DOES THE INVESTMENT GROWTH ANOMALY EXIST IN STOCK MARKET? EVIDENCE FROM PAKISTAN

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Abstract

This study is an attempt to discover the presence of investment growth anomaly in Pakistan Stock Exchange (PSX) by using data of all firms during the period of 2000 to 2019. The mined data is ordered in decile portfolios which are arranged in ascending order, from the lowest portfolio to the highest one. Assessment of the portfolio returns is executed on monthly basis and returns of both sorts of portfolios i.e. equally and value weighted are measured. Subsequently, built portfolios are evaluated by using Capital Asset Pricing Model, Fama and French three and five factor CAPM models by engaging Generalized Method of Moments. The result postulates that investment growth anomaly does exist in PSX and the firms which are involved in lower investment deliver better return. These results may assist the investors by measuring the verdicts gained from evaluated portfolios to generate abnormal return in PSX.

Keywords: Investment growth Anomaly, CAPM, GMM, Pakistan Stock Market, Decline Portfolios.

1. Introduction

Undoubtedly, thousands of individuals around the globe are coupled with the stock trading business and their bread and butter is connected with it. Therefore, numerous investigations have been conducted to address the issues related to stock trading (see for e.g. Qi Su, 2016; Titman, Wei and Xie, 2004; Cooper, 2006; Perold, 2004). In view of this, the most shared issue is additional profit or unexpected loss of raised portfolio which is termed as an abnormal stock return. Furthermore, it is also documented that numerous asset classes or securities offer dissimilar average returns; therefore, this primary query repetitively exist that why is it so? Remarkably, the response to this query lies in numerous financial perceptions for investments

and one of the explanations is the asset pricing. Analytically, the models for asset pricing are the tools that evaluate the performance of a firm's portfolio and realize that why the average returns of various assets classes or securities are not parallel. Fundamentally, several constructed assets pricing models are grounded on the notion that the return on investments is a reward of a market (systematic) risk which is reserved by investors after capitalizing in firms' securities (Perold, 2004).

Indeed, after fair assessments and by employing asset pricing models, investors' transactions are capitalized and booked by the firms i.e. either gain or loss on acquired securities. Hence, for this purpose asset pricing models are widely used to evaluate nexus between systematic risk and the expected average return of assets (Rehan et al. 2021). However, several inquiries also specify that these models do not deliver accurate outcomes for average return and entirely ignore the cross-sectional returns. Therefore, this abnormal pattern of average stock return where each asset class or security perform differently and which is not explained by traditional financial theories and outmoded capital asset pricing models is termed as Anomaly (Jebran & Khan, 2014; Fama and French, 2008). Later, one of the specific anomalies is identified in the capital markets which is termed as investment growth anomaly (Qi Su, 2016; Titman, Wei and Xie, 2004). Academically, several studies specify that overall risk adjusted return on stock is observed lower, particularly, when the firms additionally invest and boost their total assets in mature stock market (Titman, Wei and Xie, 2004). Hence, this negative connection between investment and return is often termed as investment growth anomaly (Cooper, 2006).

Broadly, the easiest way of understanding investment growth anomaly is risk-return trade off or the theory of asset pricing which declares that higher the risk higher the returns. Therefore, those firms which are growing rapidly by acquiring or by investing their own finance are taking high risk and they are under the state of uncertainty for their future transactions. Principally, due to availing high risk, these firms ought to earn high returns. In spite of the fact, if they produce low return then projected return then this abnormal return is recognized as Investment growth anomaly (Prombutr, Phengphis and Zhang, 2012). Remarkably, all models for asset pricing accept and explicate that systematic risk is the core element that has significant impact on projected returns. Indeed, the key motive of financers for investing their fortune is to get a high return. For this purpose, investors continuously try to detect those significant factors which provide a strengthened link and validate that their investment will deliver projected returns. Hence, various models to evaluate asset pricing are constructed through those factors and aspects that maximize average return for investors are identified (see for e.g Lintner,1965 Capital Asset Pricing Model, Sharpe, 1964 model and Markowitz, 1952 mean variance analysis).

Considering all of the above discussion, it is obvious that there are still some essential anomalies which are unresolved and investment growth anomaly is one of the current hotspots. Obviously, investment growth anomaly does exist in capital markets (Schwert, 2003; Levis, 1989). Nevertheless, in Pakistani context, most of the former studies are aimed to specify asset growth and accrual anomalies or conducted to recognize the factors of stock returns via using CAPM (see for e.g. Khan et al., 2021; Rehan et al., 2021; Baloch, 2015) and delivered

inconsistent evidences. Thus, it is obligatory to investigate the occurrence and characteristics of investment growth anomalies in the context of Pakistan Stock Exchange (PSX).

To address this issue, this study is set to investigate and test the existence and impact of asset growth anomaly in the PSX. To the best of the authors' knowledge, this empirical inquiry is a new addition to the literature as it would possibly be the initial effort to find out asset growth anomaly in one of the emerging Asian stock markets i.e. Pakistan Stock Exchange (PSX).

After the thorough introduction, the rest of this paper is ordered as follows. Section 2 presents the former literature. Then, Section 3 explained about data and adopted methodology. After that, section 4 describes the findings and discusses the results. Finally, section 5 contains conclusions.

2. Literature Review

With the beginning of the industrial revolution in the 20th century, a large number of savers invested their capital in stock trading and specified the abnormal returns. This drew the intention of researchers and they got engaged in finding and identifying those unsystematic factors that have impact on the investor's return. Subsequently, they indicated some anomalies such as asset growth, accrual and investment growth anomalies. To handle these unsystematic issues, Lintner (1965) introduced the CAPM model and explained the abnormal return that is observed in the capital markets because of the existing systematic risk. After few decades, Fama and French (1993) criticized the Lintner's (1965) CAPM model and presented their extended model for asset pricing. Technically, Fama and French (1993) model was developed by considering Q-Theory and with the inclusion of two new factors i.e. size of the firms and book to market value with the excess average return of the market. By injecting these two new factors, the CAPM model was corrected for outperforming outcomes. Hence, by inspiring Q-Theory, Fama and French (1993) provided better version of CAPM model that was built up on three identical factors. A while later, Cochrane (1996) inspected the actual investments with the production function and provided improved evidences than Lintner's (1965) findings. Needless to say, for the judgement of measurement perspectives, Fama and French (1993) model was constructed by considering Q-Theory, however, Cochrane (1996) focused on actual ventures and delivers better findings than Lintner's (1965) provided CAPM. Later, Polk and Sapienza (2004) who first depicted that return benefits are connected with firm's capital theory, concluded that there is reverse association between capital investment and future returns.

Besides, several studies inspected investment growth anomaly and delivered the mixed evidences for relationships among stock returns, capital investments and asset growth. Remarkably, most of these investigations considered the cross section return and reported negative connection of stock return and asset growth with the average returns (see for e.g. Titman, Wei and Xie, 2004; Carlson, Fisher and Giammarino, 2004; Gomes, Kogan and Zhang, 2003). Also, Ang et al. (2006) delivered signs about the existence of investment growth and core variations in the average return of high and low investment stocks. Notably, this study

constructed an investment factor on the foundation of book to market ratio, variable of investment and marginal productivity. By using cross sectional regression and data from 1964 to 2003, this study model reported 77% of variation in return. Likewise, Anderson and Garcia-Feijoo (2006) specified negative correlation of future return with current capital investment. By following the creating theory, this study was the first to disclose that returns are connected with the capital investment of firm. Furthermore, they concluded that firm with extra accrual income tend to provide lower future returns. Remarkably, the results reported by Anderson and Garcia-Feijoo (2006) are almost parallel with the earlier verdicts of Defond and Park (2001) who reported that accruals in firms' income results in an increase of abnormal accruals.

Afterwards, Cooper, Gulen and Schill (2008) conducted a study with the aim to investigate if the growth of firms reflects on its stock price and if it appreciates or deprecate stock value. For that purpose, the extracted data of US based firms over the period of 1968 to 2003 was used. The outcomes indicated a reverse association between firm's asset growth and its abnormal returns. Furthermore, this study concluded that those firms which booked high capital expenditures and involved in expansion of its assets probably deliver low returns. Next, Li and Zhang (2010) performed analysis and used financial constraints as a proxy for investment changes. In contrast to Cochrane (1996), they reported no-evidences that the Q-Theory with investment frictions describes investment growth or the capital expenditures. Evidently, several academic investigations have also analyzed various factors that are tested in view of Q-Theory and reported the negative relation between the investment growth and the expected average return. For instance, investment-to-assets was used by Lyandres, Sun and Zhang (2008), Investment growth is analyzed by Xing (2008), Asset growth is used as a factor by Cooper, Gulen and Schill (2008), Net stock issue is used by Fama and French (2008), Net operating assets by Hirshleifer et al. (2004) and Abnormal corporate investment is explored by Titman, Wei and Xei (2004). Likewise, these studies have not provided any evidences that Q-Theory delivers any clear explanation for existing anomalies in capital market.

Subsequently, Fu (2014) investigated the existence of investment growth and asset growth anomalies in the capital markets and discovered that those firms which reduced their investments and assets enhancements are likely to receive higher return than those that expanded the capital expenditures and tangible assets. Basically, this study was based on a concept that investment growth anomaly is vastly described by the outsource financing anomaly. Notably, this study did not deliver any significant effect of investment growth on a stock return. Likewise, Prombutr, Phengphis and Zhang (2012) analyzed asset growth anomaly by using risk-based asset pricing model. The findings obtained from this investigation confirmed that Fama and French model is able to describe the existing anomalies in the capital market. In addition to this, Constantinou, Karali and Papanastasopoulos (2017) have explored asset growth anomaly by using portfolio method and data of Greek listed firms. The results showed the negative growth in total assets of these investigated firms.

Most recently, Feng, Fan and An (2018) explored the China market and confirmed the existence of investment growth anomaly. By using the Fama and French three and five factors models they confirmed the existence of lagged anomaly in Chinese market. Clearly, Feng, Fan and An (2018) findings are contradicted with the earlier outcomes of Titman, Wei and Xie

(2004) who reported absence of anomaly for Chinese market In Pakistani context, a current study of Khan et al. (2021) investigated the asset growth anomaly. By using data of listed Pakistani firms over the period of 2000 to 2017, the finding provided evidences for the existence of asset growth anomaly in Pakistan Stock Exchange. Likewise, Chhapra et al. (2020) reported accrual anomaly in Pakistani context and concluded that firms that have low accrual-based assets deliver satisfactory return.

Undoubtedly, the Pakistan Stock Exchange (PSX) is one of the emerging stock markets around the globe. However, in case of Pakistan rare studies are conducted that explored the existence of asset growth anomaly in the market. On the other hand, the above discussed literature confirmed that asset growth anomaly exists in several markets and it has significant impact on investors' return.

3. Research Methodology

3.1 Data Collection & Portfolios Construction

This study uses mono-quantitative techniques, therefore, explanatory in nature. For analytical purpose, the monthly basis secondary data over the period from January 2001 to December 2019 is extracted from Thomson Reuters Data Stream and PSX data portal. Notably, this study selects all the firms (listed and non-listed) of PSX whose data is available during the selected nineteen years' time frame. Technically, the selection of the nineteen years' time span for data sample construction is finalized after determining the availability of data on selected data sources. Logically, the reason to select all the listed firms during the selected time period is to bypass the survivorship factor (Shaikh and Kashif, 2017; Kostakis, Kashif and Siganos, 2011). Moreover, the yearly frequency of investment growth ratios is adopted i.e t-1. In addition to this, the market value (MV) is considered monthly on time (t-1). Likewise, the return on time (t) is also measured monthly.

Subsequently, this study selects portfolio tactic on monthly basis data and calculates the discrete returns and capital expenditure growth. Technically, the individual stock returns contain idiosyncratic and firm's specific noise and creates the obstacles in predicting the pattern (Campbell et al., 1997). However, portfolios are considered better than the individual stock betas as portfolios betas have relatively less residual value. Also, portfolios betas remain stable overtime in the presence of variation in the risk and size of the firm (Cochrane, 2005). For these reasons, this study considered portfolio tactic and computed discrete returns of all the firms at PSX. Notably, the discrete return is designed on the foundation of the weight of an individual security in a portfolio, whereas, the weight of each asset shows the share of that asset in total investment (Campbell et al., 1997). For instance, the return of a portfolio (P) at time (t) is as follows:

$$R_{pi} = \varepsilon W_{pi}.R_{pi} \qquad (1)$$

Where, *i= 1,2,3,4*

Besides, for each individual portfolio the equation for the investment growth is as follows:

$$Investment\ growth\ (IG_t) = \frac{CAPEX(t)-CAPEX(t-1)}{CAPEX(t-1)} \qquad (2)$$

Where, IG_t indicates ratio of investment growth of a firm at time t, CAPEX specifies the capital expenditure of firm, CAPEX (t-1) mentions capital expenditures that is done by the firm at time (t-1). Notably, for CAPEX (t), data of all listed firms is taken from the Thomson Reuters Data-stream and PSX data portal. Also, the sorting method is implemented which is named as single sorting or post ranking method. Likewise, all the monthly stock returns is sorted in ascending order at time t based on each stock investment growth ratio (annually at time t-1). Then, all the data is arranged in ten constructed portfolios i.e. P1 to P10. Particularly, these portfolios from P1 to P10 are established in a classification which start from low investment growth and then move to highest investment growth. Furthermore, equally weight (EW) and Value weighted (VW) returns are modelled in order to check the robustness of these portfolios (Kashif, 2013). The profitability of both equally weighted and value weighted investment growth-based portfolios are then calculated by using three different asset pricing models i.e. traditional Capital Asset Pricing Model (CAPM), Fama-French three factor CAPM model and Fama-French five factor CAPM model.

3.2 Capital Asset Pricing Model (CAPM)

Firstly, this study employed CAPM which is familiarized by Treynor (1961) and William Sharpe (1964) to calculate the equally weighted (EV) and value (VW) weighted returns of investment growth-based constructed portfolios. Essentially, the CAPM is an analytical tool which is used to estimate the required rate of return on assets or securities (Rehan et al., 2021). Systematically, the CAPM explains that there is a linear relationship between risk and expected return of the firm's assets (Rehan et al., 2021; Hanif, 2011). Interestingly, CAPM integrates the price of nominated securities in such a way that the anticipated return of the securities covers the associated risk for that particular stock

Notably, this study performs asset pricing test through cross sectional and time series regression. In time series, the CAPM model considers that all the selected factors which have impact on the stock return are known. On the other side, in cross sectional regression the value of factors are estimates in view of returns at some selected particular point of time (Sharpe, 1964). Scholastically, Fama and French (1993) studied the performance of portfolio securities by using time series method and specified that the intercept in time series regression via CAPM indicated the portfolio's returns, whereas, the slope explains the risk factors which can be used for description of projected asset returns. Hence, this study has also adopted the time series approach. Precisely, the statistical model of CAPM equation for the selected variables is as follows:

$$R_{it} - R_{ft} = \alpha_{jensen} + \beta_i\left(R_{mt} - R_{ft}\right) + \varepsilon_{it} \quad (3)$$

Where, R_{it} indicates the return of IG_t portfolio i in month t, R_{ft} is the risk-free rate for month t of Karachi Inter Bank Offer Rate (KIBOR), R_{mt} shows the return of market portfolio taken from PSX all indexes, (R_{mt}-R_{ft}) is the premium of taking the risk of investing in market

and Beta β_i is the exposure of i portfolio. Precisely, this CAPM model is valid when Jansen alpha of sorted portfolios are significant at zero value which proves that the market is efficient.

3.3 Fama-French Three Factor Model

After severe criticism on traditional CAPM, numerous dissimilar asset pricing models were introduced (Black, Jensen and Scholes, 1972). Similarly, Fama and French (1993) extended their presented CAPM by adding additional factors i.e. size of the firms and book to market value which make it more reliable to find the overall performance of securities, particularly, those stocks that have small-caps. In the next step for observed testing, this study applies Fama and French three factors CAPM model that is shadowed as follows:

$$(R_{it} - R_{ft})^{\rho} = \alpha_t^{3\,factor} + \beta_t(R_{mt} - R_{ft}) + \gamma_t SMB_t + \delta_t HML_t + \mu_{it} \quad (4)$$

Where, SMB indicates a size factor of IG_t portfolio firms and HML mentions book-to-market risk factor of IG_t portfolio firms, γ_t and δ_t are the coefficients which capture the sensitivity impact of risk on book to market ratio.

3.4 Fama-French Five Factor Model

Later, it was detected that Fama and French 3-factor model is not broadly elucidating the cross-sectional variation for the projected return, specifically, that is connected with the profitability, investment and for other factors of anomaly. Therefore, they further expanded their model and came up with Fama and French (2015) five factors CAPM, in which Profitability RMW and investment CMA factors hav been added. In order to find the conclusive findings, this study also adopted Fama-French five factor model. Hence, the traditional statistical model of Fama-French five factor which is adopted by this study is mentioned below:

$$\left(R_{it} - R_{ft}\right)^{\rho} = \alpha_t^{3\,factor} + \beta_t\left(R_{mt} - R_{ft}\right) + \gamma_t SMB_t + \delta_t HML_t + \theta_t RMW_t + \lambda_t CMA_t + \mu_t s \quad (5)$$

Where, RMW is a return difference of IG_t low portfolios and high portfolios firms, CMA is a return difference of IG_t firms' portfolio which capitalize less aggressively.

Remarkably, to compute the joint significance of decile portfolio i.e. alphas, the above created systems of equations are used. Precisely, the system of equations is helpful to control the all various measurement issues in investigated factors and it also fixes the heteroscedasticity and auto correlation issues. Moreover, to check which investigated factors of the model contain risk premium if it holds the explanatory power, the most widely used traditional tactic is to execute two-step or systems of equations (Grimeland, 2018). Besides, the Generalized Method of Moments is considered as a comprehensive estimator which uses system of equations (Hansen, 1982).

3.5 Generalized Method of Moments (GMM)

For the analytical purpose this study uses system of equations that is created in view of Newey and West's (1987) estimation tactic and the two-step Generalized Method of Moments which is offered by Hansen (1982). Remarkably, if formulated in a proper way, the two different equations report similar competences in GMM approximation (Grimeland, 2018; Jagannathan, Skoulakis and Wang, 2002; Jagannathan and Wang, 1996). Likewise, the GMM estimator is also considered best to handle the issues of serial correlation and hetroskedasticity in data (Cochrane, 2005). Hence, this study regressed data by using two-step GMM estimator for the existence of investment growth anomaly by following the practices of former scholars (see for e.g. Maio and Santa-Clara, 2017;Cochrane, 2005). Remarkably, the two-step GMM estimator is considered robust when the errors are assumed independent and disseminated identically (Chaussé et al., 2010). Hence, this makes two-step GMM robust to indicate time variances, particularly, in the time series factors (Grimeland, 2018).

3.6 Wald test application

Lastly, this study executed Wald test which is similar to chi-square test. Notably, Wald test is considered most appropriate to estimate how far the assessed parameters are from zero for standard errors under their described null hypothesis. Moreover, this test provides evidences about significant factors. More specifically, this test provides overall fit of a constructed model (Frank, 2006; Bond and Windmeijer, 2005).

4. Results and Discussion

For analytical purpose, the extracted data is used to construct decline portfolio. Notably, decline portfolio contains 10 portfolios that are constructed to perform empirical analysis. Hence, the portfolio one is named as P1 then P2, P3 and then it continues until the last one which is called as P10. Exactly, these portfolios are constructed by considering all the PSX firms and sorted in ascending order based on the value of CAPEX which means that the first decline portfolio is named as P1 which represent stocks of firms that have lowest investment growth. Likewise, the P10 decline portfolio contains all those firms' stock that has highest investment growth. Then, for the month (t+1) that specifies the additional returns of the risk free return of all constructed decline portfolios has been estimated to rebalanced on monthly basis. Next, this study has performed the preliminary analysis of descriptive statistics that helps to understand the basic features of the data arranged from portfolio P1 to the last portfolio P10

Table 1: Characteristics of Investment Growth Decile Portfolios
(Descriptive Statistics, 2001-2019)

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	t-test
EW Excess Returns (% p.a)	44.60	29.88	25.56	28.57	29.71	28.40	27.10	26.20	24.13	36.44	5.92	-0.65
VW Excess Returns (% p.a)	25.96	22.66	16.43	22.30	18.47	16.05	29.94	16.60	19.32	29.32	0.57	0.055*
MV (Rs. 000)	1.20	2.33	1.80	2.62	4.41	4.06	3.42	3.33	1.06	1.58	-5.66	8.16
CAPM β	2.03	1.01	0.82	0.86	0.85	0.81	1.06	0.98	0.84	0.94	0.07	44.86

***, * Significant at 5%, 10% level*

Note :- EW and VW represent the Equally weighted and Value Weighted of the annualized average monthly returns of portfolios, MV (bn) indicates the average based market value or stocks capitalization that covered in each portfolio and weighted portfolios respectively, CAPM β is the calculated beta values of those portfolios that contain variation in the returns of portfolio and market returns, T-test values represents findings of Wald test which is to test the hypothesis and significance.

The Table 1 presents the descriptive analysis which shows the features of all ten constructed decile portfolios, Clearly, the returns of EW weighted portfolios indicates that P1 delivers higher average returns among all constructed portfolios that is 44.60% per annum Likewise, the last portfolio P10 delivers 36.44% yearly average returns that clarifies the firms which are involved in minimum investment growth and deliver high returns at PSX in comparison to those which are involved in highest investment growth. Moreover, for VW average annual returns the condition remains the identical. Evidently, this clearly provides the existence of investment growth anomaly in PSX. Nevertheless, the t-values are greater than 0.05, which specify that the findings for EW and VW are not statistically significant at the level of 5%. After that, the following table presented findings obtained from all three capital asset pricing models for EW decile portfolios.

Table 2: Asset Pricing Models & Wald Test of EW Portfolios

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	WALD-TEST
CAPM Alpha	12.06	7.76	7.70	6.34	5.64	6.29	5.28	7.23	6.19	8.32	2.14	18.40
	(1.20)	(2.34)	(1.35)	(1.46)	(1.82)	(1.03)	(1.91)	(1.53)	(2.05)	(1.96)	(0.37)	0.03*
FF3 Alpha	12.30	7.05	9.78	7.89	7.94	7.15	4.66	8.58	8.64	4.93	9.47	13.95
	(1.31)	(2.84)	(1.12)	(1.12)	(1.83)	(1.88)	(1.30)	(1.20)	(2.12)	(2.22)	(0.79)	0.01*
FF5 Alpha	12.16	6.92	9.53	7.30	7.38	8.34	4.12	9.04	8.47	6.89	3.18	12.96
	(1.09)	(2.19)	(2.31)	(1.18)	(1.26)	(1.80)	(1.63)	(1.53)	(2.11)	(1.23)	(1.84)	0.02*

Table 2 above demonstrates the findings for EW decile portfolios (P1 to P10) which are attained by CAPM, FF3 and FF5 asset pricing models. Statistically, the CAPM outcomes specify that firms having less investment growth carry higher return of 12% for portfolio one (P1) than those which have higher investment growth i.e. portfolio (P10) and deliver return of

8.32%. Evidently, the outcomes by CAPM specify the presence of investment growth anomaly as the level of spread for all portfolios (P1-P10) are found positive. Hence, it is inferred that investment growth anomaly does exist in PSX. Comparatively, Fama and Frence three factor model provides the similar evidences and specifies that firms with less investment growth in portfolio one (P1) provide higher returns i.e. 12% than all others nine constructed portfolios. Besides, the spread between P1-P10 is reported 9.47% which clearly mentions the existence of investment growth anomaly in Pakistani stock market. In similarity with above two discussed CAPM models, Fama and French 5 factor model also confirm that less investment growth firms' of portfolio P1 deliver higher returns of 12%. Likewise, the Wald test delivered significant outcomes for all three asset pricing models as their values are not greater than 0.05, which depict the significant impact and existence of investment growth on decile portfolios annualized average returns. Therefore, it can be concluded by EW return that the investment growth anomaly does exist in the firms listed in PSX.

Table 3: Asset Pricing Models & Wald Test of VW Portfolios

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1-P10	WALD-TEST
CAPM Alpha	1.83	-1.84	-7.08	-0.11	-3.64	-6.30	3.95	-8.28	-1.31	3.71	-1.88	10.22
	(2.26)	(-0.33)	(-1.86)	(-0.02)	(-0.79)	(-1.83)	(0.83)	(-1.91)	(-2.24)	(0.59)	(-0.20)	0.04*
FF3 Alpha	5.27	-1.68	-10.44	-5.48	-4.08	-2.77	3.71	-8.67	-0.27	1.66	2.05	8.93
	(2.44)	(-0.24)	(-1.93)	(-1.97)	(-0.69)	(-0.49)	(1.90)	(-1.57)	(-2.05)	(0.21)	(2.17)	0.05*
FF5 Alpha	2.51	-1.11	-7.16	-6.60	-4.92	-1.40	1.31	-10.08	-1.45	0.65	1.98	7.56
	(-2.19)	(-0.15)	(-1.30)	(-1.91)	(-1.83)	(-0.24)	(0.40)	(-1.88)	(-0.23)	(0.77)	(2.14)	0.03*

Table 3 above displays the findings for VW decile portfolios (P1 to P10) gained by employed asset pricing models. Interestingly, the outcomes reported by traditional CAPM mention that those firms which have high investment growth deliver higher return i.e. 3.7% for portfolio ten (P10). However, the findings delivered by Fama and French three and five factors' models are quite surprising which specify low investment growth portfolios (P1) sustain higher returns (5% for three factor and 2% for five factors models). Likewise, the spread between P1-P10 is observed at 2% for both three and five factors models that clearly mention the existence of investment growth in PSX. Moreover, the Wald test shows that all three asset pricing models are found significant at 5% level which confirmed the existence and impact of investment growth in PSX on decile portfolios average returns.

Considering all of the above discussion, it is worth observing that asset growth anomaly does exist in Pakistani stock market i.e. PSX. Academically, the results are consistent with the findings of Qi Su (2016), Prombutr, Phengphis and Zhang (2012) and Gomes, Leonid and Zhang (2003) who captured the existence of asset growth anomaly in stock markets.

5. Conclusion

This study examines the existence of asset growth anomaly in one of the emerging Asian stock markets i.e. Pakistan Stock Exchange (PSX). The observed evidences clearly reveal the existence of investment growth anomaly which is described by the risk adjustment (EW) and value weighted (VW) returns. Besides, the use of GMM estimator verified that asset pricing models i.e. traditional CAPM, FF3 and FF5 are found to be significant in case of

Pakistan Stock Exchange. Evidently, the results of this study are in line with the former investigations of Fama and French (1993, 2015) .

On the basis of the outcomes, this study develops an argument that investment growth anomaly also plays a role of key factor in explaining stock returns at PSX. Evidently, the results recommend that if investors want to produce abnormal returns than investing in firms which are involved in less CAPEX is a good and sound strategy as compared to the firm with high investment growth in PSX. Hence, by taking the long position in low growth stocks and taking short position in high growth stocks, investors can produce higher returns in PSX. For further studies, various macro-economic variables like inflation, exchange and interest rate can be added in the existing model to check the existence of investment growth anomaly.

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