity	Inconsistent	Consistent Possibly, Efficient

2.5 Data Source

Values of Shareholder equity, Total asset, Total liability and earning of firms are taken from the State Bank of the Pakistan and Share prices are from the business recorder from year 1999 to 2016

3. Results and Discussion

3.1 Descriptive Statistic

The above Table 4.2 explained about the descriptive statistic of different variables. Book value, earning, dividend and return's mean and median are positive which show the good position of all the companies. Maximum and Minimum points of all the variables show that which companies is more progressive as compare to all the firms. Maximum book value form all the companies is 82310.30 million rupees which is from the Mari Petroleum Company and minimum book value - 5032.73 million rupees which shows Japan Power Generated Limited is only the default company in whole data. As minimum Points of all variables are negative expect from the dividend which is zero and its show that some companies don't pay the dividend which are Altern Energy LTD, S.G Power LTD and Japan Power Generated Limited. The Maximum point of the dividend is 5831.600Rs (million) which is given by the Pakistan State Oil. The Maximum point of return is 68.71% which is obtained by the Pakistan Refinery and minimum point is -62.283% which is obtained by Attock Refinery. All the variables are rejecting the null hypothesis of Jarque-Bera normality test which shows that financial market of energy firms is efficient.

Table: 4.1 Descriptive Statistic of all Variables (Million Rupees)

	Book Value	Earning	Dividend	Return	Cash Flow News	Discount rate news
Mean	11391.87	2613.207	784.0088	4.682502	-0.003115	-0.077875
Median	7413.500	1601.450	423.6475	3.209771	0.017551	-0.069894
Maximum	82310.30	32969.19	5831.600	68.71785	0.734927	0.166361

Minimum	-5032.73	-15734.98	0.000000	-62.28382	-1.304594	-0.537172
Std. Dev	12823.83	5347.179	978.6611	20.12500	0.245499	0.109724
Skewness	3.037864	1.715275	2.219594	-0.532104	-2.455385	-1.344659
Kurtosis	15.14091	12.42546	9.256696	4.536649	13.43715	6.304056
Jarque-Bera	1075.177	586.8798	343.3071	20.38068	776.1235	105.8704
Probability	0.000000	0.000000	0.000000	0.000038	0.000000	0.000000

3.2 Hausman Test

Hausman test is used to select appropriate effect between the fixed and random effect according to the variability in data

4.2 Test cross-section random effects			
Test Summary	Chi-sq Statistic	Chi-Sq d.f	Prob
Cross-section Random	0.014772	2	0.9926

As the probability of null hypothesis is 0.9926 which do not reject the null hypothesis of random effect on all the confidence intervals at 2%, 5% and 10%, so random effect

3.3 Result of Main Model

The model is estimated through Balance Panel Data technique,

$$r_{it} - E_{t-1}r_{it} = -0.703931 + 192.3031N_{rit} - 3.013396N_{cfit}$$

$$[-1.128864] [48.31466] [-1.258052]$$

The above equation tells that discount rate news is only significant variable after utilizing the data of 12 energy firms. Cash flow news can be significant for other industries. Our results shows that Pakistan energy sector more relies on the short run variation of discount rate news as compare to the permanent effect of cash flow with change in book value and earning. Discount rate news has high beta of 192% which show the huge variation in return due to discount rate news variation. The positive sign show that variation in discount rate induces the variation in unexpected stock return. Our results match with following research papers. Campbell and Shiller (1988a) in his study defined stock return variation with the dividend price ratio and also explained that discount rate news was little contributed for explanation of variation. Then Campbell (1991) news about future cash flow was only contributed a third half of variance of unexpected stock returns whereas rest of variance was due to news about future expected return. As size is also matter to explain the variations in unexpected stock returns. As small size firms shows more variation according to the variation in flow news whereas big size firms don't show much variation with cash flow news. As Botshekan. et. al., (2010) cash flow beta was related to small-sized companies. The determined that cash

flow news is main determinant in pricing in small size firm. As this study has taken the big size companies, so this is reason behind insignificance of cash flow news with unexpected stock return.

As R-Squares and Adjusted squares is equal to the 0.929747 and 0.929003 which is describing that fitted model explains variation well and the value of F- test is equal to the 1250.633 which is rejecting the null hypothesis of only intercept model. The R-squared and F-test tells goodness of fit which prove that model is significance.

3.4 Variance Covariance Matrix

The Table 4.3 shows the variance and covariance of cash flow news and discount rate news. As table shows that cash flow news has less variance as compare to the discount rate news. As explained before big companies have less variability in cash flow news. The covariance between the cash flows news and discount rate news is positive and less than 1 which indicated both increment in one news cause the increment in other news and both increase the volatility of unexpected stock return. As Volunteeno (2002) explained expected return (discount rate news) for typical stock was increased by the good news about cash flow. This correlation appeared to be larger for smaller stocks and about zero for the largest stocks.

4.3 Variance Covariance Matrix		
	Cash Flow News	Discount Rate News
Discount Rate News	0.731844	15.84217
Cash Flow News	5.737398	0.731844

The results of this research shows that Discount rate news is significant and positive variable in explanation of unexpected stock return variation whereas the cash flow news is insignificance which show that there is transitory impact discount rate news occur on the unexpected stock returns of energy firms of Pakistan whereas the permanent change of book value and earning do not bring variability in the unexpected stock return of energy firm. As energy firms have more capital, so these firms show less variability in the book value and earning which may be the big cause of insignificance of cash flow news

4. Policy Recommendation

As discount rate is tool of monetary policy if government will bring the stability in the discount rate then it would create the stability in overall stock returns. Government should properly inform before change the discount rate

Pakistan is facing energy crisis in these days and energy firms need investment from general public. A common person cannot invest in the stock market until proper understanding of stocks and shares price. Investors can earn money with two methods

one with prices and other with dividend. Profit earning with the fluctuation in prices is tricky. Especially in Pakistan where some broker and investment banks are available with uncertain market due to political instability and terrorisms. Moreover only some companies are offered the dividends and shares for sell, so before investing money in any company investors should investigate the detail of company.

In Pakistan there is not trend to invest in the equity market whereas it is real investment and give huge benefit but in Pakistan there is few investment banks which deal with equity market. To promote the investment in the equity market, Government of Pakistan should establish the more investment banks and spread knowledge about equity market.

5. Limitation

This study has some limitation. This study has used the energy firms which are large, so this model can be checked on combination of some large and some big firms. It may bring change results. Moreover Pakistan Stock Exchange has not data of different firm for more than 25 years which show less stable equity market of Pakistan. As if more data will available better analysis can be done on the bases of different econometric technique. Cash flow news and discount rate news impact on unexpected stock returns is checked in this study but impact of accrual, recorded and non recorded capital news can be checked in other researches.

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