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A Liquidity-Augmented Capital Asset Pricing Model: Analytical and Empirical Perspectives

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Abstract
The objective of this study is to compare the single-factor model of asset pricing with liquidity liquidity-augmented model in the emerging market of Pakistan. Many researchers have proved that the traditional Capital Asset Pricing Model (CAPM) was not able to explain the variations in returns completely. Therefore liquidity, which is the main problem of emerging markets, was added to CAPM to increase its explaining power. For the said purpose, monthly data for the period of 2008-2017 was taken for PSX 100-index. Amongst the many proxies for liquidity, turnover was selected. Then the performance of single factor and CAPM adjusted liquidity risk was evaluated through Pooled OLS to determine which model is better for asset pricing. The results of two-factor models suggest that LCAPM performs better than single single-factor model. Market excess returns have a positive significant effect while the liquidity factor has also a significant effect but is negative which is consistent with the literature. The research can further be extended by comparing the results with Fama and French's three, four, and five-factor models.
Keywords: Asset Pricing, Risk and Return, CAPM, Liquidity factor.

Introduction

It is a general view that investors are expecting higher returns for assuming a high level of risk. The economist explained it through an assumption that investors are by nature “Risk Averse”, which means that investors are risk reluctant at the cost of their returns. If their assumption is considered true then investors will expect a higher rate of return whenever they assume higher risk by investing in riskier assets (Vergara-Fernández et al., 2023; Bao et al., 2018).

The measure of risk is volatility, the portion of volatility that is present in a specific asset due to its random noise is unsystematic risk. The part of volatility that is not asset-specific and comes from the market is called unsystematic risk. Beta is the measure to calculate systematic risk i.e. it measures the volatility of an asset towards the overall market. Thus, the beta will calculate the relationship between expected return and systematic risk. Investors are interested in finding a model to calculate their risk on investment and also the expected return (Cotter et al., 2023). Researchers all over the world have tested the CAPM model and had different experiences.

According to (Andrei et al., 2023; Bryant & Eleswarapu, 1997), in today’s world, investors want high returns on their investments. Financial managers or investors do

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have certain expected asset returns in their mind when they buy a stock or asset, it is quite possible that they might not receive the desired returns or at times they receive returns, more than their expectations. Because of this uncertainty, stocks are assumed to be risky securities. To lower this risk factor in the financial markets, investors are advised to diversify their portfolios so that different stocks with different ratios of risk are bought.

Capital Asset Pricing Model

Capital asset pricing model (CAPM) was originally proposed by Sharpe (1964) and Linter (1965). They suggested that the expected returns of an asset that is more than the free rate depends upon its systematic risk, which is non-diversifiable.

CAPM is based on the modern Portfolio theory proposed by Markowitz (1959). Markowitz was the first to talk about portfolio risk and return. According to this theory, the investor would minimize the risk of the portfolio for a given level of return or the return can be maximized forgiven level of risk. The model was later on modified by Sharpe and Linter by extending its assumption and drawing the effect of adding risk-free assets to a risky portfolio. CAPM has gained great fame due to its practical implication e.g. by using this model investors can construct their portfolio and manage its performance. CAPM can be used to find the required rate of return for investors and the cost of capital for the firm. In the CAPM model, unsystematic risk is eliminated by using assets portfolio whereas systematic risk is calculated by beta. The un-systematic risk could be controlled by diversification but the systematic risk is also related to the market which is called Market risk, which can never be controlled by diversification. CAPM model only calculates the market risk known as beta in this model.

The CAPM is based on some assumptions which are extensions of Markowitz and Tobin's (1958) assumptions. First, they assume that the capital market is in equilibrium. Then, Investors are price takers. The security market is frictionless. Investors have a homogeneity of expectation. Investors are assumed to face only systematic, non-diversifiable risk.

The CAPM equation can be obtained by generalizing the relationship between expected return and its non-diversifiable risk i.e.

$$E(R_A) = R_f + \beta\big(E(R_M) - R_f\big) \text{ ---------- (1.1)}$$

Where R_f in equation (1.1) represents the return on a risk-free asset. E (R_M) – R_f is the market risk premium i.e. the excess return on the market as compensation for investing in a risky asset.

Thus, the CAPM elaborates that an asset can yield risk risk-free rate along with a premium for beta which is non-diversifiable.

After Sharpe (1964), the researcher extended the model and made it more efficient by adding some more real-world factors as the explanatory power of CAPM has been proven to be weak (Chen et al., 2024; Griffen, 2002; Black et al., 1973; Basu, 1997, 1983; Banz,1981). As the world is developing, it is believed that the risk factors of investing in assets, especially in stocks are increasing and are no longer one-dimensional. The more pronounced was Fama & French (1992), who negated the use of a single risk factor, beta, in calculating returns on risky assets in the financial market. They pointed out the presence of two other anomalies i.e. the size factor and

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book-to-market.

They used SMB (small minus big) to address the size risk and HML (high minus low) for value risk. SMB which stands for Small Minus Big, is the measure of additional return investors have received by participating in stocks of companies with relatively small market capitalization (Iqbal & Brooks, 2007). This additional return is referred to as the "size premium". A positive SMB indicates that small-cap stocks outperformed large-cap stocks while a negative SMB indicates that large caps outperformed (Khandelwal et al., 2023). HML, which is short for High Minus Low, has been constructed to measure the "value premium" provided to investors for investing in companies with high book-to-market values. A positive HML indicates that the value stocks outperform the growth stocks while a negative HML indicates that the growth stocks outperform.

Minovic & Zivkovic (2010) and Bagnara (2024) showed that the inclusion of other factors enhanced the significance of the single-factor model in explaining the asset returns. Fama & French (2004) recommended that research be conducted on other factors as well as their model does not have the capability of explaining all asset returns in different markets. Amihud and Mendelson (1986) were the first to introduce the concept of liquidity. In their study, they took the stock listed on the NYSE from 1960 to 1980. They found that as the bid and ask spread increases, the return for those portfolios decreases and vice versa. Hence, they concluded that investors should be compensated for the transaction fee (Su et al., 2023).

Similarly, Buffa and Hodor (2023) and Datar, Naik & Radcliffe,(1998) have defined an alternative proxy to find the liquidity i.e. turnover rate. The results confirmed the theory that less liquid stocks generate more returns than high-liquid stocks to compensate the bearer. Amihud (2002), had given a new measure of illiquidity as the previous one of bid and ask rate was hard-to-track. The new measure is simply the measure of price impact. His results also showed a positive relationship between illiquidity and stock returns, reaffirming the compensation for illiquidity. Chan and Faff (2003), and Acharya and Pedersen (2005) have also studied the different dimensions of liquidity with different proxies.

Liu (2006) researched the two-factor model of CAPM by incorporating the liquidity factor versus the Fama and French three-factor model. He found that the explaining power of the factor model is more than Fama and French three factor model.

The standard CAPM model was static with only one factor, Market risk, which is considered in the financial markets for evaluating stock returns. Fama-French recognized three common risk factors (market risk, firm size, and book-to-market values) to evaluate the stock returns in the financial market. Liquidity-augmented CAPM considers two factors which are the market risk and the liquidity risk in estimating stock returns. Hence after, thorough investigation, it is suggested that the LCAPM model performs better than the other two models.

Liquidity is how easily the stock can be traded in a market with heavy volumes without decreasing its price and without incurring any transaction cost (Liu, 2006). It implies that before investing in an asset the investor would thoroughly analyze the market for its resale. If they want to sell it in the future what cost do they have to bear and at what price they would be able to sell it? All these concerns are related to the liquidity of an asset and also affect its price, thus an important factor while pricing an asset. Several considerations may serve as the source of illiquidity. For example, the sources identified by Zhang (2023) Amihud, Mendelson, and Pedersen (2005) exogenous

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 5 (December) (2024)

trading cost, demand pressure, inventory risk, asymmetric information, and search friction. There may be other causes too which may be time-varying but the investor should be compensated for holding the illiquid stock. The compensation for holding the illiquid stock should be in the form of higher expected returns.

Bybee et al. (2023) and Bekaert et al. (2007) indicate that the liquidity risk is significant for less developed markets where there are limited investors along with the limited availability of the stock. Exhaustive literature exists on the validity of the two-factor model in the international market but Pakistan's Stock market has been classified as an emerging market. The presence of liquidity risk has been examined in this study along with the market risk to get a clear view of whether in Pakistan investors are compensated for liquidity risk or not. Fama & French anomalies were not added as Liu (2006) has already proved that in emerging markets, LCAPM has more explanatory power than FF plus liquidity.

Through CAPM required rate of returns will be determined by taking into account the liquidity risk. There are many proxies to find the liquidity risk. However, this research is based on Chan and Faff's (2005) model for determining liquidity in emerging markets. They used the "turnover" as a proxy for finding liquidity which was followed by Datar et al. (1998). Turnover rate simply measures the liquidity of an asset by computing how many times the owner of an asset changes. It is determined by dividing the shares traded by the number of shares outstanding.

Now, after adding the liquidity to CAPM, the model is:

$$E(R_i) = R_f + \beta_{i,m} (E(R_m) - R_f) + \beta_{i,l} E(LIQ)$$

This study was carried out to find whether CAPM is most fits best for calculating asset return for investors in the Pakistan 100 index or LCAPM. Thus, the objective which defines this purpose is to find the relationship between stock returns and market excess returns (Single factor model). This study aims to find the relationship between stock returns and liquidity factor (LCAPM) and to compare the explanatory power of single-factor and two-factor models i.e. (CAPM and LCAPM). This study will be beneficial for investors and managers of asset management in decision-making regarding investment. It will also increase the literature on asset pricing in Pakistan by applying liquidity-augmented CAPM.

Literature Review

The CAPM model is considered to be vital and powerful in measuring risk about the expected rate of return on the stocks or assets in any financial market (Manresa et al., 2023). The CAPM Model was created on the Markowitz model. Markowitz's model is considered to be a model of portfolio choice where an investor chooses a portfolio that generates a stochastic return. This model is often known as the "Mean-variance model". In CAPM theory, it is believed that diversification of portfolio stocks reduces the risk in the financial market (M. Li & Zhu, 2024). The Aggregate risk consists of systematic risk and specific risk in the financial stock market. The specific hazard and risk can be reduced by adding more securities to the portfolio. As an outcome and result, the primary investors are only rewarded for the systematic risk of that stock market. However, some scholars believe that it is very hard to hold diversified portfolios as stock information and costs associated with these stocks are very limited and it has been also observed that investors tend to invest in those stocks already

known to them (Pan et al., 2023). So, it is suggested that idiosyncratic risk should be compensated for holding a diversified portfolio of stocks (Herskovic et al., 2023).
CAPM model despite several shortcomings and limitations, is considered a very useful analytical tool for the financial managers and investors of the financial market (K. Li & Liu, 2023). It is extensively being used as an instrument which is utilized by Fund Managers to foresee and estimate portfolio or asset return for the holding period and also the market return in any financial market. Lau, Quay, and Ramsey (1974) used this CAPM model in the stock market of Tokyo where the outcomes and results reinforced in applicability of that CAPM model. While Blume (1993) explained there is a linear association between risk calculated by beta and the anticipated output of an investment. Hence his findings were compliant with the CAPM model assumptions (Kehoe et al., 2023).
Many researchers have been critical of the CAPM model because it depends only on one beta factor for decision-making. It's a known fact all around the world that the "Higher the risks, the higher will be the returns" (Bretscher, 2023). However, the problem in financial markets is how one measures the risks associated with an investment in financial assets. Hence, to make the CAPM more meaningful, the researcher added some more real-world factors as the explanatory power of CAPM has been proven to be weak (Fagereng et al., 2024; Griffen, 2002; Black et al., 1972; Basu, 1997, 1983; Banz,1981; Bhandari, 1988). Fama and French (1994) also showed that the return of the small stock gives a larger return than on the highest stock portfolios.
Fama and French (1995) also negated the use of a single risk factor, beta, in calculating returns on risky assets in the financial market. They considered the size factor and the book-to-market factors as important in estimating the risk-return relationship in financial markets (K. Li & Xu, 2023). Koutmos and Knif (2002) came up with another model known as the GARCH model that calculated time-varying betas. Although, the Capital Asset Pricing Model is still considered significant in establishing the relationship between risk and return other models such as GARCH and APT are believed to be more efficient in calculating multiple risks on investments and their returns (Alessi et al., 2023).
Amihud and Mendelson (1986) were the first to report the association between the liquidity of stocks and stock returns in cross-section portfolios. They believed that liquidity emerges as a natural factor in any asset pricing model. They assumed while estimating stocks through the capital asset pricing model (CAPM) that stock or asset returns increase with market beta (X. Zhang et al., 2023).
Amihud (2002) believed that illiquidity chiefly has an impact on small firm stocks hence he concluded that small firms face bigger liquidity risks. So, the small firm should offer more illiquidity risk premium in the emerging financial market (Jiang et al., 2023).
Liquidity is considered to be one of the important factors in influencing investors' decision options in the stock market (Shi & Li, 2023). In theory, it is believed that when investors buy illiquid stocks, they expect higher returns as compensation for risk coverage (Lin et al., 2024). Many researchers including Amihud (2002) and Datar et al. (1998) concluded that there is a negative relation between individual stocks and gross stock returns. Datar, Naik & Radcliffe,(1998) have defined an alternative proxy to find the liquidity i.e. turnover rate. The results of their research also confirm the theory that less liquid stocks generate more returns. Chan and Faff (2003) employed the same shared turnover rate to calculate the liquidity for all listed companies in

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 5 (December) (2024)

Australia from 1989 to 1998. They investigate the anomaly by adding it to the Fama and French three-factor model (Chen et al., 2024). All the investigated betas were significantly affecting the returns. The liquidity beta is also significant i.e. illiquidity affects the returns positively (Cotter et al., 2023).

While Acharya and Pedersen (2005) in their research believed that elements of the illiquidity factor are also closely related to the stock returns in the financial market. Whereas Pastor and Stambaugh (2000) found out in their research that market-wide liquidity is vital for asset or stock pricing in the Financial market. Liu (2006) researched the two-factor model of CAPM by incorporating the liquidity factor versus the Fama and French three-factor model (Khandelwal et al., 2023). He found that the explaining power of the factor model is more than Fama and French three factor model (Iqbal & Brooks, 2007).

In another study, Zhang (2010) mentioned that although investors are fascinated by the high stock return potential in emerging or developing markets, on the other hand, investors are also apprehensive due to the liquidity risk in the financial market (Bagnara, 2024). As emerging markets are less regulated therefore investors are worried misguided or misinformed by the management and else they can be outdone by well-informed investors (Su et al., 2023). Hence, it was considered that liquidity is an important factor in estimating asset prices in the financial market.

The scholar, Li (1994) tests the liquidity factor in the second largest equity market of Japan. He found that liquidity-adjusted CAPM gives better results than the Traditional CAPM model. Minovic and Zivkovic (2012) analyzed the impact of the liquidity and size premium on the equity market of Serbia by using CAPM, Fama-French, and Liquidity augmented CAPM (LCAPM) (Z. Zhang, 2023). Their results revealed that liquidity and firm size play an important role in equity price formation (Manresa et al., 2023).

The scholar, Stereńczak (2017) in the paper, “Usefulness of selected liquidity measures on the Warsaw Stock Exchange” evaluates the usage of the different measures of liquidity on the Polish Stock Exchange. It was found that the most apt measure of liquidity is the Amihud illiquidity ratio on the Polish stock market (M. Li & Zhu, 2024).

Dinh (2017) investigated the correlation among stock returns, market risk, and liquidity in a high-frequency trading stock market. The relation between risk and return has already been established in the traditional CAPM theory (Bao et al., 2018). It was found that liquidity factors have an impact on idiosyncratic risk which meant that while estimating this risk liquidity factors should also be considered (Vergara-Fernández et al., 2023). That shows that liquidity and stock returns have a positive relation with each other while it was also mentioned that beta and stock returns have a flat relation.

Azam & Naveed (2021), conducted research on Pakistan’s Stock Exchange with a large sample of 521 companies. They applied and compared different pricing models that explain the returns of Pakistani investors. They used CAPM, Liquidity augmented CAPM (by Liu), Fama & French three-factor model, the factors model by Carhart, FF five-factor model, and liquidity and momentum augmented five-factor models. The researchers concluded that liquidity and momentum are important factors in asset pricing while using the FF 5-factor model (Buffa & Hodor, 2023).

Jain & Singla (2021) tested different pricing models on Indian Stocks. They tested CAPM, FF 3-factor model, leverage augmented 4-factor model, liquidity augmented

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 5 (December) (2024)

four-factor model, and liquidity and leverage augmented 5-factor model. Their results revealed that the liquidity and leverage augmented 5-factor model performs better than other models (X. Zhang et al., 2023).

Theoretical Framework

From the above literature, the importance of liquidity is proved along with the fact that in emerging markets CAPM alone cannot explain the returns. Hence, it can be concluded from the theory that excess market return depends upon two factors which are market premium and liquidity risk. In this study, the dependent variable "excess market returns" depends upon two independent variables i.e. market risk premium and liquidity factor.

Hypotheses

The Arbitrage pricing theory (APT) by Ross (1967) and multiple equilibrium approaches (Merton 1973, Breeden 1979 and Cox et al., 1985) proved the form of asset pricing model as

$$E(R_i) = \lambda_0 + \beta_1\lambda_1 + \beta_2\lambda_2 + \cdots \beta_k\lambda_k \text{---------- (3.1)}$$

Equation 3.1 in this study of testing a two-factor model takes the following form.

$$E(Ri)\text{-}Rf = \alpha_i + \beta_1 (E(R_m) - R_f) + \beta_2 E(LIQ) \text{ ----------(3.2)}$$

Where $E(R_m)$ is the expected return on the market portfolio and $E(LIQ)$ is the expected value of the liquidity factor. β_1 and β_2 are the slopes of time series regression which takes the form. The β_1 will measure the sensitivity of excess returns of a portfolio towards excess market return and β_2 will measure the sensitivity of excess return of a portfolio towards liquidity factor. If the riskiness of the portfolio increases i.e. betas increases then the excess returns will also be expected to increase.

Thus, the alternate hypothesis of β_1 will estimate that the risk factor will be significantly higher than zero i.e.

$\boldsymbol{H_1}$: *The market excess returns (RM-RF) has a significant impact on security's excess return (RI-RF)*

β_2 represents the effect of the liquidity factor on stock's returns. According to the theory, the relationship between the illiquidity factor and returns is expected to be negative. The alternate hypothesis of β_2 will be

$\boldsymbol{H_2}$: *The effect of illiquidity has a significant impact on stock returns.*

This study investigated the applicability of existing single and two-factor models of developed stock markets in the emerging stock market of Pakistan.

Methodology and Design

This study uses quantitative data (Saunder et al., 2009) which helps in explaining the relationship between dependent and independent variables (Lorraine et al., 2006). The population of this study is all the companies that are listed on the Pakistan Stock Exchange i.e. 572 companies. It is difficult to study all the listed companies of PSX because huge numerical calculations are involved. Therefore, this study takes the PSX 100 index as its sample. These 100 companies are the best representative of all listed companies because 85% of the trading is done in these companies. Only those

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 5 (December) (2024)

companies are considered as samples that are present in the recomposed list of PSX 100index on the reference date of 2nd October 2017. The period that was considered for the research is 10 years, that is, from Jan 2008 to Dec 2017.

While doing research for the applicability of the factors model, this study comprises two independent variables which were market excess returns and liquidity factor. The **"Market Excess"** returns are calculated by (R_M - R_F). The market return (R_M) is calculated by taking monthly index points of PSX from 2008-2018. Then the returns of index points are calculated by following the formula:

$$Market\ Returns\ =\ Index_t - Index_{t-1} \div Index_{t-1}$$

The six-month treasury bills rate (T-bills) is taken as a proxy of the risk-free rate (R_F). As it is issued by the Government there is no risk. That is why, it has been taken as risk-free.

The unavailability of data limits the research to only trading quantity dimension of liquidity by using the proxy of turnover. For this purpose, the monthly turnover of each company was taken for ten years which was further averaged to get the average monthly turnover of each company. The average of turnovers was taken to avoid the seasonality effect (Chan and Faff, 2003; Liu, 2006), that is, in January the liquidity premium is 2% higher than in other months of the year. After getting averaged turnovers, the median of the turnover was calculated to sort the companies in ascending order and rank them as high liquid and low liquid. The company with low turnover will be considered as less liquid while those with high turnovers are more liquid. Then the portfolio IMV was formed as in Chan and Faff (2003). The average returns of stocks with high liquidity are subtracted from the average returns of stocks with low liquidity. IMV is the measure of additional return investors have received by participating in stocks of companies with relatively low liquidity. This additional return is referred to as the "liquidity premium".

The dependent variable of the study is excess return on stock. The **Excess Return on Stocks** (R_I) is calculated by subtracting R_F from R_I. The monthly returns of securities are calculated by taking the individual stock prices of all the companies for the period of 2008-2017. The monthly return on stocks (R_I) is calculated by the following formula:

$$Stock\ Returns\ =\ Price_t - Price_{t-1} \div Price_{t-1}$$

Table 1: Variables of the Study

ame of variable	roxy	alculation
EPENDENT VARIABLE		
xcess Security's Return	I-RF	i is calculated by month eturn on security F is calculated as monthly yiel n 6 months T-Bills
NDEPENDENT VARIABLES		
Iarket Excess Return	M - RF	M is calculated by taking th Ionthly returns of 100 inde oints.

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 5 (December) (2024)

iquidity	ecurity's Turnovrading volume/No. Chan and Faff, 2002)nares outstanding	

Results and Discussion

Descriptive Statistics

Table 2: Descriptive Statistics

'ariables	Iean	td Dev	Iinimum	Iaximum
i-Rf	0957304	;316469	..12059	5.4741
m-Rf	0960323	)689589	7552815	)85322
iquidity	.11e+07	.44e+07	0	06e+09

Table 2 shows the findings of summary statistics for the variables which argued that the mean value stock premium is negative -0.957304 which means that the average variance of share prices in the study observations have been found negative, with a minimum -1.12059 and maximum 7.4741. The mean of the market premium is -.0960323 which also has been found negative with a minimum of -.7552815 and a maximum of .085322. The average value of liquidity is 2.11 which argued that the turnover of the market is positive and an increasing trend has been seen in the study observations.

Table 3: Matrix of correlations

'ariables	.i-Rf	.m-Rf	iquidity
i-Rf			
m-Rf	.17101**		
iquidity	).15316**	.21536**	

The findings show that the correlation between stock premium and market premium is 0.17 which is positively and significantly related with each other. Hence, if the market premium increases, the stock premium will also be increased.

The correlation between stock premium and liquidity has been found -0.15, negatively, and significantly correlated with each other. Hence, if the illiquidity increases, the stock premium will be decreased.

The CAPM model has been analyzed for the addition of liquidity factor. The results will be analyzed to check for the impact of the independent variable (RM-RF & IMV) on the dependent variable (stock's excess return).

Diagnostic Tests

Chow Test

The diagnostic test was used to check the model of data analysis that needs to be taken in the present study. The Chow test is the diagnostic test that has been used in the study to check the recommended model among fixed effect and pooled OLS models.

Ho: Pooled OLS

H1: Fixed effect model

Chow test for a structural break at observation 1:0016
F(3, 954) = 0.196444 with p-value 0.8988

The above are the findings of the Chow test which concludes that the null hypothesis has been accepted and argues that the pooled OLS model has been recommended for

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 5 (December) (2024)

the present study analysis.

Breusch-Pagan test statistic

The diagnostic test was used to check the model of data analysis that needs to be taken in the present study. The bruesch pagan test is the diagnostic test that has been used in the study to check the recommended model among random effect and pooled OLS models.

H0: Pooled OLS
H1: Random effect model

Table 4: Breusch-Pagan Test

est	**hi square**	**-value**
reusch-Pagan Lagrange Multiplier	.402608	.525746

According to Girma (2006), if the p-value is less than 0.05 then the random effect model would serve the better option for explanation. If the p-value is greater than 0.05 then Pooled OLS is a good model to use. Table 4 shows that the p-value is 0.5 which is greater than 0.05, so the null hypothesis has been accepted that pooled OLS is an adequate model as compared to random effects for present study analysis.

Pooled OLS
Model 1: OLS

Table 5**:** Regression Results CAPM

	oefficient	***d. Error***	***ratio***	***value***	
)nst	.0709703	00779926	.0996	).00001	*
n-Rf	247957	0673997	6789	00025	*

Dependent variable: Ri-Rf

squared	.139301	ljusted R-squared	.129002
1, 958)	3.53432	value(F)	.000247

*** *p<0.01*, ** *p<0.05*, * *p<0.1*

Above table 5 shows the findings taken from the regression model which has been used in the study to evaluate the market premium on the stock premium of the firm. The model that has been selected comprises two factors i.e. stock premium which has been drawn from the variance in the share prices of the sample firms and market premium has been estimated by the changes that occur in the market indexes. The study has taken market premium as the independent variable while the stock premium was the dependent variable. The value of R-square argued that the market premium has 13.9 effects on the share premium. The statistics show that the independent variable explained a 13 percent variance in the dependent variable. The study has used F-value for the estimation of model statistical significance. The F-value in Table 4.2 is 13.53 which is more than the standard value i.e. 4 and concluded that the selected model is statistically significant.

The market premium has a positive relationship with the stock premium which argued that when the market premium has been increasing then the share prices will be higher and will lead to higher share premium. The beta value of the market premium

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 5 (December) (2024)

is 0.247957 which shows that the share premium will be increased by 24 percent when the market premium has been increased which shows the positive relationship of the market index with the firm's share price. The t-value and p-value have been used to accept or reject hypotheses. The t-value of the market premium in the table is 3.6750 which is more than the standard value i.e. 2. Also, the p-value is 0.00001 which is less than 0.05, and argued that there is a significant effect of market premium on the stock premium.

Model 2: OLS

Table 6: Regression Results LCAPM

	oefficient	***d. Error***	***ratio***	***value***	
ɔnst	.0701071	00784491	.9366	).00001	*
n-Rf	245192	0674529	6350	00029	*
Q	.064168	011015	.8255	).00001	*

Dependent variable: Ri-Rf

squared	.095001	ljusted R-squared	.072942
2, 957)	287213	value(F)	.000723

*** *p<0.01*, ** *p<0.05*, * *p<0.1*

Above table 6 shows the findings taken from the regression model which has been used in the study to evaluate the effect of market premium and liquidity premium on the stock premium of the firm. The model that has been selected comprises two factors i.e. stock premium which has been drawn from the variance in the share prices of the sample firms and market premium has been estimated by the changes that occur in the market indexes. The study has taken market premium and liquidity premium as independent variables while the stock premium was the dependent variable. Table 4.3 shows that the market premium and liquidity risk have a 9.5 percent effect on the share premium. The value of R-square shows that the independent variable explained a 9.5 percent variance in the dependent variable. The F-value is used for the estimation of the model's statistical significance. The f-value in Table 4.3 is 7.28 which is more than the standard value i.e. 4 and concluded that the selected model is statistically significant.

The market premium has a positive relationship with the stock premium which argued that when the market premium has been increasing then the share prices will be higher and will lead to higher share premium. The beta value of the market premium is 0.245192 which shows that the share premium will be increased by 24 percent when the market premium has been increased which shows the positive relationship of the market index with the firm's share price.

The t-value and p-value have been used for the acceptance or rejection of the hypothesis. The t-value of the market premium in the table is 3.6350 which is more than the standard value i.e. 2. Also, the p-value is 0.0007 which is less than 0.05, and argued that there is a significant effect of market premium on the stock premium.

Table 4.3 implies that illiquidity has a negative relationship with the stock premium which argues that when the market turnover has been increasing then the excess return on stock decreases. The beta value of liquidity is -0.064168 which shows that the excess return on stock will decrease by 6 percent when the market illiquidity has

been increased by 1% which shows the negative relationship of turnover with the stock's excess return-. The t-value has been used in this table to accept or reject hypotheses. The t-value of market liquidity in the table is -5.8255 which is more than the standard value i.e. 2. Also, the p-value is 0.0001 and argued that there is a significant effect of liquidity on the stock premium.

Conclusion

The objective of the study was to define a best-fit asset pricing model in the emerging market of Pakistan which will be helpful for investors while calculating their required rate of return. Traditionally, CAPM was considered the best in calculating stock returns. This model has only one factor (market excess return) which could affect the excess stock's return. However, with new research, it has been proved that this model is based on some ideal assumption. Hence, some real-world factors were added to make the model more reliable for investors. Pakistan has been categorized as an emerging market, this study considers only LCAPM. In this study, Chan and Faff's (2003) methodology has been adopted to study LCAPM. The results of the Pooled OLS of the single factor model showed that market excess returns have a positive significant effect on the stock excess return. The overall single-factor model validity was proved. The results of the two-factor models were also significant. Market excess returns have a positive significant effect on stock premiums while the liquidity factor has also a significant effect but is negative which is consistent with the literature. Hence, it proves that if the liquidity risk increases, the stock premium would decrease and vice versa. Hence LCAPM can explain the required rate of returns on stocks. In a state of low market returns while high illiquidity, the investor's return is significantly decreased.

Future Directions

To check the effectiveness of LCAPM on the Pakistan Stock Exchange in the future, it is recommended that the present study use the CAPM model, and in the future, the researchers can also use other models as well e.g. Fama and French models. The sample time period of 10 years is very short as the same researches are conducted in developed markets for time series of more than 20 years. The study was conducted on PSX 100 index firms and in the future the study can be conducted in comparison of two or more sectors.

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