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Company Fundamentals as Determinants of Firm-Level Equity Premiums: Evidence from an Emerging Economy

Summary: Equity premium is a vital number to consider in finance when making fund allocations and investment decisions. This study explores the relationship between (controllable) determinants of firm-level equity premiums in the context of the Pakistan stock market. It uses a sample of 306 firms' annual data, from January 2001 to December 2015, using a two-stage least-squares method to estimate our panel data model (Jeffrey M. Wooldridge 2005; Manuel Arellano 2016). During the selected sample period, the average market premium of the Pakistan stock exchange (100 Index) was 20%. The average equity premium of individual firms was only 8%. Company fundamentals are considered determinants of firm-level equity premiums. Panel data econometrics techniques were used to estimate the modified version of the multi-factor model for the Pakistan Stock Exchange. It is found that the market premium, return on equity, dividend payout ratio, accounts receivable and firm size significantly and positively affect the firm-level equity premium. However, increase in the debt-to-equity and quick ratio negatively affect that premium. The company fundamental variables are controllable for the firms and can be improved by company management to encourage investors and maximize shareholder wealth.

Keywords: Pakistan stock exchange, Equity premium, Company fundamental, Multi-factor model.

JEL: B15, B21, B22, C38, E4, E6, G12.

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The equity risk premium is perhaps the single most important number in financial economics (Ivo Welch 2000). One of the most pressing, contemporary topics in advanced corporate finance and financial economics is the equity premium and the magnitude of that equity premium in total returns. The equity premium is the additional return that investors require from investing in riskier stocks rather than in risk-free securities. The risk premium drives the total expected stock returns and is a key determinant of the cost of equity. Eugene F. Fama and Kenneth R. French (2002) define the equity risk premium as the difference between expected market portfolio return and the risk-free rate of return. Similarly, according to Rajnish Mehra and Edward C. Prescott (1985, 2003), the difference between the market portfolio of stock and the risk-free interest rate is excess return and this is called the equity premium.

Aswath Damodaran (2009, 2016) has stated that the stock risk premium is a central figure on which investors insist for a high return from investing in the stock market, because the stock market risk is higher than the money market risk. Based on theoretical assumptions, the equity premium is the reward for taking that higher risk. It is a major factor for investors in estimating the total expected return of venture capital investment demand. It is also an important contribution to the valuation of corporate finance and market securities. Recently, Damodaran (2016) stressed the importance of previous equity risk premiums and conducted empirical studies using data from 1926 to 2015. It was found that the average equity premium during this period was only 3.68%, with SD of 1.91%.

Equity premiums are estimated in many asset pricing models, such as APTs, three-factor models, and multi-factor models. Many studies have validated the Capital Asset Pricing Model (CAPM), which is the origin of the equity premium in various capital markets (Stephen A. Ross, Randolph W. Westerfield, and Jeffrey Jaffe 2005). The preliminary empirical test of CAPM predicts a positive statistically significant intercept term and concludes that the CAPM corresponds to the expected return of the market. The CAPM also has a linear relationship with the actual calculated return of the market portfolio.

While studying the drivers of the equity premium, one cannot ignore the importance of non-economic factors that affect stock returns in general and equity premiums. In particular, Andrew H. Chen and Thomas F. Siems (2004), Marc Chesney, Mustafa Karaman, and Ganna Reshetar (2011), Ari Aisen and Francisco Veiga (2013), Naceur Essaddam and John M. Karagianis (2014), Essaddam and Ayman Mnasri (2015), Godwin Okafor (2015), Emmanuel Apergis and Nicholas Apergis (2016), Jeffrey Hobbs, Joel Gingrich, and Ludwig Christian Schaupp (2016) and Mnasri and Salem Nechi (2016), *inter alia*, have studied the impact of non-economic factors such as political corruption, law and order, government regime changes and political stability on stock market returns and equity premiums. Macroeconomic and non-economic factors are beyond the control of fund managers and of firm managers. Investors need to diversify their investment to minimize their risk and the firm needs to make necessary changes that respond to changes in macro and non-economic factors.

In Pakistan a number of related studies (Attiya Yasmin Javid and Eatzaz Ahmad 2008; Muhammad Hanif 2009; Nida Shah, Javaid Ali Dars, and Muhammad Haroon 2015; Muhammad Abdullah Zeeshan 2016, *inter alia*) address stock market returns, their implications, determinants and the interrelation with global markets. However, to the best of the authors' knowledge, there are very limited numbers of studies on market premiums and none on firm-level equity premiums. Research into the firm-level equity premium, its size in total expected returns for individual assets, its estimation, importance and the equity premium determinants remain scant in the literature.

1. Literature Review

The most popular fund allocations and investment decisions were based on Mean-Variance Analysis. Harry Markowitz (1952) and James Tobin (1958) introduced the mean variance rule. This seems to have been the first and most used investment allocation tool to address uncertainty in economics and finance. It has been broadly used by academics and investment practitioners. The same Mean-Variance Analysis framework is the basis of William F. Sharpe's (1964) CAPM, which is the cornerstone of today's modern economics and finance and other theoretical models. Olivier Blanchard (1993), Fama and French (2002, 2004, 2015), Myron J. Gordon, and Paul J. Halpern (2002) and Wu MengYun et al. (2018), examine company fundamentals using a dividend growth model and conclude that changing price earnings ratios and dividends can also change the magnitude of the equity premium, which translates into a decrease in the total expected rate of return. They also conclude that dividends and price earnings ratios are the most basic company fundamental factors that affect the equity risk premium. Mehra and Prescott (1985) argue that the equity risk premium is important for making various decisions such as portfolio allocation decisions, in deciding about the cost of capital, for determining the compensation for investing social security funds in the equity market, and many more such applications. These studies are mostly related to market premiums rather than firm-level equity premiums. Our study is different, in that we examine the impact of company fundamentals on firm-level equity premiums, which is poorly represented in the available literature.

Pablo Fernandez (2010) conducted a survey and received responses from 85 countries, including Pakistan; the survey asked about the required market risk premium (MRP). The average MRP reported for Pakistan was 6.3, with a standard deviation (SD) of 2.3; the study concluded that Pakistan is a developing capital market. The discount rate was not statistically significantly correlated with the developed world, especially Western Europe and the United States. Therefore most of the macroeconomic and monetary economic indicators do not adequately explain the situation of the Pakistan stock market return, and in fact this is true for all developing economies. "The country has a very large undocumented sector, very limited tax base and its policies – for the most part – are not set independent of international political pressures" (Fernandez 2010). We predict from these studies that the equity premium of the Pakistan stock market is not properly calculated in any empirical study nor have its determinants been examined.

In the equity premium survey, Fernandez (2010) reported considerable variation in equity premiums across economic analysts within the same stock market. In the United States, for example, the average equity risk premium across analysts was 5.8%. However, the numbers produced by different academic and economic experts ranged from 3.2% to 10.5%. Therefore an extensive investigation of the market equity premium, as well as of firm-level equity premium, is of paramount important. Company fundamentals, as determinants of the firm-level equity premium, will open avenues for further research into this topic for future decision making that will be relevant to internal factors of firm performance.

Fama (2002) and others provide studies which furnish detailed analysis at company level, using scorecard techniques. In this paper we discuss company factors and their relationship with the extension of the CAPM. The basic assumption of CAPM is that the risk premium is a function of the systemic risk of securities. Since we know that the company's risk should be determined by a combination of the fundamentals and the market characteristics of the company's stock, this study differentiates itself from earlier studies by taking into account the firm-level equity premium with its internal risks of its fundamentals. This is important to study because company fundamentals are controllable and the firm's management can take any necessary action to improve them and encourage investors.

2. Model

The equity premium can be modelled using different asset pricing models such as CAPM, APT, the three-factor model and multi-factor models. Markowitz (1952) was the first to provide the basis of the risk and return theory. Markowitz's theory was further developed and constructed into the CAPM by Tobin (1958), Sharpe (1964) and Jan Mossin (1966). The CAPM was criticised for its single-factor measure, which gave birth to Arbitrage Pricing Theory (Richard Roll 1977), followed by the three-factor model (Fama and French 1995; Mark M. Carhart 1997) and the multi-factor model (Fama and French 2002). Relevant to the different degrees of risk, macro-based and micro-based risk factor models were also developed accordingly. However, there remains room to add new phenomena of company fundamental factors in order to evaluate the association between the equity premium and its possible determinants. In this study we will use a modified version of Fama and French's (2002) multi-factor model to examine the effect of company fundamental variables (i.e., market premium, liquidity, solvency, efficiency and size) on firm-level equity premiums in Pakistan. The model is explained in the following formula:

$$EP_{it} = \alpha i + \beta_{i0}(\mathrm{MP_T}) + \beta_{i1}(\mathrm{ROE_T}) + \beta_{i2}(\mathrm{QR_T}) + \beta_{i3}(\mathrm{DPR_T}) + \beta_{i4}(\mathrm{DER_T}) + \\ + \beta_{i5}(\mathrm{ART_T}) + \beta_{i6}\,(Size) + \varepsilon_{it}, \tag{1}$$

where EP_{it} is the firm-level equity premium, MP_T is the market premium, ROE is return on equity, QR is the quick ratio proxied for liquidity of the firm, DPR is the dividend payout ratio, *DER* is the debt to equity ratio, *ART* is the accounts receivable turnover in days, *Size* represents the firm size, which is calculated as the log of total assets, and ε_{it} is the error term.

Previous studies (Fama and French 1996, 2002; Damodaran 2016) considered variables such as growth, size, momentum and macroeconomic factors. However, the company-specific micro variables are also used as technical indicators for investment decision making. Changes in investor preferences are also caused by the company's fundamental performance. This enables the firm to take necessary measures and to improve them, because these factors are avoidable and they can be controlled by the firms themselves. The MP represents the trend of the overall market. When the market premium increases, this means that investors are investing in different market portfolios, which result in increases in the EP of firms. Therefore the expected sign of the coefficient of the MP is positive, i.e., $\beta_0 > 0$. ROE also provides the magnitude of the return on equity, which encourages (or discourages) investors to invest in those particular firms. Thus the sign of the coefficient β_1 is expected to be positive, i.e., $\beta_1 > 0$. Similarly, increases in the value of DPR, ART and Size encourage investors in that particular firm and the expected sign of the coefficient of these variables will be positive, i.e., $\beta_3 > 0$, $\beta_5 > 0$, $\beta_6 > 0$. In turn, the effect of QR and DER on the firm's equity premium is expected to be negative. Thus the expected sign of the coefficient is negative, i.e., $\beta_2 < 0$, $\beta_4 < 0$.

3. Econometric Methodology

3.1 Data Collection and Research Methodology

This study selects 306 non-financial firms listed on the Pakistan Stock Exchange. This selection is made by keeping in view the liquidity of listed firms. The data have been collected from reliable sources of the PSX official website, business recorders, and economic surveys of Pakistan. The company fundamental variables, i.e., accounting data, are collected from the balance sheet analysis compiled by the State Bank of Pakistan. These are the most reliable sources of such financial information.

The following section discusses the methodology used for the estimation of the relation of the equity premium and its determinants. The study uses the assumption of continuous returns for the KSE100 index and the asset prices of each firm. The continuously compounded returns formula is expressed as follows:

$$Futurevalue \ = Presentvalue \times e^{in};$$
$$R_t = ln\left({}^{P_t}/_{P_{t-1}}\right), \tag{2}$$

where R_t is the compounded return, P_t is the price of asset at period "t", and P_{t-1} is the price of assets at the period "t - 1".

After calculating the returns of the KSE100 index and firm assets, we can calculate the equity premium by taking the difference of market return and risk-free interest rate following the Fama and French (2002) method:

$$ER_i = R_m - R_f, \tag{3}$$

where ER_i is the equity premium, R_m is the return of the market, and R_f is the risk-free rate of return.

3.2 Panel Data Econometrics

A panel, or longitudinal data, is a data set which comprises repeated measures of a given sample or same variable over time, such as individuals, firms, persons, cities, countries that are observed at numerous points in time such as days, months, quarterly or years before and after treatment (Xingle Long et al. 2017). In the literature it is known by various terms, such as pooled data, micro panel data, a combination of time series and cross-section data, longitudinal data and cohort analysis. Panel data sets are divided into micro and macro panel data and balanced and unbalanced panel data sets. Micro panel data sets are those for which the time dimension, T, is of less importance than the dimension of individual N, while for macro panel data the dimension of time T and the individual N are similarly important. A panel data set is called balanced if it has the same time intervals, $t = 1,..,T$, for each cross-section observation; for an unbalanced set the time T dimension is specific to each individual (Long et al. 2017).

The general model for panel data can be written as:

$$\begin{gathered} Y_{it} = \beta_0 + \beta_1 X_{it} + v_{it} + u_{it}, \\ t = 1,2,\dots,T \\ i = 1,2,\dots,N \end{gathered} \tag{4}$$

where Y_{it}, is the dependent variable (in our case we consider it as the firm-level equity premium), as usual β_0 is the intercept and independent from i and t, β_1 is the $K \times 1$ vector of the unknown parameter to be estimated, X_{it} is the $1 \times k$ vector of explanatory variable observations, and u_{it} is the disturbance or error term.

The basic type model that can be estimated using the panel technique can be written as the following function:

$$Y_{it} = f\,(X'_{it}\beta) + \delta_i + \gamma_t + \epsilon_{it}, \tag{5}$$

The most important case concerns the linear conditional mean specification so that we have the following functions:

$$Y_{it} = \alpha + X'_{it}\,\beta + \delta_i + \gamma_t + \varepsilon_{it}, \tag{6}$$

where Y_{it} is the dependent variable and X_{it} is a $k - vector$ of regressors, and ϵ_{it} are the random error terms for $i = 1, 2, 3, \ldots, M$ cross-sectional units observed for dated periods, i.e., $t = 1,2,3,\ldots,T$. The α parameter indicates the overall constant in the above stated model, while the δ_i and γ_t represent the cross-sections for each period-specific effects (random or fixed). Random effect and fixed effect are the two most used methods for the analysis of cross-sectional data sets. However, generally there are three basic estimation models of panel data.

3.2.1 The Fixed Effect Model

In fixed effect model, the intercept varies across individuals but the slope coefficients are constant over individuals as well as over time. It is written as follows:

$$Y_{it} = \beta_{0i} + \beta_1 x_{1it} + \beta_2 x_{2it} + e_{it}, \tag{7}$$

3.2.2 The Random Effect Model

The alternative method is to use random effect model. The following is the general equation of the random effect model:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + V_i + \varepsilon_{it}, \tag{8}$$

where v_i, is considered a component of the random error term. V_i is the part of the error which varies between groups but not within groups. E_{it} is the factor of the error which varies over group and time. We assume as follows:

The average of both errors is zero:

$$E(V_i) = E(\varepsilon_{it}) = 0.$$

The variance of both error can be defined as:

$$E(V_i^2) = \sigma_v^2,\ E(\varepsilon_{it}^2) = \sigma_\varepsilon^2.$$

Both are homoskedastic.

Both the error terms are independent from each other:

$$E\left(\varepsilon_{it} v_j\right) = 0\ \forall i, t, j.$$

There is no autocorrelation and no across-group correlation:

$$E\left(\varepsilon_{it}\varepsilon_{js}\right) = 0\ if t \neq s\ or\ i \neq j;$$
$$E\left(v_i v_j\right) = 0\ if\ i \neq j.$$

Both are independent:

$$E(v_i X_{it}) = E(\varepsilon_{it} X_{it}) = 0.$$

A decision to choose between the random effect model and the fixed effect model will be checked by using the Hausman test.

To estimate the model used in this study we applied the two-stage least-squares (2SLS) method. The estimation of the model is not appropriately undertaken by using the simple ordinary least-squares method, because the problem of possible endogeneity of the variables can cause the least-squares estimators to be biased and contradictory. Endogeneity is expected to occur mainly due to reverse causality between the independent variables (such as inflation and money supply); these likely same-nature variables are therefore likely to be correlated with the error term. To find reliable parameter estimates in panel data, we apply the two-stage least-squares estimation technique. This is based on the standard of variables used as instruments under the theoretical assumption that, although there may be correlation between explanatory variables and the error term, as we have cross-sectional data, we discussed the use panel data econometric technique to estimate our proposed research models. In the presence of instrumental variables, two standard approaches to endogeneity in panel data are the panel two-stage least squares (TSLS) (e.g., among others, Wooldridge 2005; Arellano 2016) and the panel limited information maximum likelihood (LIML) estimators. Hence, in order to avoid the endogeneity problem, we use the TSLS (instrumental variables) to estimate our panel data set.

3.3 The Hausman Test

The Hausman test is a standard method used in observation panel data analysis to distinguish between fixed effects and random effects models. Therefore an assessment test based on two sets of parameter estimates is called the Durbin-Wu-Hausman test, or DWH. For ease of description, we will refer to it as the Hausman test (Jerry A. Hausman 1978).

The general procedure can be described as follows. If we presume that we have two types of estimators for a certain factor θ of element $K \times 1$. One of them, $\hat{\theta}_r$, is robust, i.e., reliable under both the null and alternative hypothesis. One of the $\hat{\theta}_e$, is capable and reliable under the null hypothesis H_0, but inconsistent under the alternative H_1. The variations between both the estimators are then used as the basis for testing the analysis. The Hausman test indicates that, under appropriate assumptions, under H_0, the statistic h based on $(\hat{\theta}_R - \hat{\theta}_E)$ has a limiting Chi-squared distribution:

$$h = \left(\hat{\theta}_r - \hat{\theta}_e\right)[\widehat{Var}\left(\hat{\theta}_r - \hat{\theta}_e\right)]^{-1}\left(\hat{\theta}_r - \hat{\theta}_e\right) \sim x_K^2. \tag{9}$$

If this value lies in the upper tail of the chi-squared distribution we reject our null hypothesis H_0: if the variance matrix is consistently analysed and estimated, the test will have more power against any other alternative under which $\hat{\theta}_r$ is robust and $\hat{\theta}_e$ is not robust. Holly (1982) explored the power in the context of maximum likelihood of the estimators.

The Hausman procedure also shows that, again under certain appropriate assumptions:

$$Var(\hat{\theta}_r - \hat{\theta}_e) = Var(\hat{\theta}_r) - Var(\hat{\theta}_e). \tag{10}$$

It is well known that the assumptions used are sufficient but not necessary. Further, while it may be convenient to estimate:

$$Var(\hat{\theta}_r - \hat{\theta}_e) = Var(\hat{\theta}_r) - 2Cov(\hat{\theta}_r, \hat{\theta}_e) + Var(\hat{\theta}_e), \tag{11}$$

this may be more robust and the trade-off between its robustness and power should be considered appropriately. The Hausman specification test for error components provides guidance on whether $E = (X_{it}V_i) \neq 0$. The key idea is that, if:

$$E = (X_{it}V_i) \neq 0,$$

then the inconsistent random effect estimator and the consistent fixed effect estimator converge to different estimates. If $E = (X_{it}V_i) = 0$, then the unobserved heterogeneity is uncorrelated with X and does not create a base. Random effect and fixed effect are both consistent. However, then the Hausman test can draw us away from using random effects in the existence of an outsized bias, but there remains room for substantial efficiency gains in switching to random effect.

4. Results and Discussion

This section explains the effect of company fundamentals on the firm-level equity risk premium. Company fundamental variables include market premium, ROE, QR, DER, DPR, ATR and size of the company. Each of these variables has 4284 observations.

4.1 Summary Statistics

Table 1 presents the descriptive statistics for the company fundamental variables used in this study. The results of these summary statistics includes mean, minimum, maximum, standard deviation, skewness and kurtosis.

Table 1 Descriptive Statistics

Variables	Mean	Stand dev.	Minimum	Maximum	Skewnes	Kurtosis
Equity premium	.0451	.6056	-3.86	5.39	.173	3.693
Market premium	.1957	.3959	-1.01	.71	-1.863	3.473
Return on equity	.0069	5.1731	-324.64	28.93	-58.059	3.627
Quick ratio	.5141	2.9516	.00	184.00	56.335	3.489
Dividend payout ratio	2.9582	14.9081	.00	749.71	31.940	1.489
Debt to equity ratio	1.4811	41.8672	-23.38	342.00	-38.602	1.732
A/C turnover ratio	1.1876	1.1357	.00	21.06	7.037	3.557
Size	7.3540	1.7636	-.11	12.76	-.092	1.123

Source: Author's calculations.

These descriptive statistics show that the mean value of equity premium is 0.045, with a range of -3.86 to 5.39% with a standard deviation of 0.60. The mean of the market premium is 0.19, with a range of -1.01 to 0.71% with a standard deviation of 0.39. Return on equity (ROE) has the lowest mean of 0.007, ranging from as low as -324.64 to 28.93, with a high standard deviation value of 5.17. The rest of the variables can also be interpreted in the same way. Size of the firm is an important component and has the highest mean of 7.35, with a range of -0.11 to 12.76; this is followed by dividend payout ratio, which is also an important number in calculating the total return from an investment by investors, and is followed by the mean of debt to equity ratio, i.e., 1.48. The standard deviation of debt to equity ratio is the highest, at 41.86, followed by the standard deviation of dividend payout ratio, return on equity and quick ratio.

Table 2 presents the results of the correlation matrix of the company fundamental variables. Values of correlation coefficients indicate that the market premium has a positive but insignificant correlation with ROE, debt to equity ratio and accounts receivable turnover in days. However, it has a positive and significant relationship with QR. The market premium has significant negative correlation with size, and negative but insignificant correlation with DPR. ROE is positively but insignificantly related with QR and dividend payout ratio; however, its positive and significant correlation is recorded with ATR. ROE shows a negative relationship with DER and SIZE but no negative significant correlation of ROE is recorded with other factors. The QR shows an insignificant positive correlation with DER, a negative insignificant relation with DPR and a negative but significant correlation with SIZE. DPR shows a positive and significant correlation with ATR and SIZE and a negative and insignificant correlation with DER. The factor DER has a positive relation with ATR and a negative relation with SIZE, but both values are statistically insignificant. In addition, ATR shows a negative and significant correlation with SIZE.

Table 2 Correlation Matrix of Company Fundamentals

Variables	MP	ROE	QR	DPR	DER	A/R TR	SIZE
MP				1			
ROE	.003	1					
	.868						
QR	.08**	.001	1				
	.000	.958					
DPR	-.013	.018	-.001	1			
	.404	.237	.973				
DER	.010	-.022	.001	-.001	1		
	.501	.142	.935	.950			
A/R TR	.014	.032*	-.018	.106**	.013	1	
	.370	.037	.240	.000	.411		
SIZE	-.09**	-.024	-.040**	.136**	-.023	-.039*	1
	.000	.117	.009	.000	.131	.011	

Source: Author's calculations.

We applied the Kolmogorov-Smirnov test and the results demonstrate that the *p*-value is greater than 0.05, which suggests that the equity premium is normal.

Table 3 Normality Test of Dependent Variable (Equity Premium)

	Kolmogorov-Smirnov		
H_0: **Equity premium is normal**	statistic	*p*-value	Decision
	0.659	0.076	Retain null hypothesis

Source: Author's calculations.

To examine the structure break in the equity premium data, we have divided the data into two periods: before and after the 2008 global financial crisis. Period 1 consists of data from January 2001 to July 2008; period 2 consists of data from August 2008 to December 2015. Period 2 contains the crisis period, followed by the normal bullish market trend. A paired *t*-test is applied to check the differences of equity premium before and after the 2008 financial crisis. Table 4 presents the paired *t*-test results.

Table 4 Paired Sample t-test

Variable	**Paired samples statistics**			**Paired correlations**	
Equity premium	Mean	S.D	S.E mean	Statistic	Sig
Pair -1	0.0468	0.60087	0.01298	0.249	0.000
Pair -2	0.0434	0.61049	0.01319		

Paired differences

	Mean	S.D	S.E mean	95% C.I Lower	95% C.I Upper	T	Df	Sig
Pair 1-2	**0.003**	0.742	0.0160	-0.028	0.035	0.208	2141	0.836

Source: Author's calculations.

The results show that two pairs of equity premium are weakly and positively correlated ($r = 0.243$, $p = 0.00$), since the *p*-value of *t*-statistics is insignificant (0.836), which implies that null hypothesis is accepted, i.e., there is no significant difference in returns before and after the global financial crisis.

Table 5 shows the results of the Augmented Dickey-Fuller (ADF test), which shows that our data series is not stationary at level but is stationary at first differences. Thus, the series is integrated to the order of one I (1).

Table 5 Unit Root Test

	ADF-level	**ADF-1st diff.**	**PP-level**	**PP-1st diff.**
Market premium	**-1.1053**	**-8.4316**	**-0.4218**	**-8.3612**
Return on equity	-0.4946	-10.3120	-0.4210	-10.4592
Quick ratio	-1.8738	-3.2252	-1.6110	-7.1577
Dividend payout ratio	-2.3059	-5.9441	-2.3220	-5.8909
Debt to equity ratio	-1.5979	-9.9624	-1.6390	-9.9577
A/R turnover (days)	-3.4925	-3.4931	-3.4930	-5.4032
Size	-2.8887	-2.8789	-2.8890	-4.6755

Source: Author's calculations.

The ADF test requires that the error terms be statistically independent and data homoskedastic. However, in certain cases these assumptions may not be true for some data, and so the researcher uses another important technique, the Phillips-Perron test, to test the stationarity of the time series. Table-3 also reflects the results of the Phillips-Perron test, which confirms the results of the ADF test. Thus, we can conclude that the series is I(1).

4.2 Estimation and Interpretation of Results

We can estimate our model by the fixed effect or random effect technique – in panel data econometrics, the most extensively used techniques. In order to select between them, we used the Hausman test, the most widely used technique for that selection. We estimate the following model by using the panel data for our sample variables for the period of January 2001 to December 2015:

$$Y_{it} = f(X_{it}, \beta) + \theta_i + \gamma_t + v_{it}. \tag{12}$$

The model can be expressed in more compact form as follows:

$$Y_{it} = X_{it}\beta + \theta_i + \gamma_t + v_{it}. \tag{13}$$

The independent variables X_{it} are the company fundamentals. The others are as described earlier.

Table 6 presents the Hausman test results. The statistically insignificant value of the Hausman test indicates that the random effect is better than the fixed effect model.

Table 6 Correlated Random Effects - Hausman Test

Test cross-section random effects			
Test summary	Chi-sq. statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.89	7	0.67

Source: Author's calculations.

We use the TSLS (instrumental variables) to estimate our panel data set. a widely used technique for avoiding the problem of endogeneity (Wooldridge 2005; Arellano 2016; Huaping Sun et al. 2019). The estimated results from the model are reported in Table 7. The results show that the market premium has a positive and statistically significant impact on the firm-level equity risk premium. The value of the coefficient implies that a 1% increase in the market premium will increase the firm-level equity premium by 0.55%. The coefficient of the ROE is statistically significant and positive, which indicates that, when the ROE increases by 1%, the firm-level equity premium will increase by 0.003%. The findings are consistent with previous studies. The ROE shows the growth potential of firms and predicts an accurate firm performance. The coefficient of the QR is positive, which implies that quick ratio has a positive impact on equity premium. However, the coefficient of QR is statistically insignificant. The coefficient of the DPR is positive and statistically significant. This indicates that a 1% increase in DPR will increase the firm-level equity premium by 0.001%. The statistically significant coefficient of the ATR indicates that a 1%

increase in ATR will increase the firm-level equity premium by more than 0.02%. These results are consistent with previous studies (Rolf W. Banz 1981; Fama and French 2002; Damodaran 2016). Size also has a statistically significant and positive relationship with ERP. However, economically speaking, the magnitude of the coefficient is low, which implies that the firm-level equity premium is not very dependent upon the size of the firm.

Table 7 Estimated Results of Equity Premium

Variable	Coefficient
Constant	-0.165
Market premium	0.551 (24.656)*
Return on equity	0.003 (1.814)**
Quick ratio	0.003 (0.932)
Dividend payout ratio	0.001 (1.952)*
Debt to equity ratio	-0.000 (-1.190)
Accounts receivable turnover	0.027 (3.402)*
Size	0.009** (1.800)**
R-squared	0.194
Adjr-squared	0.193
S.E. of regression	0.564
F-statistic	94.768
Prob(F-statistic)	0.000
Durbin-Watson stat	2.152
Prob(J-statistic)	0.3367

Notes: *(**)(***) indicates that the variable is significant at the 1% , 5%, and 10% levels of significance.

Source: Author's calculations.

The value of the coefficient of determination (R^2) shows that a more than 19% deviation in the model is explained by the explanatory variables. Similarly, the value of adjusted-R^2 implies that the 19% variation in firm-level equity premium is explained by the model. The value of *F*-statistics is statistically highly significant, which implies that there is no problem in analyzing the data by way of the proposed model and technique. The DW statistics value is close to the benchmark value of 2, which confirms that there is no problem of autocorrelation in the data. The instrument rank value used in this model is 322. The validity of the instrument rank was check by *J*-statistics. The statistically insignificant value of *J*-statistics indicates that the instruments are valid.

Table 8 shows the sensitivity analysis of the model. We ran the same model for different combinations of variables one by one. The results are given in columns. This shows that the signs and the significance of these variables remain the same.

Table 8 Estimated Results of Equity Premium: Robustness Analysis

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.165	-0.151	-0.15	-0.167	-0.173	-0.178
Market premium	0.551 (24.656)*	0.352 (7.123)*	0.331 (9.324)*	0.401 (12.198)*	0.468 (16.876)*	0.501 (20.159)*
Return on equity	0.003 (1.814)**	0.002 (1.711)	0.002 (1.804)**	0.002 (1.81)**	0.003 (1.811)**	0.003 (1.814)**
Quick ratio	0.003 -0.932		0.001 -0.811	0.001 -0.882	0.002 -0.901	0.003 -0.913
Dividend payout ratio	0.001 (1.952)*			0.001 (1.943)*	0.001 (1.949)*	0.001 (1.951)*
Debt to equity ratio	0.00 (-1.190)				0.000 (-1.190)	0.000 (-1.284)
A/R turnover (days)	0.027 (3.402)*					0.025 (2.398)*
Size	0.009** (1.800)**					
R-squared	0.194	0.112	0.134	0.14	0.165	0.179
Adj-squared	0.193	0.123	0.139	0.148	0.166	0.181
S.E. of regression	0.564	0.432	0.459	0.484	0.501	0.588
F-statistic	94.768	88.132	88.977	90.373	92.118	93.631
Prob (F-statistic)	0	0	0	0	0	0
Durbin-Watson stat	2.152	2.322	2.341	2.202	2.2	2.152
Prob(J-statistic)	0.3367	0.2143	0.2211	0.2695	0.2733	0.3058

Notes: *(**)(***) indicates that variable is significant at 1%, 5%, and 10% levels of significance.

Source: Author's calculations.

For the single variable model presented in Column 2, the value of the coefficient of determination (R^2) is only 11%. As the number of variables increases, the value of the R^2 also increases. Other values that show the fitness of model and data remain intact as the benchmark of these values. The instrument rank value used in these models is 322. The statistically insignificant value of each of the *J*-statistics indicates that the instruments are valid to control the problem of endogeneity.

5. Conclusion and Recommendation

Knowledge about the equity premium is an important statistic for the efficient allocation of funds in various securities and valuation of capital resources. The equity premium can be used for evaluating the cost of equity as well as the expected return from an investment. The equity premium has been analysed extensively in developed and in emerging equity markets. However, a very limited literature is available for developing counties such as Pakistan.

This paper quantifies the impact of company fundamentals on the firm-level equity premium in an emerging market, Pakistan, using a panel data technique for 306 non-financial firms listed on the Pakistan Stock Exchange for the period January 2001 to December 2015. The company fundamental factors included profitability, liquidity, dividends, solvency, efficiency and size. Based on the literature, we selected proxies for measuring company fundamentals of return on equity, quick ratio, dividend payout ratio, debt to equity ratio, account receivable turnover ratio and size, as company fundamental variables as determinants of the equity premium. The company fundamentals are the controllable factors for companies and can be revisited by companies if they affect company returns.

The CAPM is not valid for the valuation of securities in the PSX. Therefore, in this study, we develop an extended version of Fama and French's (2002) model, which contains seven company fundamentals, in order to test the effects on the equity premium. First, we checked the normality of the dependent variable using the Kolmogorov-Smirnov test; the results reveal that the data are normal. The results of the paired *t*-test indicate that there is no significance difference in the pre- and post-2008 global financial crisis periods. The estimated results of the equity premium and the fundamental variables show that five out of seven company fundamentals significantly affect the equity premium. These variables are the market premium, return on equity (ROE), the dividend pay-out ratio (DPR), the accounts turnover ratio (ATR), and the size of the firm. Of these five variables, the market premium, the dividend payout ratio and the accounts receivable turnover have a positive, significant effect on the firm-level equity premium at a 5% level of significance. However, ROE and size have positive and statistically significant effect on the firm-level equity premium at a 10% level of significance. This implies that an increase in the market index, high dividend payment and good cash inflows increase the market value of individual stocks, which generates a high premium. The results also reveal that the quick ratio (QR) has a positive and debt to equity (DER) ratio a negative, but statistically insignificant, effect on the firm-level equity premium.

The paper has some important implications for policy makers. The firm's managers can manage these company fundamentals in the best interests of the company in order to maximize shareholder wealth. But fund managers need to observe company fundamentals before making any investment decision as to an individual firm's stocks. It is also evident for policy makers that an increase in the interest rate leads to a decrease in the equity premium. Therefore policy makers need to control interest rates in order to encourage stock market investment domestically and internationally.

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