

The Equity Risk Premium Puzzle in Pakistan

Ali Sajid¹

Karachi Institute of Economics and Technology, Pakistan

Mohammad Arsalan

Faculty of Business and Law, University of Newcastle, Australia

Muhammad Tahir Khan

Department of Economics & Business Administration, University of Education, Lahore, Pakistan

Muhammad Sufyan Ramish

Institute of Business Management, Karachi, Pakistan

Abstract

Our study uses the consumption-based asset-pricing power utility model to test the Equity Risk Premium (ERP) puzzle in Pakistan. The study has collected monthly stock price data from July 1997 to December 2017 from the PSX data portal. We extracted information about macroeconomic factors such as inflation and risk-free interest rate from the State Bank of Pakistan. Moreover, the study used private consumption and population data from the Pakistan Bureau of Statistics. The results suggest that the ERP puzzle has a strong occurrence in Pakistan, a phenomenon previously associated with only developed markets. One disadvantage of the present investigation is the small sample size. A longer time duration could have reduced short-term biases. Past researchers have suggested different approaches for solving the equity premium puzzle. For instance, some studies used improvised structural models to justify the equity risk premium puzzle using macroeconomic factors.

Keywords: *Equity risk premium, inflation, risk-free interest rate, abnormal stock returns.*

Introduction

The Capital Asset Pricing Model (CAPM) gives insight into the trade-off between risk and return. The theory assumes that a higher systematic risk gives investors a higher return (Hollstein, Prokopczuk, & Wese-Simen, 2020). Mehra & Prescott (1985) examined the stock returns trend for 110 years in the US equity market. The study found that the average annual return in the US equity market over 110 years was 8.06%, while the average annual returns, over a similar period, on short-term risk-free debt securities,

¹Corresponding Author: Ali Sajid; Email: ali.sajid@kiet.edu.pk

was just 1.14%. The study also found a discrepancy of 6.92% between equity returns and risk-free debt returns, which it called the equity premium. Mehra & Prescott (1985) developed an ERP puzzle to explain the disparity of returns between shares and short-term debts. Mehra & Prescott (1985) indicate that the return on shares is significantly higher as equity instruments are riskier than short-term debts.

Risk aversion is also a factor that explains the disparity between equity market returns and risk-free debt returns (Conine, McDonald & Tamarkin, 2017). Risk aversion postulates that investors tend to avoid risk. Therefore, they invest where both returns and risk are low (Camba-Méndez & Mongelli, 2021). Risk-averse investors avoid ventures with high returns and high risk (O'Donoghue & Somerville, 2018). However, if the magnitude of equity return is very high, the investor may disregard the risk aversion tendency and invest in riskier ventures (Robiyanto, 2017; Yoon, 2017).

After Mehra & Prescott (1985) paper on the ERP puzzle, many researchers presented their opinions on how to solve the ERP puzzle, including myopic loss aversion (Thaler & Benartzi, 1995), habit formation of investors (Campbell & Cochrane, 1999; Campbell, 1999) market segmentation theory (Mankiw & Zeldes, 1991), survival bias (Brown & Goetzmann, 1995), and disappointment aversion (Ang, Bekaert & Liu, 2005). Although there is substantial literature on the equity premium puzzle, only a few papers have examined it in emerging economies, but not in Pakistan (Shirvani, Stoyanov, Fabozzi & Rachev, 2020; Kim, 2021; DaSilva, Farka & Giannikos, 2019). Individual investors in emerging markets do not have the same expertise as developed economies (Claus & Thomas, 2001; Bonizzi, 2017). Additionally, stock markets are less developed or non-existent in several emerging economies (Fernald & Rogers, 2002). Many investors in emerging markets do not consider equity instruments a sensible investment but a type of gambling (Haroon & Rizvi, 2020; Indārs, Savin & Lublóy, 2019). One of the main reasons for this is that most investors in emerging stock markets make investment decisions on speculation rather than fundamentals (Hadhri & Ftiti, 2019; He, He & Wen, 2019). Thus, our research uses macroeconomic variables to investigate the ERP puzzle in the Pakistan Stock Exchange.

Pakistan Stock Market

The Pakistan stock market faces extreme volatility due to political instability and unfavorable macroeconomic performance (Arby, 2004). The Karachi Stock Exchange (now called the Pakistan Stock Exchange – PSX) was established on September 18, 1948. It is now considered an emerging stock market of the world (Ayub, 2002). Despite having two other stock markets in Lahore and Islamabad, which started in 1970 and 1992, KSE remained the center of financial activity until 2016. In 2016 all the three markets were

integrated via Stock Exchanges Corporatization, Demutualization, and Integration Act (2012) to form PSX (Honey, Tashfeen, Farid & Sadiq, 2019). With the liberalization of the financial sector during the 1990s, foreign investors were allowed to make portfolio investments in PSX, which significantly increased market capitalization and performance. PSX has been ranked third in the emerging equity market of the world ranking. The SECP during the 2000s introduced and implemented various regulations and policies that gave stability to the market and increased investor confidence. However, due to political uncertainty, the PSX in 2017 suffered adversely, and the benchmark KSE-100 index dropped 1900 points. (Honey, Tashfeen, Farid & Sadiq, 2019). PSX, since its inception, has transformed itself into a dynamic and highly volatile market.

Consumption-Based Asset-Pricing Power Utility Model

Our study uses the consumption-based asset-pricing power utility model to test the ERP puzzle in the Pakistani stock market. The model postulates that assets with high return-consumption covariance tend to deliver low return when consumption is low, i.e., when the marginal utility of consumption is high and vice versa (Liang, Yang, Zhang & Cai, 2017). Such assets are considered risky, and investors require a large risk premium to invest or hold such assets.

Every market in the world is affected by economic cycles (Mian & Sufi, 2018). These economic cycles affect the return structure of various assets and affect investors' attitudes towards these assets (Bräuning & Ivashina, 2020). In a recession, consumption is low, and investors expect a high return on their investment (Ballard-Rosa, Mosley & Wellhausen, 2021). Thus, assets that offer low returns in a recession are not attractive for investors (Menounos, Alexiou & Vogiazas, 2019). On the other hand, an asset performing poorly in a booming period is considered good as consumption is high and investor feels wealthy (James, Abu-Mostafa & Qiao, 2019). Thus, to invest in or hold previously mentioned assets, an investor requires a large risk premium to compensate for the assets' poor performance in recessionary periods (Caballero, Farhi & Gourinchas, 2017). According to the consumption-based asset-pricing power utility model, the equity risk premium is determined by the covariance of consumption growth with stock and debt returns and relative risk aversion coefficient (Caballer, Farhi & Gourinchas, 2017). A risk-averse investor prefers investing in bonds over stocks (Adrian, Crump & Vogt, 2019). However, if the return on stocks exceeds the bonds return substantially, it makes no sense for an investor to opt for low-return securities over highly rewarding bonds unless the risk aversion coefficient is very high (Umar, Shehzad & Samitas, 2019).

Scope of Research

Based on the equities listed on the PSX, this research paper aims to evaluate the

following for the period 1997-2017:

1. Real-returns to risk ratio comparison of stock and debt – to assess the equity premium in Pakistan Capital Markets.
2. Optimal holding horizons of equities in terms of risk-adjusted real returns (RARR), i.e. the investment horizon where the RARR peaks?
3. Coefficient of risk aversion that justifies the equity risk premium in Pakistan, i.e. to characterize investor behavior in Pakistan?

Literature Review

Mehra and Prescott (1985) first examined the ERP puzzle in US equity markets. They inferred that in the US stock market from 1889 to 1978, the real annual yield was seven percent while the normal yield on short-term debt was less than one percent. They also noted that a standard rational model could not explain the equity risk premium. From that point onward, justification of the ERP puzzle has been a cause of concern in the academic literature (Morawakage, Nimal & Kuruppuarachchi, 2019; Yao, Qin, Hu, Dong, Vega & Sosa, 2019).

ERP Puzzle and Traditional Economic Aspects

Constantinides (1990) suggests that habit persistence is crucial for solving the ERP puzzle. He demonstrated that the rational expectations model could help in solving the ERP puzzle under certain conditions. Constantinides (1990) also found that relaxed time sub-distinctiveness and consumption are highly correlated. He named it habit persistence. Based on the empirical results, Constantinides (1990) also found that investors expect a higher premium due to risk-aversion factors. Investors are sensitive to short-term consumption decisions. Therefore, they require a higher premium on their investments to accommodate the given level of risk aversion due to the positive subsistence rate of utilization and non-reparability of consumption (Haasnoot, van-Aalst, Rozenberg, Dominique, Matthews, Bouwer & Poff, 2019).

Campbell & Cochrane (1999) extended the work of Constantinides (1990) and developed the "Habit Formation Model." According to the model, utility capacity with both utilization development and a reasonable moving outside propensity is "independently and indistinguishably dispersed." Mankiw & Zeldes (1991) analyzed 17 years of data for one-fourth of US families to investigate consumption patterns amongst investors and non-investors. They found that the total consumption of investors significantly varies from non-investors. They concluded that the non-equity consumption of investors is not associated with excess returns. Investor's consumption

is random and associated with surplus returns. The difference between investors' and non-investors consumption patterns helped in explaining the equity risk premium. However, Brown, Goetzmann & Ross (1995) evaluated accessible information for survival bias. They concluded that historical data does not take into account discontinued stocks. Thus, due to survivorship bias, only high-performing stocks were considered. However, the impact of survival bias was inadequate to explain the equity premium puzzle.

ERP Puzzle and Behavioral Aspects

Thaler & Benartzi (1995) attempted to justify the ERP puzzle through myopic loss aversion. Myopic loss aversion combines loss aversion with regular assessments (Alessandri, Mammen & Eddleston, 2018; Kahneman & Tversky, 1979). Myopic loss aversion suggests that investors are highly sensitive to losses than gains; therefore, they demand higher premiums to compensate for high return volatility (Ebrahimi-Sarv-Olia, Salimi & Ghouchifard, 2020). To a great extent, investors' decision-making is affected by how regularly they check the performance of stocks (Guillemette, Blanchett & Finke, 2019). Thus, extant literature suggests that investors, who make frequent assessments, favor less risky investment options (Durand, Fung & Limkriangkrai, 2019; Atsala, 2017). Investors avoid making short-term losses at the expense of long-term gains. Odean (1998) and Chrisman & Patel (2012) referred to this phenomenon as myopic loss aversion. They concluded that investors are myopic loss averse. Thaler & Benartzi (1995) also examined the investment pattern of individual and institutional investors. They found that institutional investors are more myopic loss averse than individual investors.

Ang, Bekaert & Liu (2005) used Gul's (1991) work on the disappointment aversion framework and concluded that investors want to fulfill their desires. Therefore, investors do not invest in stocks despite having a considerable premium. Also, investors tend to switch to other investment opportunities that provide a higher possibility of satisfying their expectations and lower expected return in absolute terms (Lien & Wang, 2002; Gul, 1991). Olsen & Troughton (2000) found that investors and decision-makers are ambiguity averse. Therefore, they expect market returns should reflect both ambiguity and risk premium. The capital asset pricing model tends to underestimate required returns because it does not contain any provision for ambiguity (Hollstein, Prokopczuk & Wese-Simen, 2020; Phuoc, 2018). Moreover, assets whose return potentials are ambiguous and difficult to quantify fall in the understatement category (Kuehn, Simutin & Wang, 2017).

The presence of pricing ambiguity relates to two other risk-related phenomena. First, most firms give a heavy discount in their initial public offerings (IPOs). Second,

Poterba & Summers (1995) and Miller & Scholes (1978) noted that the returns on large, non-routine, capital-budgeting expenditures are high relative to capital costs based on existing financial models. They suggested that the excess required return may result from managers not evaluating projects in a portfolio context. Another possibility, however, is that the excess required return is a result of ambiguity associated with forecasting the future of large, non-routine capital projects.

Muscarella & Vetsuydens (1989) and Clarkson & Merkley (1994) also found that ex ante uncertainty is positively related to the size of IPO discounts. Thus, a high degree of ambiguity and future performance of the new stocks are associated with a large discount. Olsen & Troughton (2000) justified the ERP puzzle using ambiguity aversion. They concluded that investors prefer investments in a high return uncertain stock market due to the unclear return structure of equity investment.

Empirical Research

Campbell (1999) explored the equity premium puzzle in 11 developed countries and concluded that the average real return on equity is around 5%, whereas short-term debt investments have only reported an average return of over 3%. The paper demonstrated that the relationship between equity returns and real consumption rate is variable in various nations. The ERP puzzle is a strong aspect of these economies because of a substantially higher risk aversion coefficient. Hibbard (2000) inspected the presence of ERP puzzles using consumption data and quarterly monetary security returns in New Zealand. The research demonstrated that high equity premium in New Zealand could not be justified using the Consumption-Based Asset Pricing Model, which indicates that the ERP puzzle existed in New Zealand from 1965 to 1997.

Cysne (2006) utilized quarterly data from 1992 to 2004 of Brazil to assess the existence of the ERP puzzle. Differing from the actual results of Mehra & Prescott (1985), the paper demonstrated that the equity premium puzzle existed in Brazil during the study period. The research formally established the presence of the ERP puzzle phenomenon in developing countries. The coefficient of risk aversion was calculated to be 561.75, which lay outside the normally acceptable range, inferring the presence of the ERP puzzle in Brazil. In light of the GMM method and Hansen-Jagannathan limits, Park & Kim (2009) demonstrated that a moderate level equity premium exists in South Korea, reposing the unpredictability of consumption and asset returns. A survey was conducted by on a large group of Polish investors in the Warsaw stock exchange (Łukowski, Gemra, Maruszewsk & Śliwiński, 2020). The results suggest that investors are biased in investment decisions and affect the market, creating an equity premium puzzle. Further, Nyberg & Vaihekoski (2014), using annual data from 1913 to 2009 for

Finland and Sweden, found the ERP to be 10.14% and 6.01%, respectively. A rational economic paradigm could not explain such a high equity premium. The results were partly driven by government controlled interest rates, which were kept intentionally low, which allowed artificially low returns on short-term debt securities, Using data from 17 countries between 1900 and 2005, Dimson, Marsh & Staunton (2008) found that the US equity risk premium was higher than the average of other 16 countries. They concluded that investors expect a minimum of 4.5% to 5% equity premium on the world equity index, which is still higher under rational economic models.

Choi, Lee & Pae (2012) conducted a study on the Korean stock exchange for the years 2000 to 2007 and found compelling evidence of a significantly higher equity risk premium of 15.1%. The study also found that due to the prevailing financial crises, the premium decreased in subsequent years. Huang, Zhou & Zhang (2019) employed three approaches, i.e., the dividend growth model, average realized equity premium, and consumption growth model, to test the equity premium puzzle in the Chinese stock exchange. They concluded that the dividend growth model provided a higher estimate of the equity risk premium. The average realized equity premium and consumption growth model failed to explain the high volatility in realized equity premium.

Bessler (1999) found consistent evidence of the equity premium puzzle in Germany from 1870 - 1992. It was concluded that average returns on equity are considerably higher than average bond returns over long investment periods, consistent with the findings in other industrially developed economies. The research also leads to the conclusion that despite higher returns, investment in equity markets is low. A decline in equity risk premium in the South African equity market was reported using data ranging from 1900 to 2004 (Digby, Firer & Gilbert, 2006). Using the dividend and earnings growth model, it concluded that expected equity returns in South Africa had been lower than in the past, indicating a fall in equity risk premium.

However, Alpalhao & Alves (2005), employing Godfrey–Espinosa approach, studied the Portuguese stock market from 1993 to 2001 and found no evidence of extraordinarily high-risk premiums. It observed that the Portuguese market has settled for a very low-risk premium compared to other European counterparts. The phenomenon attributes to a recent merger with Euronext, which may have caused a structural break in the data series. However, it was anticipated that Portuguese market premiums could overtake other European markets shortly due to high market volatility. Morawakage, Nimal & Kuruppuarachchi (2019) reported similar results for the Indonesian market where investors were not compensated for conditional volatility of excess returns. In the same study, however, it was observed that investors in Sri Lanka are rewarded for risks due to

prevailing negative returns shock.

From the above discussion, it can be concluded that the ERP puzzle is not tested frequently in Asian and developing markets. Many attempts have been made to explain the phenomenon using the behavioral economics model, but the ERP puzzle is still considered a widely unexplored and unsolved puzzle in finance.

Data

The study used stock price data from July 1997 to December 2017 collected from the PSX data portal. Further, the data for inflation and risk-free interest rate was extracted from the State Bank of Pakistan website. We also collected private consumption and population data from the Pakistan Bureau of Statistics. Due to the restricted accessibility of data, the dividend yield was not utilized to compute gross return for the PSX. Thus, gross return for each period was computed as follows.

$$R_t = \ln \frac{P_t}{P_{t-1}}$$

Where R_t is the return on the benchmark index at time t.

Real consumption per capita is calculated by converting private consumption into millions, divided by inflation (CPI) and total population. Log difference in current and one-period lagged consumption per capita is used to calculate real consumption growth. The nominal data is converted to real terms by utilizing the Consumer Price Index.

Methodology

By utilizing the work of Campbell (1999), we used the consumption-based asset pricing power utility model to test the ERP puzzle in Pakistan. The model is as follows:

$$(r_{i+1} - r_{f,i+1}) + \frac{\sigma_i^2}{2} = \gamma \sigma_{ic}$$

Where,

r_i = Gross return on asset i

r_f = Risk free return on asset

σ_i^2 = Unconditional variance of log consumption [$Var(C_{t+1} - E_t C_{t+1})$]

γ = Coefficient of risk aversion

σ_{ic} = Unconditional covariance of innovations [$Cov(r_{i,t+1} - E_t r_{i,t+1}, C_{t+1} - E_t C_{t+1})$]

An asset is considered risky and requires a large risk premium when the marginal utility of consumption is high. In other words, assets with high consumption covariance

register lower returns when consumption is low. We utilize the above equation to check the presence of the ERP puzzle in Pakistan. According to the equation, the covariance of consumption growth and the coefficient of relative risk aversion with debt and equity returns will determine the equity risk premium in Pakistan. In general, if the coefficient of risk aversion is higher than 10, as prescribed by Mehra and Prescott (1985), it will indicate the ERP puzzle in Pakistan.

Results and Discussions

Descriptive Statistics and Analysis

Table 1 shows the results related to the descriptive statistics.

Table 1: Stock & T-bill Returns from 1997-2017

Country	Sample Period	r_e	$\sigma(r_e)$	r_f	$\sigma(r_f)$
Pakistan	1997-2017	21.10%	40.71	9.1`8	3.52

Table 2: Stock and T-bill Returns over Five Year Periods

Country	Sample Period	r_e	$\sigma(r_e)$	r_f	$\sigma(r_f)$
Pakistan	1997-2002	13.18%	41.08%	10.34%	3.37%
Pakistan	2003-2007	44.73%	24.82%	5.81%	3.14%
Pakistan	2008-2012	8.77%	28.05%	12.11%	1.28%
Pakistan	2013-2017	22.61%	18.41%	7.66%	1.70%

The above tables show the annualized mean returns and standard deviation of stocks and T-bills. The study has annualized monthly returns from the formula $[(1 + R)^{12} - 1] \times 100$. We have also computed the annualized standard deviation by taking the square root of the annualized variance. Table 1 shows that the return on stocks is 21.10%, and the return on T-Bills is 9.18% during the sample period of 1997 – 2017. The results also suggest that the standard deviation of return on stocks is more volatile than T-bills. However, the annualized standard deviation of stock returns with monthly data is less volatile than yearly data. The return on short-term debt is stable except for the period 2003-2004.

Table 2 shows that the stock returns during the five-year periods of 1997 – 2002 and 2008 – 2012 are considerably lower than the other two periods. The stock exchange's downfall in 1998 and the global financial crisis have contributed to this trend. These unprecedented events have lowered stock returns and increased the risk-free rate. The periods of 2003 – 2007 and 2013 – 2017 generate 44.73% and 22.61% stock returns. The

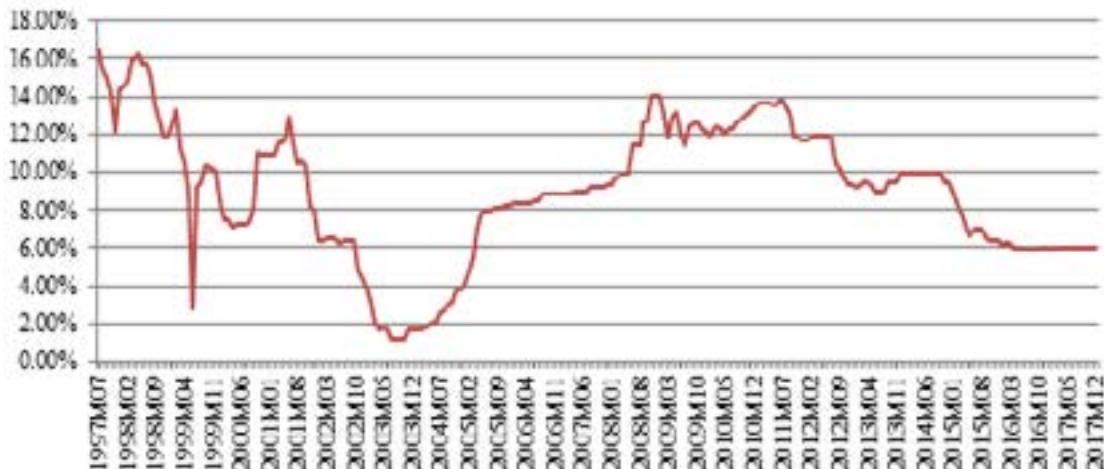
results indicate that the Pakistan stock exchange recovered from the crisis and provided efficient returns. However, the Pakistan stock exchange remained highly volatile but grew between 2014 and 2017 to an all-time high of 52,000 points.

The Pakistan stock market bubble burst in the mid of 2017, which caused the benchmark index to fall by almost 10,000 points. Figure 1 depicts the stock returns and benchmark index trend over the period 1997-2017. The figure also indicates volatility in stock returns during this period. Furthermore, Figure 2 depicts the T-Bills rates during the sample period.

Figure 1: Stock Returns and Benchmark Index Returns in Pakistan from 1997-2017



Figure 2: T-Bill Rates in Pakistan from 1997-2017



Tables 3 and 4 depict the excess returns and consumption growth in Pakistan during the period 1997-2017. Table 3 suggests that Pakistan experienced a positive excess return of 11.91%, which is exceptional considering that the international benchmark was 6%. We also found that the standard deviation of excess returns was highly volatile. The standard deviation of excess returns is highly volatile due to stock returns volatility over the period. The consumption growth was 4.19%, with a standard deviation of 5.86%, suggesting stability in the consumption pattern.

Table 3: Excess Returns and Consumption Growth

Country	Sample Period	er_e	$\sigma(er_e)$	ΔC	$\sigma(\Delta C)$
Pakistan	1997-2017	11.91%	42.37%	4.19%	5.86%

Table 4: Excess Returns and Consumption Growth over Five Year Periods

Country	Sample Period	er_e	$\sigma(er_e)$	ΔC	$\sigma(\Delta C)$
Pakistan	1997-2002	2.85%	48.46%	8.68%	8.33%
Pakistan	2003-2007	38.91%	36.86%	5.33%	6.46%
Pakistan	2008-2012	-3.33%	43.69%	4.70%	4.55%
Pakistan	2013-2017	14.95%	26.61%	2.08%	1.96%

Table 4 suggests that excess return on stocks and T-bills during five-year periods. However, we found a negative excess return during 2008-2012 due to the global financial crisis as stocks did not perform well. However, the risk-free rate was high at that time, providing attractive returns. Further, the consumption growth over the period was not correlated with excess returns. However, the low standard deviation of real consumption growth explains the stable consumption pattern in Pakistan.

Table 5 depicts the results of the equity premium puzzle in Pakistan using the equation:

$$(r_{t+1} - r_{f,t+1}) + \frac{\sigma_i^2}{2} = \gamma \sigma_{ic}$$

Table 5, $a(er_e)$ denotes the normal excess equity return in addition to half of the variance of the excess stock return, $\sigma(er_e)$ represents the annualized standard deviation of excess return. $\sigma(\Delta c)$ represents the annualized standard deviation of real consumption, $\sigma(m)$ is the sample estimate of the lower bound on the standard deviation of the log stochastic discount factor. The correlation between real consumption development and real excess equity returns is presented in the fifth column, while the covariance is represented in the sixth. Further, RRA(1) denotes the risk aversion coefficient.

Table 5: Equity Premium Puzzle

Country	Sample Period	$a(er_e)$	$\sigma(er_e)$	$\sigma(\Delta C)$	$\sigma(m)$	$\rho(er_e, \Delta C)$	$Cov(er_e, \Delta C)$	RRA(1)	RRA(2)
Pakistan	1997-2017	-20.8%	42.37%	5.86%	49.30%	-.1077	-.0026	-78.00	12.26

RRA(2) is equivalent to $a(er_e)$ divided by $\sigma(er_e)$ and $\sigma(\Delta c)$, making the correlation between real consumption growth and excess equity return equals to one. In a standard economic model, excess equity return and real consumption are positively correlated. We utilize RRA(2) to trace the presence of the ERP puzzle in Pakistan, which originated from the correlation between real consumption growth and excess equity returns.

From Table 5, we observe the presence of the ERP puzzle in Pakistan. The coefficient of risk aversion is higher than 10, a benchmark set by Mehra & Prescott (1985). The risk aversion coefficient is negative because the covariance of consumption growth with equity return is negative. However, in this case, the covariance is near zero. Nevertheless, disregarding the low correlation between equity returns and consumption growth, RRA(2) still has a risk aversion coefficient of more than 10.

The risk aversion coefficient in Table 5 is a point estimate and is prone to sampling error. For these assessments, the study has not calculated the standard errors. However, Lam, Cecchetti & Mark (2000) and Kocherlakota (1996) examined the long-run yearly US data and found few standard errors. They also dismissed the risk aversion coefficients since they were below the traditional level of 8.

Table 6: Five Years Equity Premium Puzzle

Country	Sample Period	$a(er_e)$	$\sigma(er_e)$	$\sigma(\Delta C)$	$\sigma(m)$	$\rho(er_e, \Delta C)$	$Cov(er_e, \Delta C)$	RRA(1)	RRA(2)
Pakistan	1997-2002	10.78%	49.53%	7.93%	21.77%	-0.017	-0.0006	-159.93	2.75
Pakistan	2003-2007	39.45%	36.86%	4.77%	107.03%	-0.66	-0.0117	-33.58	22.46
Pakistan	2008-2012	11.62%	43.69%	4.20%	26.60%	-0.02	-0.0004	-265.07	6.33
Pakistan	2013-2017	19.98%	26.61%	1.86%	75.19%	-0.56	-0.0028	-71.19	40.30

Table 6 shows the equity risk premium puzzle during five-year periods. The negative risk aversion coefficient is due to a negative correlation between excess return and consumption growth. Excess consumption growth is generally positively correlated. However, this is not the case in Pakistan.

RRA (1) indicates that the equity risk premium in Pakistan is higher than 10. However,

the best chance model and our benchmark for establishing equity risk premium puzzle RRA(2) is less than ten during 1997-2002 and 2008-2012, and there is no equity premium puzzle as the risk-free rate was higher than the stock return. During 2003 – 2007 and 2013 – 2017, RRA(2) is 22.46 and 40.30, respectively. These results suggest that an ERP puzzle exists in Pakistan.

Conclusion

In this research, we have tested the presence of the ERP puzzle in Pakistan. The results suggest that the ERP puzzle is a prominent phenomenon in Pakistan. One limitation of the present investigation is the small sample size. A larger sample could have reduced short-term biases. However, this is not possible because stock data availability is limited in Pakistan. Part researchers have suggested different approaches for solving the equity premium puzzle. Rietz (1988) argues that the abnormal return on stocks compared to T-bills may be due to market crashes resulting in high equity risk premiums and low risk-free returns. Some researchers have used improvised structural models to justify the equity risk premium puzzle with macroeconomic factors and recessions. Therefore, we recommend that future studies may investigate the ERP puzzle in developing countries using these models.

Limitations

Past research has supported their conclusions based on data, comprising fifty years or more (Mehra & Prescott, 1985; Campbell, 1999; Hibbard, 2000; Nyberg & Vaihkoski, 2014). However, PSX being a nascent equity market lacks such long term data availability. Hence, our scope is limited to twenty years.

Future Research

Our study is primarily focused on the ERP puzzle, which has been investigated in developed countries. Being a novel study in Pakistan, our study is a basis for new research in the area of asset pricing domain in developing economies. It will be worthwhile to empirically explore the causes of such phenomenon and its effects on various financial institutions and asset classes.

References

- Adrian, T., Crump, R. K., & Vogt, E. (2019). Nonlinearity and flight-to-safety in the risk-return trade-off for stocks and bonds. *The Journal of Finance*, 74(4), 1931-1973.
- Alessandri, T. M., Mammen, J., & Eddleston, K. (2018). Managerial incentives, myopic loss aversion, and firm risk: A comparison of family and nonfamily firms. *Journal of Business Research*, 91, 19-27.
- Alpalhao, R., & Alves, P. (2005). The Portuguese equity risk premium: what we know and what we don't know. *Applied Financial Economics*, 15(7), 489-498.
- Ang, A., Bekaert, G., & Liu, J. (2005). Why stocks may disappoint. *Journal of Financial Economics*, 76(3), 471-508.
- Arby, M. F. (2004). *State Bank of Pakistan: Evolution, functions and organization*, Munich Personal RePEc Archive {Available}, https://mpra.ub.uni-muenchen.de/13614/1/MPRA_paper_13614.pdf
- Atsala, B. (2017, May). Behavioral finance: The literature review of myopic loss aversion. In *International Conference on Education (ICE2) 2018: Education and Innovation in Science in the Digital Era* (pp. 162-168).
- Ayub, M. 2002) *Islamic Banking and Finance: Theory and Practice*, Karachi: State Bank of Pakistan Printing Press.
- Ballard-Rosa, C., Mosley, L., & Wellhausen, R. L. (2021). Contingent advantage? Sovereign borrowing, democratic institutions, and global capital cycles. *British Journal of Political Science*, 51(1), 353-373.
- Bessler, W. (1999). Equity returns, bond returns, and the equity premium in the German capital market. *The European Journal of Finance*, 5(3), 186-201.
- Bonizzi, B. (2017). An alternative post-Keynesian framework for understanding capital flows to emerging markets. *Journal of Economic Issues*, 51(1), 137-162.
- Bräuning, F., & Ivashina, V. (2020). US monetary policy and emerging market credit cycles. *Journal of Monetary Economics*, 112(C), 57-76.
- Brown, S., & Goetzmann, W. (1995). Performance persistence. *The Journal of Finance*, 50(2), 679-698.
- Caballero, R. J., Farhi, E., & Gourinchas, P. O. (2017). The safe assets shortage conundrum. *Journal of Economic Perspectives*, 31(3), 29-46.

- Camba-Méndez, G., & Mongelli, F. P. (2021). Risk aversion and bank loan pricing. *Economics Letters*, 200, 1-21.
- Campbell, J. Y. (1999). Asset prices, consumption, and the business cycle. In T. B. John, & H. Uhlig, *Handbook of Macroeconomics* (Vol. 1, pp. 1231-1303). Amsterdam: North Holland Press.
- Campbell, J. Y., & Cochrane, J. H. (1999). By force of habit: A consumption based explanation of aggregate stock market behavior. *Journal of Political Economy*, 107(2), 205-251.
- Campbell, J. Y., & Viceira, L. M. (1999). Consumption and portfolio decisions when expected returns are time-varying. *The Quarterly Journal of Economics*, 114(2), 433-495.
- Choi, T. H., Lee, E., & Pae, J. (2012). The equity premium puzzle: empirical evidence for the "Korea Discount." *Asia-Pacific Journal of Accounting & Economics*, 19(2), 143-166.
- Chrisman, J. J., & Patel, P. C. (2012). Variations in R&D investments of family and nonfamily firms: Behavioral agency and myopic loss aversion perspectives. *Academy of Management Journal*, 55(4), 976-997.
- Clarkson, P. M., & Merkley, J. (1994). Ex ante uncertainty and the underpricing of initial public offerings: Further Canadian evidence. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, 11(2), 54-67.
- Claus, J., & Thomas, J. (2001). Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets. *Journal of Finance*, 56(5), 1629-1666.
- Conine, T. E., McDonald, M. B., & Tamarkin, M. (2017). Estimation of relative risk aversion across time. *Applied Economics*, 49(21), 2117-2124.
- Constantinides, G. (1990). Habit formation: A resolution of the equity premium puzzle. *Journal of Political Economy*, 98(3), 519-543.
- Cysne, R. P. (2006). Equity-Premium Puzzle: Evidence From Brazilian Data. *Economia Aplicada*, 10(2), 161-180.
- DaSilva, A., Farka, M., & Giannikos, C. (2019). Age dependent increasing risk aversion and the equity premium puzzle. *Financial Review*, 54(2), 377-412.

- Digby, P., Firer, C., & Gilbert, E. (2006). The South African equity risk premium. *Studies in Economics and Econometrics*, 30(3), 1-17.
- Dimson, E., Marsh, P., & Staunton, M. (2008). The worldwide equity premium: A smaller puzzle, in R. Mehra, *Handbook of the Equity Risk Premium* (pp. 467-514). Amsterdam: Elsevier B.V.
- Durand, R. B., Fung, L., & Limkriangkrai, M. (2019). Myopic loss aversion, personality, and gender. *Journal of Behavioral Finance*, 20(3), 339-353.
- Ebrahimi Sarv Olia, M. H., Salimi, M. J., & Ghouchifard, H. (2020). The effect of investors' myopic loss aversions (MLA) on investment in stocks in Tehran Stock Exchange. *Empirical Studies in Financial Accounting*, 17(67), 89-124.
- Fernald, J., & Rogers, J. (2002). Puzzles in the Chinese Stock Market. *The Review of Economics and Statistics*, 84(3), 416-432.
- Guillemette, M., Blanchett, D., & Finke, M. (2019). The effect of investment and withdrawal horizons on myopic loss aversion. *Applied Economics Letters*, 26(10), 787-790.
- Gul, F. (1991). A Theory of Disappointment Aversion. *Econometrica*, 59(3), 667-686.
- Haasnoot, M., van Aalst, M., Rozenberg, J., Dominique, K., Matthews, J., Bouwer, L. M., ... & Poff, N. L. (2019). Investments under non-stationarity: economic evaluation of adaptation pathways. *Climatic Change*, 161, 451-463.
- Hadhri, S., & Ftiti, Z. (2019). Asset allocation and investment opportunities in emerging stock markets: Evidence from return asymmetry-based analysis. *Journal of International Money and Finance*, 93, 187-200.
- Haroon, O., & Rizvi, S. A. R. (2020). Flatten the curve and stock market liquidity—an inquiry into emerging economies. *Emerging Markets Finance and Trade*, 56(10), 2151-2161.
- He, Z., He, L., & Wen, F. (2019). Risk compensation and market returns: The role of investor sentiment in the stock market. *Emerging Markets Finance and Trade*, 55(3), 704-718.
- Hibbard, R. (2000). The equity premium puzzle: New Zealand Evidence. *Pacific Accounting Review*, 12(2), 65-99.
- Hollstein, F., Prokopczuk, M., & Wese Simen, C. (2020). The conditional Capital Asset Pricing Model revisited: Evidence from high-frequency betas. *Management Science*, 66(6), 2474-2494.

- Honey, D., Tashfeen, R., Farid, S., & Sadiq, R. (2019). Credit risk management: Evidence of corporate governance in banks of Pakistan. *Journal of Finance and Accounting Research*, 1(1), 1-18.
- Huang, P., Zhou, Z. Q., & Zhang, W. (2019). The equity premium in China. *Applied Economics Letters*, 27(13) 1-7.
- Indārs, E. R., Savin, A., & Lublóy, Á. (2019). Herding behaviour in an emerging market: Evidence from the Moscow Exchange. *Emerging Markets Review*, 38(C), 468-487.
- James, A., Abu-Mostafa, Y. S., & Qiao, X. (2019). Machine Learning for Recession Prediction and Dynamic Asset Allocation. *The Journal of Financial Data Science*, 1(3), 41-56.
- Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263-291.
- Kim, Y. Y. (2021). Composite-asset-risk approach to solving the equity premium puzzle. *International Review of Economics & Finance*, 71, 200-216.
- Kocherlakota, N. (1996). Implications of Efficient Risk Sharing without Commitment. *Review of Economic Studies*, 63(4), 595-609.
- Kuehn, L. A., Simutin, M., & Wang, J. J. (2017). A Labor Capital Asset Pricing Model. *The Journal of Finance*, 72(5), 2131-2178.
- Lam, P.-s., Cecchetti, S. G., & Mark, N. C. (2000). Asset pricing with distorted beliefs: Are equity returns too Good to be true? *American Economic Review*, 90(4), 787-805.
- Liang, H., Yang, C., Zhang, R., & Cai, C. (2017). Bounded rationality, anchoring-and-adjustment sentiment, and asset pricing. *The North American Journal of Economics and Finance*, 40, 85-102.
- Lien, D., & Wang, Y. (2002). Risk aversion, disappointment aversion, and futures hedging. *Journal of Futures Markets: Futures, Options, and Other Derivative Products*, 22(2), 123-141.
- Łukowski, M., Gemra, K., Maruszewsk, J., & Śliwiński , P. (2020). Equity premium puzzle — Evidence from Poland. *Journal of Behavioral and Experimental Finance*, 28, 1-28
- Mankiw, G. N., & Zeldes, S. P. (1991). The consumption of stockholders and nonstockholders. *Journal of Financial Economics*, 29(1), 97-112.
- Mehra, R., & Prescott, E. C. (1985). The equity premium: A puzzle. *Journal of Monetary Economics*, 15(2), 145-161.

- Menounos, G., Alexiou, C., & Vogiazas, S. (2019). Investigating the relationship between high-yield bonds and equities and its implications for strategic asset allocation during the Great Recession. *International Journal of Finance & Economics*, 24(3), 1193-1209.
- Mian, A., & Sufi, A. (2018). Finance and business cycles: the credit-driven household demand channel. *Journal of Economic Perspectives*, 32(3), 31-58.
- Miller, M. H., & Scholes, M. S. (1978). Dividends and taxes. *Journal of Financial Economics*, 6(4), 333-364.
- Morawakage, P. S., Nimal, P. D., & Kuruppuarachchi, D. (2019). Equity Risk Premium Puzzle: Evidence from Indonesia and Sri Lanka. *Bulletin of Indonesian Economic Studies*, 55(2), 1-19.
- Muscarella, C. J., & Vetsuydens, M. R. (1989). A simple test of Baron's model of IPO underpricing. *Journal of Financial Economics*, 24(1), 125-135.
- Nyberg, P., & Vaihekoski, M. (2014). Equity premium in Finland and long-term performance of the Finnish equity and money markets. *Cliometric*, 8(2), 241-269.
- Odean, T. (1998). Are investors reluctant to realize their losses?. *The Journal of Finance*, 53(5), 1775-1798.
- O'Donoghue, T., & Somerville, J. (2018). Modeling risk aversion in economics. *Journal of Economic Perspectives*, 32(2), 91-114.
- Olsen, R. A., & Troughton, G. H. (2000). Are Risk Premium Anomalies Caused by Ambiguity? *Financial Analysts Journal*, 56(2), 24-31.
- Park, K. Y., & Kim, K. H. (2009). Explaining the Equity Premium in Korea. *The Journal of the Korean Economy*, 10(2), 151-176.
- Phuoc, L. T. (2018). Jensen's alpha estimation models in capital asset pricing model. *The Journal of Asian Finance, Economics, and Business*, 5(3), 19-29.
- Poterba, J. M., & Summers, L. H. (1995). Unemployment benefits and labor market transitions: A multinomial logit model with errors in classification. *The Review of Economics and Statistics*, 77(2), 207-216.
- Rietz, T. A. (1988). The equity risk premium a solution. *Journal of Monetary Economics*, 22(1), 117-131.
- Robiyanto, R. (2017). The volatility-variability hypotheses testing and hedging effectiveness of precious metals for the Indonesian and Malaysian capital market. *Gadjah Mada International Journal of Business*, 19(2), 167-192.

Shirvani, A., Stoyanov, S. V., Fabozzi, F. J., & Rachev, S. T. (2020). Equity premium puzzle or faulty economic modeling?. *Review of Quantitative Finance and Accounting*, 56(4), 1329-1342.

Thaler, R. H., & Benartzi, S. (1995). Myopic Loss Aversion and the equity premium puzzle. *Quarterly Journal of Economics*, 110(1), 73-92.

Umar, Z., Shehzad, C. T., & Samitas, A. (2019). The demand for eurozone stocks and bonds in a time-varying asset allocation framework. *The European Journal of Finance*, 25(11), 994-1011.

Yao, D., Qin, Y., Hu, S., Dong, L., Vega, M. L. B., & Sosa, P. A. V. (2019). Which reference should we use for EEG and ERP practice?. *Brain Topography*, 32(4), 530-549.

Yoon, S. J. (2017). Time-varying risk aversion and return predictability. *International Review of Economics & Finance*, 49, 327-339.