Is Asset Growth Priced?

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Abstract

This study examines the effect of asset growth premium on future stock returns using data of 285 firms listed on Karachi Stock Exchange using the Fama Macbeth methodology (1973) also known as two pass test. We applied both the one pass and two pass regression on single factor model and two factor model. The validity of CAPM is checked and is not considered as appropriate in Pakistani stock market. After the incompetence of CAPM, Asset Growth Premium is added to the single factor to check the predicting ability of the new two factor model i.e. market premium plus asset growth premium. Adding asset growth premium to the model enhances the ability of the model to predict future portfolio returns. Our results further suggest that, asset growth premium is a priced variable in determining the future returns and can be used by the investors for strategic decision making.

Keywords: CAPM, Asset Growth, FAMA Macbeth.

Asset pricing has been the focus of attention for researchers in finance for the last six decades. Researchers have been working on asset pricing to find the forces that best determine the price of assets. They have introduced number of models for asset pricing, to guide investors and corporations to make efficient investments and financing decisions. These models include the Capital Asset Pricing Model (CAPM), Arbitrage Pricing theory(APT), Fama and French three factor model and Sentiment models. The most prominent of these models is the (CAPM)given its several testable implications and dominance in the finance literature. Capital Asset Pricing Model was introduced by Sharpe and Lintner (1964) and was based on the Markowitz model of portfolio choice (1958). Despite all its limitations, CAPM debate has remained the focus of research. Lau & Quay (1974) accepted CAPM while Eatzaz & Attiya (2008), Hanif (2009), Fama and French (1992) and Hui and Christopher (2008) challenged the validity of CAPM.Capital Asset Pricing Model compensates the investors for the time value of money and for bearing the market risk. The limitation of CAPM is its strong underlying assumptions and single factor predicting the future returns.

Keeping in view these limitations, researchers have identified many anomalies in this model. The first blow to CAPM was Basu (1977) research, who introduced E/P ratio as a priced factor in determining the

future returns.Stattman (1980) investigated that high B/M ratio firms earn higher returns than low B/M ratio firms, Jacobs and Levy (1988) observed that companies with high cash to price ratio (Cash/Price) earn higher returns than firms with low cash to price ratio. Ross introduced the Arbitrage Pricing Theory in (1976) in which he argued that there are multiple factors which can be priced in the determination of future returns. He identifies the relationship of macroeconomic variables with equity returns. Fama and French (1993) added size effect and value effect to the CAPM. Their work is the famous Fama and French three factor model. Carhart (1977) added momentum effect to the Fama French three factor model. In this particular study we have introduced Asset Growth Premium as an extension to the CAPM to study its significance in predicting the securities' future returns.

Asset Growth refers to changes in total assets. When we compare asset growth rate with the previously documented determinants of returns (i.e., book-to-market ratios, firm capitalization, lagged returns, accruals, and other growth measures), we find that a firm's annual asset growth rate emerges as an economically and statistically significant predictor of returns, and has a negative correlation with the subsequent returns (Titman et al. 2004, Cooper et al 2008).

High asset growth firms yield lower returns: two explanations have been identified for this relationship through literature. A leading risk based explanation is that when a firm makes capital investments such as purchase of large equipment and building, money invested in new ventures, merger and acquisition, public equity and debt offerings & loan initiations, tend to be followed by abnormally low stock returns,It increases its total assets, which replaces the risky growth options with less risky assets. Average firm risk will be lowered and, therefore, the returns will be lowered. Berk et al (1999) explained it the other way round. The firm's returns after trimming down its assets (spinoffs, share repurchases, debt repayments and dividend initiations) tends to be followed by abnormally high returns,thus induces a negative relation between investment and expected stock returns.This relationship is also evident in the work of Knopf, Teall (1999), they argued that high asset growth firms experience deteriorating accounting return on equity (ROE) while it improves for low asset growth firms.

Another explanation is based on mispricing. Cooper et al. (2008) and Titman et al. (2004)attempt to investigate the relationship based on mispricing. They conclude that investors under-react to the empire building implications of investment expansion. Chan, Karceski, Lakonishok, and Sougiannis (2008) find that the asset growth anomaly is more pronounced in firms with low levels of pastprofitability and poor corporate governance and imply that the anomaly is due to investors' under-reaction to managers' empire-building investments. Empire building investment isthe act of attempting to increase the size and scope of an individual or organization's power and influence. In the corporate

world, this is seen as unhealthy when managers or executives are more concerned with expanding their business units, their staffing levels and the value of assets under their control than they are with developing and implementing ways to benefit shareholders. Investors under-react to the empire building activities of managers, thereby lowering the prices and increasing the returns. Overall, the asset growth effect is most consistent with this mispricing interpretation. These explanations can best be explained through figure 1.

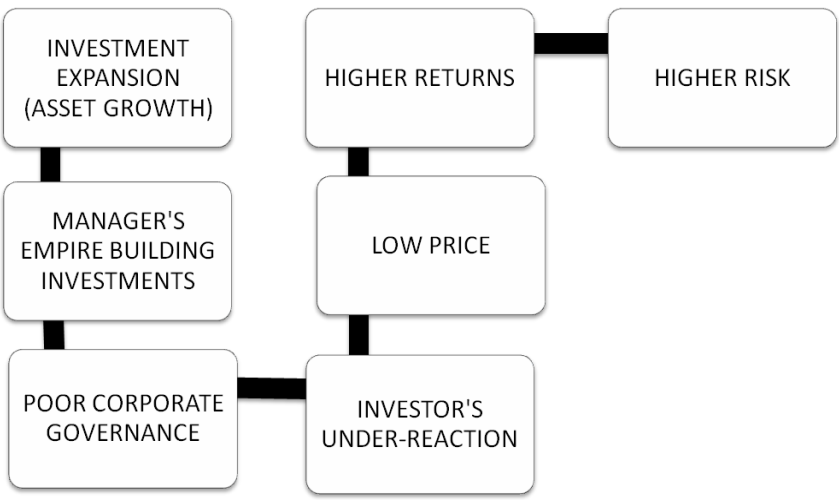

Figure 1. Relationship of Asset Growth with Risk

This is a novel work in the context of Pakistan. No work has been found on asset growth premium as a risk factor in asset pricing model in Pakistan equity market.The relationship between asset growth and stock returns is important, because it has many important implications for asset-pricing, and it can also assist finance managers and investors to take effective investing and financing decisions.This paper will answer the following research questions.

Research Question

There are two main questions that will be answered after detailed empirical examination of the data.

i) Whether Capital Asset Pricing Model is valid in Pakistani equity market?

ii) Whether Asset Growth Premium is a priced variable in asset pricing model?

Objectives of Study

Objectives of the study are identified as following:

i) To test Capital Asset Pricing Model in Pakistani Equity Market.

ii) To see whether asset growth have an effect of the expected returns of portfolio.

This model will help to resolve the untested anomaly of asset growth but is still exposed to the following limitations.

Limitations of Study

There are growing concerns in the literature about the use of portfolios to identify anomalies, and more generally to test asset pricing models. The main objection on portfolio construction is that grouping firms into portfolios and aggregating returns wastes and potentially distort valuable information about cross sectional patterns in abnormal returns. For example, Litzenberger and Ramaswamy (1979) and Ang, Liu, and Schwarz (2010) consider the loss in efficiency from using portfolios rather than individual firms in asset pricing models. Lewellen, Nagel and Shanken (2010) show inferences in asset pricing models are remarkably sensitive to the choice of test portfolio. More anomalies should be investigated to find their effect on future returns.

This paper is organized as follows: section 1 introduces the Asset Growth Premium as an extension to CAPM. It gives a clear picture of the background, set objectives of study, explains the contributions of the study along with its limitations. Section 2 provides the theoretical framework of the models. It intends to present and describe relevant theories. It describes the review of previous relevant papers. Section 3 mentions the data used and their sources in this study. All the variables are described in detail. This section explains the methodology for portfolio construction and Fama Macbeth procedure. Section 4 mentions the detail data analysis. Descriptive statistics, OLS results and Fama Macbeth two pass results are mentioned and discussed for CAPM and Asset Growth based two factor model. Section 5 concludes

Literature Review

Before reviewing the literature on asset growth and stock returns, we will review studies on asset pricing and the different factors identified and tested by researchers that can affect stock returns and stock prices. The key assumption of asset pricing models is that systematic risk is a function of market wide factors, and these factors are quantified by taking their respective betas. The Capital Asset pricing model of Sharpe (1964) is the pioneer in beta based pricing models and is vastly discussed in the literature. It has been tested in different markets in different times. Lau & Quay (1974) tested CAPM in the Tokyo stock market and reported its applicability in the Tokyo stock market, because the results given by the model were accurate and consistent. Fraser and Hamelink, (2004) also carried out a research on the validity of CAPM and concluded that results of Capital Asset Pricing Model are accurate, but,

with the passage of time more accurate tools like APT overtake CAPM in accuracy and correctness.

Other researchers are of the view that stock returns are not based only on a single factors i.e. beta, but there are other factors which can affect stock returns more aggressively. Scheicher (2000); Gomez and Zapatro, (2003); Groenewold and Fraser (1997) and Huang (2000) also tested the validity of CAPM in different markets, and reported that the results of CAPM might be misleading and there is a need to include other factors in the model in order to accurately estimate the stock returns. Researchers in finance introduced different anomalies and studied the sensitivity of expected returns of financial assets towards these anomalies. These anomalies are: Price Earning Ratio by Haim Levy (2012), Size Premium by Banz (1981), Book to Market Ratio by Shefrin and Stattman (1985), Momentum by Jegadesh and Titman (1993), Liquidity by Amihud and Mendelson (1986).Many macroeconomic factors are also identified and studied by researchers in different countries like industrial production, inflation, foreign exchange rate, money supply, labor force, export and import, population, oil prices, market indices, interest rates and inventories.

Khan; F, Hassan, A; Ali, S. (2012) carried out a study on asset pricing in the Karachi Stock Exchange (KSE). They studied the effect of size and leverage in asset pricing model using multivariate regression. The results of the study revealed that firms with high market capitalization beat the firms with low market capitalization, thereby, supporting the effect of size anomaly in predicting the future returns.

Asset growth (changes in total assets) can also be included in the list of fundamental (firm specific) factors that can affect the stock returns. Asset growth is also studied by researchers in finance as an indicator of a strong predictor of future abnormal returns. Those firms which are keen to undergo relatively higher asset growth ended up with relatively lower risk. Increase in total assets results in lower returns because the risky growth options are replaced with less risky assets, which will result in a lower average firm risk. Asset growth has also established a dominant position in research and is studied and tested by many researchers. Cochrane (1991); Berk, Green, and Naik (1999); Gomes, Kogan, and Zhang (2003) have reported that high premium in returns in low asset growth stock is a compensation for risk. They have justified their argument by stating that firms always keep a combination of existing assets and growth options, and these growth options are comparatively more risky than the existing assets. Whenever a firm decides to carry out growth options, the overall risk of the asset mix is reduced because existing assets replace growth options. This reduction in risk due to the exercise of growth options, results in a negative correlation between asset growth and returns. The q-theory framework proposed by Tobin (1969); Yoshikawa (1980) also explains this

relationship by arguing that whenever required returns decline then investments expands.

Michael J. Cooper, Huseyin Gulen and Michael J.Schill (2010) concluded that asset growth rates are a strong predictor of future returns with a strong negative relationship having a 't' value of - 6.52. Same findings were also reported by Berk, Green, and Naik (1999); Gomes, Kogan, and Zhang (2003); Carlson, Fisher, and Giammarino, (2004); Fama and French (2006a); Anderson and Garcia (2006) and others, who reported that firm growth results in lower expected return. Michael J. Cooper, Huseyin Gulen and Michael J.Schill (2008) also worked on the strength of the relationship between asset growth and returns, and find asset growth as a strong/robust predictor of future abnormal return. Shaw Chen, Tong Yao, Tong Yu, Ting Zhang (2008) examined the relationship between asset growth and stock return. They used data from nine equity markets in the Pacific-Basin region (PACAP). They concluded that there is a negative association between the two variables, but also stated that the relation is stronger in the U.S. market as compared to PACAP. They further investigated the relationship, by inspecting the factors which affects the relationship between asset growth and stock return, and found out that the dominance of the banking system and more dependence on debt causes a decline or weakness in the negative correlation.

Praveen Kumara, Dongmei Lib (2013) examined the relationship in more depth, by including a firm's innovative capacity (ability of a firm to create multiple growth options from novel activities) along with asset growth. They concluded that it is not necessary that expected returns always fall as a result of asset growth in firms with high innovative capacity, because investment can generate new growth options. The negative correlation between asset growth and excess return occurs only in firms with low innovative capacity. Akiko et al. (2013) also reported negative correlation between asset growth and stock return. They justified the negative relationship by arguing that asset growth is followed by lower stock return in companies with higher growth in assets in international equity markets. The negative relationship is stronger in developed markets. The strength of relationship is due to the adoption of optimal investment strategy.

Many researchers have worked on the relationship and have reported a negative relationship between asset growth and stock returns. Titman, Wei, and Xie, (2004) reported a negative relationship between asset growth and stock returns, and it is supported by Anderson and Anderson and Luis (2006). Cooper, Gulen, and Schill, (2008) also studied the relationship between large increase in capital investment, and subsequent returns and documented a negative relationship between the two.

There is no or very little work done to investigate the effect of asset growth on stock return in Pakistani equity markets. Keeping in mind the high uncertainties in the Karachi Stock Exchange, there is a

need to identify and study factors that can significantly affect stock return in order to compensate investors for being exposed to a specific risk.

Research Methodlogy

Data Description and Sources

This study uses mainly four variables described in detail below:

i) Monthly closing prices of all stocks for the period June 2001 to June 2012: It refers to the price mentioned on the last trading day of the month. Monthly closing stock prices have been obtained from the website of the Business Recorder Pakistan, which is a reliable source of information. Monthly returns are calculated from these prices with the natural log formula i.e.

$R_i = \ln (P_t / P_{t-1})$ Eq 3.1

Where:

R_i is monthly return of a stock

P_t is the current month closing price

P_{t-1} is the previous month's closing price.

ii) Monthly closing values of KSE 100 index for the period June 2001 to June 2012 refers to the index points on the last trading day of the month. Monthly closing points of KSE 100 index are obtained from the website of the Business Recorder Pakistan, which is a reliable source of information. Market returns are calculated from monthly KSE-100 index points with the natural log formula i.e.

$R_m = \ln (I_t / I_{t-1})$ Eq 3.2

Where:

R_m is the monthly market return

I_t is the current month's 100 index points

I_{t-1} is the previous month's 100 index points.

iii) Six month T-bill rate for the period June 2001 to June 2012. There are three types of T- bill rates available in Pakistan. A 3 month, 6 month and 12 month T-bill rate. All are weighted averages and annual rates. The researcher can pick anyone of them. In this research we needed a monthly T-bill rate; therefore, a 6 month T-bill rate was selected and divided by 1200 to get the monthly absolute T-bill figure so as to match the other variables. T-bill rate is taken as a proxy for risk free rate.

iv) Total assets for the year ending June of all the companies listed for the period June 2001 to June 2012. Asset growth is calculated with the help of the following formula:

$$AGt = \frac{TA_t - TA_{t-1}}{TA_{t-1}} \quad \text{Eq 3.3}$$

Where:

AGt is an indicator for asset growth for the current year.

TA_t is total assets for the current year.

TA_{t-1} is total assets for the previous year.

Data of total assets is collected from the analysis reports which are published on a yearly basis and are available on the KSE website.

Inclusion Criteria

i) Only those stocks are included which are continuously listed on the Karachi Stock Exchange during the study period i.e. June 2001 to June 2012.
ii) Only non financial firms are selected.
iii) Only those stocks are included which are traded for at least eight months during a year.
iv) Only those stocks are included which have considerable changes in total assets every year.

Initially 418 non financial firms were selected according to the first three points mentioned above but after including the fourth point, the firms shrank to 285.

After a study of the available literature, three different procedures have been widely used by the researchers to test CAPM and extended CAPM.

1. Black Scholes test
2. Fama Macbeth test
3. Petén gill test

Most of the researchers tested capital asset pricing model and its extension, by using a two pass regression known as Fama Macbeth (1973) methodology. The Fama Macbeth methodology is tested twice in this paper, first on capital asset pricing model i.e. on market premium, and then the asset growth based model (market premium and asset growth premium).

Testing One Factor Model (CAPM)

The econometric model of Capital Asset Pricing Model is as follows:

$$R_{it} - RFR = \alpha_{it} + \beta_{i1}(R_m - RFR_t) + \mu_{it} \quad \text{Eq 3.4}$$

According to the Fama Macbeth (1973) procedure the data set is divided into two parts: the estimation period and the testing period. The following table shows the detail.

Table 1 Estimation and Testing period

Description	Time periods
Initial beta estimation period	July 2001-June 2004
Testing period	July 2004- June 2012

A three year (36 months) estimation period was considered and beta was calculated. There are two methods to calculate beta. Either of the method gives the same result. One is to run regression of realized returns (R_{it}-RFR) of an asset against market returns (R_m-RFR). The other method is to apply the following formula on the 37th observation i.e. the first figure of the testing period and then drag it to the end of the column. Every month's beta is calculated on the basis of previous overlapping 36 months data.

$$\beta = Cov(R_{i,m})/Var\ (R_m)$$ Eq 3.5

The resulting betas from both the methods gave the same result, therefore, the second method was used to calculate beta because of its simplicity. The resulting beta is used as proxy for the true beta of the asset and is regressed against the excess returns (R_{it}-RFR) of the asset. Generally this regression takes the following form:

$$R_{it} - RFR = \lambda_{ot} + \lambda_{1t}\beta_i + \mu_{it}$$ Eq 3.6

Where:
the left hand side is the monthly mean return of the asset in excess of the risk free rate
$\beta_i$is the estimated beta.
$\lambda_{0t}$and $\lambda_{1t}$are the management's alpha and market premium respectively.
$\mu_{it}$is the random error

In the above equation it is hypothesized that the intercept is zero. A cross sectional regression analysis will provide the results. A significant positive value of λ_{1t} will depict the applicability of capital asset pricing model.

As our data set consists of 132 months i.e. from July 2001 – June 2012, we will have the first β_i calculated in the 37th month of our data set i.e. July 2004 because 36 months (three years) are taken as the estimation period. The second regression is run on 95 months i.e. from July 2004–

June 2012 because regression requires equal number of observation in all columns. The first pass involves the time series regression while the second pass involves the cross sectional regression.

Testing Two Factor Model (MKT along with Asset Growth Premium)

The econometric equation for our two factor model is as follows:

$$R_{it} - RFR = \alpha_{it} + \beta_{i1}(R_m - RFR_t) + \beta_{i2}(AG_{it}) + \mu_{it} \quad \text{Eq 3.7}$$

Where:

AG_{it}= returns of low asset growth firms − returns of high asset growth firms

According to the Fama Macbeth (1973) procedure, the data set is again divided into two parts: the estimation period and the testing period. The data set now is organized in three columns i.e. $(R_{it} - RFR)$, $(R_m - RFR_t)$& (AG_{it}).

For the third column of asset growth premium, asset growth of 285 stocks is calculated at the end of June for the year 't-1' and then the stocks are arranged in descending order. The sample is divided into two parts to get asset growth sorted portfolios. The upper portfolio is termed high asset growth firm and the lower portfolio is termed as low asset growth firm. This process is repeated each year. Now for the portfolios created at the end of year "t-1", monthly portfolio returns are calculated for year "t". The returns of high asset growth portfolio are subtracted each year from the returns of low asset growth portfolio to find asset growth premium as shown below:

$AG = R_{low} - R_{high}$ Eq 3.8

A three year (36 months) period was considered for the estimation of betas. Betas were calculated by applying the following formula on the 37th observation i.e. the first figure of the testing period and then drag it to the end of the column. Every month's beta is calculated on the basis of the previous 36 months data to get overlapping betas.

$$\beta = Cov(R_{i,m})/Var\ (R_m) \quad \text{Eq 3.9}$$

The resulting betas are used as proxy for the true betas of the portfolios and are regressed against the excess returns (R_{it}-RFR) of the portfolio. Generally this cross-sectional regression takes the following form:

$$R_{it} - RFR = \lambda_{ot} + \lambda_{1t}\beta_1 + \lambda_{2t}\beta_2 + \mu_{it} \quad \text{Eq 3.10}$$

Where:
the left hand side is the monthly mean return of the asset is in excess of the risk free rate
β_1 & β_2 are the estimated betas of market and asset growth factors respectively.
λ_{0t} in the above equation is the management's alpha
λ_{1t}& λ_{2t} are the market premium and asset growth premium respectively.
μ_{it} is random error

The two factor model explains the relationship between expected portfolio return and asset growth premium along with market premium. It is hypothesized that firms with low asset growth rate out-performsthe firms with high asset growth rate; therefore, the premium is calculated by subtracting returns of high asset growth firms from returns of low asset growth firms. If the premium is calculated the other way round (returns of high asset growth firms – returns of low asset growth firms), its sign would become negative which is not permissible in asset pricing model rather it would become a discount. It is finally hypothesized that there exists a positive relationship between asset growth premium and expected returns.

Data Analysis and Results

This section is mainly divided into two portions. Each for the analysis of "single factor" and "two factors" models respectively. Both sections are sub divided into the three following portions:

i. Descriptive statistics
ii. Empirical results of one pass regression
iii. Empirical results of two pass regression (Fama Macbeth methodology)

Single Factor Model (CAPM)

The descriptive statistics of the single factor model i.e. CAPM are shown in the following table.

Table 2. *Descriptive Statistics-CAPM*

	Rit-RFRt	Rmt-RFRt
Mean	-0.003713	0.01028764
Standard Deviation	0.066482	0.08663256
Kurtosis	0.290178	6.2208072
Skewness	-0.104367	-1.24467891
Count	132	132

By looking at the mean of portfolio returns (Rit-RFRt= -0.003713) and market premium (Rmt-RFRt=0.01028764), both have

opposite signs which indicate that there is a negative relationship between them. Market premium is more volatile than portfolio return and earns more return than securities; it may be a result of outstanding performance of Pakistani equity market during 2001 to 2012. The negative skewness (Rit-RFRt= -0.104367, Rmt-RFRt= -1.24467891) shows that both are left skewed distributions but the little magnitude of the values does not support the abnormal distribution of the data.The econometric model is as follows:

$$R_{it} - RFR = \alpha_{it} + \beta_{i1}(R_m - RFR_t) + \mu_{it} \qquad \text{Eq 4.1}$$

The following table shows one pass regression analysis of CAPM.

Table 3. *OLS Result-CAPM*

	2001-2012
Intercept	-0.00941
(Rm-Rf)	0.553753
t (Intercept)	**-2.32342***
t (Rm-Rf)	**11.8838***
R^2	0.520693

*t value significant at 95%

The above regression result shows an R^2 of 52% which indicates that the market risk premium contributes 52% variation in portfolio return. The remaining 48% of the variation can be determined by several other factors which are omitted in this study. Rm-Rf is the only independent variable in this model which has a significant positive impact on determining portfolio return. The coefficient (0.553753) of Rm-Rf shows a strong magnitude of the impact and its 't' value (11.8838) shows a significant positive relationship with portfolio return. Thus proving that market risk premium alone can explain up to 55% of the portfolio returns. Jensen's alpha has also a significant negative impact on portfolio return [t (intercept) = -2.32342]. The negative sign of Jensen's alpha may not be an indicator of poor performance of the manager but it may rather lead to the omitted variable case (Kang, J. & Lee. S., 2013). The second pass of the Fama Macbeth methodology shows the linear relationship between the systematic risk (beta) of a factor and portfolio's returns. In Table 3, we have mentioned the empirical results of two pass (Fama Macbeth Test) regression for CAPM.

Table 4. *Fama Macbeth Results-CAPM*

	2004- 2012
λ_{0t}(intercept)	-0.043378
	(-1.449)
λ_{1t}(MKT)	0.050339
	(0.975954)
R^2	0.010031

The Fama Macbeth test explores the validity of the capital asset pricing model by testing that $\lambda_{0t}= 0$ and $\lambda_{1t} \neq 0$. The above results shows that λ_{0t} i.e. Jensen's alpha has a weak negative impact on portfolio returns (-0.043378) and is also statistically an insignificant factor (t (λ_{0t}) = -1.449). λ_{1t} denotes the average market risk premium and theoretically it should be positively related to portfolio return. The Fama Macbeth test shows that results are inconsistent with the theory and λ_{1t} has no significant impact on the future returns of the portfolio, thus, it failed to prove the validity of the capital asset pricing model.

It can finally be concluded, that market risk premium does not provide insight into determining the linear relationship between market beta and portfolio's returns, hence CAPM is not valid in Pakistani equity market for the period 2001-2012. Market premium is not a priced factor. We can also relate these results with the concept of market efficiency according to which current information cannot be used to predict future return, hence, proving the Pakistani equity market to be efficient in its weak-form during 2001-2012.

Two Factor Model

Market risk premium alone failed to predict the future returns of the portfolio. Therefore, another firm specific factor "Asset Growth" is added to CAPM to enhance the pricing ability of the equation. The same format as in the case of single factor has been adopted for the data analysis of the two factor model. The descriptive statistics are shown below in Table 5.

Table 5. *Descriptive Statistics for the Two Factor Model*

	Rit-RFRt	*Rmt-RFRt*	*R(high AG)*	*R(low AG)*	AG premium
Mean	-0.00371	0.010288	0.004092	0.003287	-0.00080447
Standard Deviation	0.066482	0.086633	0.060609	0.073066	0.030801767
Count	132	132	132	132	132

The above table shows that market premium; high asset growth firms and low asset growth firms have positive mean return during the study period i.e. 2001-2012, while total portfolio and asset growth premium have negative mean return during the same period. Asset growth premium have the lowest standard deviation (0.030801767) among all variables because the sole reason of constructing portfolios is to reduce volatility. Asset growth premium is calculated by subtracting returns of high asset growth firms from return of low asset growth firms. Hence, it has been proved that portfolio construction involves reducing idiosyncratic volatility. Market returns has again been the most volatile

returns. Adding Asset Growth Premium to CAPM takes the following form of equation:

$$R_{it} - RFR = \alpha_{it} + \beta_{i1}(R_m - RFR_t) + \beta_{i2}(AG_{it}) + \mu_{it} \quad \text{Eq 4.2}$$

OLS regression has the following results.

Table 6. *OLS Result for the Two Factor Model*

	2001-2012
Intercept	-0.00855
(Rm-Rf)	0.52711
AG_t	0.72739
t (Intercept)	**-2.40189***
t (Rm-Rf)	**12.81019***
t (AG_t)	**6.285162***
R^2	0.63306

*t value significant at 95%

R^2 has increased to 63% in this model as compared to the single factor model (52%). It shows that asset growth premium has increased the explaining power of the model. The new factor added in this model i.e. asset growth premium has a significant positive impact on the security's current return (AG_t = 0.72739, t= 6.285162). In other words, firms having low asset growth outperform the firms having high asset growth. To check the linear relationship between asset growth anomaly and portfolio returns, the Fama Macbeth methodology is applied on the two factor model. The results are presented in Table 7 below.

Table 7. *Fama Macbeth Test for the two factor model*

	2004- 2012
λ_{0t}	-0.08913
λ_{1t}	0.062808
λ_{2t}	0.058307
t (λ_{0t})	**-2.23603***
t (λ_{1t})	0.971072
t (λ_{2t})	**2.383027***
R^2	0.065336

*t value significant at 95%

R^2 has increased to 6.5% in this model as compared to the single factor model (1%). The increase in the coefficient of determination depicts that adding asset growth premium enhances the capability of this model to predict the future return. In other words, asset growth premium is a priced factor which can be

further proved by its significance [t (λ_{2t}) = 2.383027]. The results are consistent with Cooper et al. (2008) and Titman et al. (2004).

Table 8 reports the statistical significance of the difference between return of asset growth sorted portfolios and market return. Panel 1 exhibits the difference between average return of low and high asset growth portfolios and its statistical significance. Panel 2 exhibits the difference between the average return of low asset growth portfolios and market return and its statistical significance. Panel 3 shows the difference between the average return of high asset growth portfolios and market return, and its statistical significance.

No statistical difference was found in either panel which shows that both high and low asset growth portfolios failed to outperform the market. Panel 1 result shows that the returns of low asset growth firms are more than the returns of high asset growth firms but the difference is not statistically significant.

Table 8. *Comparison between returns of asset growth sorted portfolios and market returns*

Panel 1 results	Returns of low AG stocks	Returns of high AG stocks	Difference	t-statistics
Time Period (2001-2012)	0.00328711	0.0040915	-0.00080439	-0.30006857
Panel 2 results	Returns of low AG stocks	Market returns	Difference	t-statistics
Time Period (2001-2012)	0.00328711	0.01028764	-0.00700053	-1.21514888
Panel 3 results	Returns of high AG stocks	Market returns	Difference	t-statistics
Time Period (2001-2012)	0.0040915	0.01028764	-0.00619614	-1.245725297

Conclusion

Investors in general, and financial experts in specific, need to understand the stock market efficiency. It is worth mentioning here that a financial analyst is said to be an expert analyst only if he/she has the ability to give an opinion on the basis of fundamental variables and macroeconomic variables about the future returns of a portfolio or security, and not on the basis of a "cosmetic view" of the financial reports or rumors in the market. A financial analyst must know about the actual performance of stock market. The stock exchange is an important tool to quantify or to judge the success of the economic system. Inflow of foreign investment into a country is also dependent on the stock market efficiency. Stock exchanges of the country should provide facilities to the foreign portfolio investment in predicting the future stock returns from their portfolios. This study provides an insight into the determination of stock returns by adding asset growth to the fleet of variables that can affect the stock returns in a positive or negative way. Data from 285 companies from the Karachi Stock Exchange over a

period of 132 months is used in this paper to provide more understanding about stock return. We can conclude from the results of the Fama Macbeth methodology that market premium cannot determine the future returns and is considered to be a non-priced variable. An analyst cannot provide a justified prediction about the future portfolio return to the investor by using CAPM as the decision criteria. So, there is a need to introduce a more powerful indicator which can help the analyst predict future portfolio return. Asset growth premium proved to be the one which can help the analyst solve this problem. By adding asset growth to CAPM and applying the Fama Macbeth methodology, it is concluded that the capability of the model to predict future return is enhanced. The results also show that asset growth premium has a significant positive impact on the security's current return thus, proved to be a priced variable.

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