Downside Risk Measures Incorporated in Islamic Capital Asset Pricing Model

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Received: **October 11, 2022**
Last Revised: **December 09, 2022**
Accepted: **December 20, 2022**

Abstract
This study attempts to examine different risk measures and their combinations as the part of a suitable asset pricing model for Islamic stocks. We choose beta, coskewness, downside beta, and downside coskewness and their combinations in single- and two-factor asset pricing model settings. We selected 91 companies from PSX using monthly returns from 2000-2018. The double sorting procedure is adopted for robustness, and collinearity between beta/downside beta and its respective higher moments is addressed by orthogonalizing each variable with its counterpart. Results tend to indicate that the two-factor model comprising downside beta and downside coskewness-based model is the most suitable asset pricing model for Islamic stocks. The use of two risk measures in the Islamic asset pricing framework yields a better understanding of stock prices which can help assess the risk of Islamic stocks for an investment decision.
Keywords: Downside beta, Downside coskewness, Islamic stocks, Double sorting

1. Introduction
Islamic finance is not just a religious obligation; rather it is a fast-growing business opportunity for the Gulf and Asia as well as for the developed markets especially after the 2008 crisis when the world witnessed that the countries using the Islamic-based financial system observed little fluctuations and the Western world took special interest as an investment opportunity. For the last two decades, it has been consistently growing at 10-12% and stands with assets of $2.6 trillion in 2017 and is expected to be worth a whopping $3.8 trillion by 2022. In 2013, the United Kingdom became the first non-Muslim country to

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issue worth £200 million in Islamic bonds (Sukuk). Islamic financial assets are dominated by the banking sector which stands tall with 75% of the total share of the market. The Sukuk account for 15% while Islamic funds stand under 5%; both are indeed very low.

Mwamba et al. (2017) organize the literature on Islamic finance into four groups. These four groups are based on important features of Islamic financing especially from the viewpoint of financial performance, investment, and linkages between Islamic banks and their markets. However, the literature in the field of a suitable Islamic asset pricing model for Islamic stocks is almost non-existent. Several researchers tried to carry out comparative studies between conventional financing and shariah compliant financing. Hanif(2011) studied CAPM by using the inflation rate instead of the risk-free rate to achieve better results. Hakim et al. (2016) used data from the Malaysia Stock Exchange to analyze the use of CAPM in Islamic financial instruments. In his research, he developed a CAPM model based on sharia by modifying the risk-free rate parameters with treasury bills and using the yield value of Sukuk as a zero beta parameter. By doing this, the usury component of traditional CAPM formulations is removed. The study's findings demonstrate that sharia-based CAPM can be used to forecast security returns in the same way as the traditional CAPM does. Furthermore, Derbali et al. (2017) constructed a CAPM model that complies with shariah by making several adjustments including adding zakat, improving returns, and creating exclusions for short sells. A sample of 10 Islamic stocks listed on the Malaysia Stock Exchange is used in the tests. The study's findings suggest that the proposed CAPM is appropriate and pertinent for examining how risk and return interact in sharia stock exchanges. Rosadi et al.(2021) declared that the performance of traditional CAPM was better in the Indonesian Stock Exchange.

Hayat and Kraeussl (2011) and Reddy et al. (2017) report that Islamic equity funds perform better than conventional funds. But Sadaf and Andleeb(2014) found no distinction between the two models by using data from the Pakistan Stock Exchange. Furthermore, Widianingsih(2019) presents the same results of no difference in return in conventional and shariah-compliant models by incorporation into the Indonesian stock exchange. Though Mwamba et al. (2017) study a comparative analysis between conventional and Islamic stock markets based on their financial tail risks, the study does not address the individual stocks and focuses on indices only rather than on Islamic stocks. Furthermore, the screening or prequalification for Islamic stocks, as rightly identified by Masih et al. (2018), is also a matter to implore.

The traditional asset pricing model i.e. CAPM is based on the beta. It is the most famous risk measure used in studies. However, in the last two decades, it is witnessed that finance studies are moving away from traditional variance/beta risk measures towards incorporating downside risk (Abbas et al. 2011). Lower partial moments (LPM) is the proxy used for downside risk (Ayub et. al. 2011). Furthermore, stock returns depict non-normal distribution which makes the traditional asset pricing model vulnerable to the third moment i.e. coskewness/downside coskewness.

This research centers its motivation on the issue of a suitable Islamic asset pricing model. It is an undeniable fact that the rise of Islamic finance, especially after the 2008 crisis, provides tremendous opportunities for investors. Islamic banks have maintained better capital ratios than their conventional counterparts during the global financial crisis (Chaz and Syed, 2010). Moreover, Islamic stocks are different from traditional stocks as they must prequalify for Shariah standards. Thus the number of Islamic stocks available for an investor for portfolio construction is less. Furthermore, the traditional stock market index does not apply to the Islamic asset pricing model; rather, the Islamic stock market index is a proxy for market returns. These reasons motivated us to investigate a suitable Islamic asset pricing model.

The study is the first of its kind in the Islamic asset pricing model using multiple risk measures. Normally, only one risk measure is used i.e. beta or downside beta while higher moments i.e. coskewness or downside coskewness are ignored altogether. Deviation from the condition of normality for stock returns advocates the incorporation of a third moment; however, treating the model as a single or two-factor asset pricing model is an important unexplored question. The study also uses all the different proxies of downside risk based on the existing literature and three variants of downside beta and the same number for downside coskewness are used. Furthermore, the study uses robust methodology by building double-sorted and orthogonalized portfolios to remove high correlations among different risk measures. The structure of the paper is based on five sections. Section 1 is an introduction and section 2 is the literature review. Section 3 covers the data and methodology, while results and discussions are presented in section 4. The conclusion is covered in section 5.

2. Literature Review

CAPM outlines the risk-return relationship, and in due course of time, has became the most popular and widely used asset pricing model (Graham and Harvey, 2001 and Brounen *et al.* 2004). CAPM heavily relies on Markowitz's (2010) portfolio theory by taking variance as the proxy of risk which is incorporated in the asset pricing world as a beta- a measure of systematic risk. Many disagree with the proxy of risk used and propose that beta should be replaced by downside beta based on downside risk. This replacement is superior in three ways: firstly, it caters for the investor preference for only downside risk while CAPM's beta represents both upside and downside risk. Secondly, it relaxes the assumption of normality which is imperative in the case of beta. And lastly, downside beta-based models can be extended to risk-taking and risk-neutral investors as well whereas CAPM is restricted to risk-averse behavior. Thus, beta is replaced by downside beta, the proxy of systematic downside risk, yielding DCAPM.

Furthermore, stock returns exhibit coskewness and cokurtosis questioning the appropriateness of variance as a risk proxy, especially when the distribution is severely asymmetric Chng, M. (2014). Relaxing the condition of normality justifies the incorporation of coskewness. Many researchers have included higher moments in CAPM Tse (2016). These studies argue that coskewness along with beta has better explanatory power than its predecessor Doan et al (2014). However, the results for cokurtosis are sensitive to both empirical methodology and the selected sample (Chang et al, 2010). The coskewness based CAPM performs better in Pakistan. However, the latter reports a marginal role for kurtosis in Pakistani markets (Ahmed and Javid, 2009; Iqbal et al., 2010).

Traditionally, only one risk measure is used in an asset pricing model and extended for different factors like size, value, momentum, profitability, and investment[1]. Contrarily, there is evidence of incorporating downside risk measures in the one model (Galagedera and Brooks, 2007). They compare downside risk with downside coskewness in the CAPM framework as DCAPM (downside risk-based CAPM). They claim that downside coskewness is a more effective predictor of monthly returns in developing markets than downside beta. However, their results are based on indices of emerging markets rather than portfolios built on individual stocks for individual stock markets. Furthermore, Doan et al. (2014) find that systematic coskewness is more robust in explaining average stock returns compared to the Bhardwaj and Brooks (1993) dual-beta CAPM. However, their research is based on upside and downside risks in the same model. This study fills up these gaps by introducing different models in the domain of risk. The study uses the concepts of double-sorted portfolios and orthogonal portfolios explained in the next section. The hypothesis is based on comparing different models; CAPM with the beta, CAPM with coskewness, and CAPM with beta and coskewness, DCAPM with downside beta, DCAPM with downside coskewness, and DCAPM with downside beta and downside coskewness.

3. Data and Methodology

3.1 Sample for Islamic Stocks

The Pakistan Stock Exchange PSX is chosen as the emerging market as the sample of this study because it has stocks that are permitted to trade as Islamic securities. PSX is reclassified as an MSCI Emerging Market in May 2017 while the FTSE classifies it as a Secondary Emerging Market. It was declared the "Best Performing Stock Market of the World for the year 2002.

Islamic banking sector showed expansion by 9% in all respects. The market share of total assets and deposits were documented at 13.8% and 16.1% respectively. There are a total of 22 Islamic banks including 5 fully operational Islamic banks and 17 having combined Islamic operations with traditional banking. These branches covered 115 districts of Pakistan as of September 2019. Overall, 41% of shares are contributed by Islamic banks in the Islamic banking industry. Pakistan is regarded as a country making a substantial contribution to the field of Islamic finance. The “International Shariah Standard Council's Accounting and Auditing Organization” for Islamic Financial Institutions in Bahrain is led by Mufti Taqi Usmani. These explanations are sufficient to classify PSX as a significant emergent market in Islamic finance. s

The data sample for this study consists of the returns of stock prices from January 2000 to December 2018. The KSE-30 index for traditional stocks and the KMI-30 Shariah-compliant index for Islamic stocks are used as a proxy for the market portfolio. Six months’ treasury bill rate is taken as a proxy for the risk-free rate. Data has been taken from DataStream and PSX's official website. Standard Fama and MacBeth's (1973) methodology is used and the results are reported. As a standard procedure following Fama and French (2015), we take the non-financial companies. To qualify for Islamic stocks, the study follows a two-stage strategy. Firstly, those companies which only offer products/services are taken. In the second stage, the companies are assessed upon the use amount of debt financing. After the detailed screening, a total of 91 companies are selected for analysis and are used in this study.

3.2 Methodology: Risk Proxies, Portfolio Sorting, and Alternative Models

This study uses the basic CAPM and downside risk-based-CAPM (DCAPM) equations and replaces/incorporates higher moments. There are three major types of downside risk outlined by Hogan and Warren (1974), Harlow and Rao (1989), and Estrada (2002) used in this study. This gives our four risk proxies to be compared; beta, downside beta-Hogan and Warren (1974), downside beta-Harlow and Rao (1989), and downside beta-Estrada (2002). Likewise, the same combination also stands for coskewness (gamma).

In this study, equal-weighted portfolios are formed and Newey-West estimator is used for an estimation window of 12 months. As regular beta and downside beta are highly correlated, we double-sort the portfolios to disentangle them following Ayub et al. (2015) and Ang et al. (2006). This procedure yields four major double-sorted portfolios; HH, HL, LH, and LL for each downside beta/beta and beta/downside beta sorting to give us results for different levels of risk proxies.

Furthermore, the collinearity between beta/downside beta and its respective higher moments i.e. coskewness is addressed by orthogonalizing each variable concerning its counterpart using Jorion and Schwartz (1986) and Galagedera and Brooks (2007) methodologies. Between two regressors beta/downside beta and gamma/downside gamma, we isolate gamma/downside gamma from beta/downside beta by projecting gamma/downside gamma on constant and beta/downside beta. The residuals from this regression which are orthogonal to beta/downside beta are effectively the orthogonalized component of gamma/downside gamma.

The first pass Fama and MacBeth's (1973) equation for different combinations is:

$$r_{Pt} = r_{ft} + \beta_{Pt}(r_{PSXt} - r) + \varepsilon_{Pt} \ldots\ldots. (1)$$

$$r_{Pt} = r_{ft} + D\beta_{Pt}^{E}(r_{PSXt} - r_{ft}) + \varepsilon_{Pt} \ldots.. (2)$$

for DCAPM where $D\beta^{i}$ is the proxy of systematic downside risk

$$r_{Pt} = r_{ft} + \gamma_{Pt}(r_{PSXt} - r_{ft})^2 + \varepsilon_{Pt} \ldots\ldots (3)$$

for CAPM where γ is coskewness replacing β as a proxy of risk

$$r_{Pt} = r_{ft} + D\gamma_{Pt}^{E}(r_{PSXt} - r_{ft})^2 + \varepsilon_{Pt} \ldots. (4)$$

for DCAPM where $D\gamma^{i}$ is downside coskewness replacing Dβ as a proxy of risk

$$r_{Pt} = r_{ft} + \beta_{Pt}(r_{PSXt} - r_{ft}) + O\gamma_{Pt}(r_{PSXt} - r_{ft})^2 + \varepsilon_{Pt} \ldots\ldots (5)$$

for CAPM where Oγ is orthogonal coskewness to β

$$r_{Pt} = r_{ft} + O\beta_{Pt}(r_{PSXt} - r_{ft}) + \gamma_{Pt}(r_{PSXt} - r_{ft})^2 + \varepsilon_{Pt} \ldots\ldots (6)$$

for CAPM where Oβ is orthogonal beta coskewness γ

$$r_{Pt} = r_{ft} + D\beta^{E}_{Pt}(r_{PSXt} - r_{ft}) + OD\gamma^{E}_{Pt}(r_{PSXt} - r_{ft})^2 + \varepsilon_{Pt} \ldots (7)$$

for DCAPM where ODγ is orthogonal coskewness to Dβ

$$r_{Pt} = r_{ft} + OD\beta^{E}_{Pt}(r_{PSXt} - r_{ft}) + D\gamma^{E}_{Pt}(r_{PSXt} - r_{ft})^2 + \varepsilon_{it} \ldots (8)$$

for DCAPM where ODβ is orthogonal beta coskewnessDγ

R_{pt} is the return of portfolio return at time t, R_{ft} is return of risk-free (t-bills) at time t, $\alpha_{p\,t}$ is the intercept of portfolio returns at time t, and p is equivalent to HH, HL, LH, and LL portfolios. β and γ are proxies for beta and coskewness while Dβ and Dγ are specified for different proxies of downside beta and downside coskewness for Estrada (2002) defined as follows:

$$\beta_p = \frac{E[(R_p - \mu_p).(R_{PSX} - \mu_{PSX})]}{E[(R_{PSX} - \mu_{PSX})]^2}$$

For beta in the CAPM framework

$$\gamma_p = \frac{E[(R_p - \mu_p).(R_{PSX} - \mu_{PSX})]^2}{E[(R_{PSX} - \mu_{PSX})]^3}$$

For coskewness in the CAPM framework

$$D\beta^E_p = \frac{E[\min(R_p - \mu_p, 0).\min(R_{PSX} - \mu_{PSX}, 0)]}{E[\min(R_{PSX} - \mu_{PSX}, 0)]^2}$$

For Estrada (2002) downside beta.

$$D\gamma^E_p = \frac{E[\min(R_p - \mu_p, 0).\min(R_{PSX} - \mu_{PSX}, 0)]^2}{E[\min(R_{PSX} - \mu_{PSX}, 0)]^3}$$

4. Empirical Findings

The first two (02) tables compare CAPM versus DCAPM models based on beta and coskewness as a measure of risk. However, the next two (02) tables are separated, and they report the extension of CAPM and DCAPM. The first column of the table is the double-sorted portfolios, and the second column reports the average returns for each portfolio type. The difference between the high and low sides is given and is essential to show the risk and return relationship. The difference of returns is directly proportional to respective different risk measures, thus showing more validation in the relationship between risk and return. Like other studies, this study takes the standard 5% significant level for rejecting the null hypothesis.

In table 4.1, the results of CAPM are shown as follows: portfolio High-High (HH), coefficient of beta (β) is 1.464 with t-statistic of -0.014 hence accepting our null hypothesis for the second pass in Fama and MacBeth (1973) regressions. This means that beta is a significant measure of risk. The value of R-squared is 56.50% showing the low power or capability of independent variables to explain the dependent variables. Likewise, we failed to reject the null hypothesis rejected for both High-Low (HL) and Low-High (LH) portfolios validating the theory of CAPM. For the Low-Low (LL) portfolio, the null hypothesis is not accepted but at a 10% significant level; however, it is still acceptable for not qualifying the 5% threshold. The value of the R-squared of HL, LH, and LL portfolios is very low. The HH and LL portfolio returns are reported at 5.91% and 5.33% p.a. for the complete sample period from 2000 to 2018. The High-Low difference between HH and LL portfolio beta is reported at 1.582. These return and beta difference values endorse the positive risk-return relationship.

The results of DCAPM in table 4.1 are as follows: portfolio High-High (HH), coefficient of downside beta (Dβ) is 1.663 with a t-statistic of -3.638 hence accepting our null hypothesis. This means that the downside beta is a significant measure of risk. The value of R-squared is 65.60% showing better power or capability of independent variables to explain the dependent variables as compared to the CAPM model. The null hypothesis for HH is not acceptable at a 1% significance level. Likewise, we observe that the null hypothesis is also not accepted at 10% for High-Low (HL), and Low-Low (LL) portfolios validating the theory of CAPM. The values of the R-squared of HL, LH, and LL portfolios are very low. The High-Low difference between HH and LL portfolio beta is reported at 1.787. These return and beta difference values endorse the positive risk-return relationship where the difference figure of the downside risk is larger than CAPM's beta.

The results for CAPM and DCAPM propose that both models hold for risk-return relationships. According to the results of the R-square, DCAPM is declared as a better model. These results are consistent with Tahir et al.(2013), Ang et al.(2004), Post and Vliet (2004), and Estrada (2002) studies. We can safely contend that both CAPM and DCAPM are viable models based on t-stat; however, analyzing the R-squared values, both models have low values especially for non-HH portfolios.

Tabel 4.1: Results for Beta and Downside Beta based Models

Portfolios	Return	β	R^2	Adj R^2	$D\beta^E$	R^2	Adj R^2
HH	5.910	1.464 (-0.014)	0. 565	0.554	1.663 (-3.638)*	0.656	0.635
HL	5.334	0.836 (0.216)	0.435	0.332	0.685 (1.44)***	0.532	0.432
LH	5.261	0.304 (-0.133)	0.116	0.112	0.292 (-0.078)	0.182	0.177
LL	-0.597	-0.118*** (1.851)	0.223	0.177	-0.124 (1.445)***	0. 263	0.217
HIGH-LOW	**6.507**	**1.582**	-	-	**1.787**	-	-

Note: The t-stat is indicated in brackets. A significance level of 1%, 5%, or 10% is indicated by the symbols *, **, and ***, respectively.

In table 4.2, we replaced beta and downside beta with coskewness and downside coskewness respectively and reported the results for both models. Coskewness and downside coskewness have relatively high non-positive values for high-risk portfolios. Negatively skewed distributions or long left tail values are reported which indicate that investors have a greater chance of extremely negative outcomes. This phenomenon is common for PSX for its extreme volatility. LL portfolios have the lowest value for the third statistical moment. We accept the null hypothesis in all the cases except the LL portfolios which rejects the null hypothesis at 10% significance. This also shows the importance of the third statistical moment in the respective models in the coskewness model. Likewise, the same results are shown in the case of the downside coskewness model, that we failed to reject the null hypothesis in the case of the HH and HL hypotheses. But, the LH portfolios show significance at 10% and the LL portfolios show acceptance at a 5% significance level. However, the R-squared values for both alternative models are even lower than their counterparts-the CAPM and DCAPM. The High-Low difference row accounts for similar results as reported in table 4.1.

The results for coskewness and downside coskewness for CAPM and DCAPM-based models are not encouraging. These models perform on a low note as compared to the former models. The results are quite opposite to the results of Galagedera and Brooks (2007) who report that the downside co-coskewness is a better explanatory variable of emerging market monthly returns than downside beta. A possible explanation might be that Galagedera and Brooks' (2007) sample is indices while this study uses company's returns to form portfolios making the former less robust than the latter. Another reason is the use of US return as a market return for different emerging market indices which itself is highly debatable.

Table 4.2: Results for Coskewness and Downside Coskewness Based Models

Portfolios	Return	γ	R^2	Adj R^2	$D\gamma^E$	R^2	Adj R^2
HH	5.910	-1.658 (-0.253)	0.430	0.384	-5.789 (1.594)	0.511	0.509
HL	5.334	-0.215 (-0.178)	0.126	-0.343	-2.222 (1.423)	0.290	0.285
LH	5.261	-0.327 (-0.039)	0.159	0.112	-0.726*** (1.775)	0.282	0.224
LL	-0.597	-0.308*** (1.818)	0.266	0.220	0.282** (-2.363)	0.377	0.330
HIGH-LOW	**6.507**	**-1.351**	-	-	**-6.071**	-	-

Note: The t-stat is indicated in brackets. A significance level of 1%, 5%, or 10% is indicated by the symbols *, **, and ***, respectively.

In search of a better asset pricing model, we extended CAPM and DCAPM by incorporating coskewness and downside coskewness respectively and their results are reported in Tables 3 and 4. In table 3, the results of the CAPM model with coskewness have two sub-models- beta with orthogonal coskewness and orthogonal beta with coskewness are reported. We failed to reject the null hypothesis for all the variables using the threshold of 5%. Results for two variables are rejected at a 10% significance level for LL portfolios. This shows that the risk measures of beta and coskewness are significant. The High-Low difference for returns and risk measures implies their positive relationship; however, this relationship is weak for return-coskewness as the value for the first equation is 0.392. The R-squared and adjusted R-squared values increase for all the equations estimated compared to the values estimated in Tables 4.1 and 4.2. This shows that incorporating coskewness in the CAPM framework instead of regular beta is a better option.

Table 4.3: Results for Beta and Coskewness Based Models

Portfolios	Return	B	Oγ	R^2	Adj R^2	Oβ	γ	R^2	Adj R^2
HH	5.910	1.487 (0.251)	-0.024 (-0.155)	0.667	0.624	3.075 (-0.381)	-3.102 (-0.382)	0.687	0.645
HL	5.334	0.193 (0.348)	0.679 (0.377)	0.449	0.444	1.944 (0.365)	-1.186 (0.345)	0.449	0.404
LH	5.261	0.293 (0.663)	0.011 (0.502)	0.116	0.108	0.268 (-0.529)	-0.255 (-0.437)	0.186	0.108
LL	-0.597	0.276*** (1.738)	-0.416*** (1.678)	0.337	0.328	-2.880 (-0.814)	2.416 (-0.940)	0.324	0.300
HIGH-LOW	**6.507**	**1.211**	**0.392**	-	-	**5.955**	**-5.518**	-	-

Note: The t-stat is indicated in brackets. A significance level of 1%, 5%, or 10% is indicated by the symbols *, **, and ***, respectively.

In table 4.4 we report the results of incorporating downside coskewness in the DCAPM framework. There are again two sub-models: downside beta with orthogonal downside coskewness and orthogonal downside beta with downside coskewness that are reported. The null hypothesis for all the variables is accepted using the threshold of 5%. The result for orthogonal downside coskewness shows the rejection of the null hypothesis at a 10% significant level for LL portfolios. The High-Low difference for returns and risk measures implies their positive relationship. We can safely say that all variables are significant in defining the risk-return relationship. The R-squared and adjusted R-squared values increased for all the equations estimated compared to the values estimated in Tables 4.1, 4.2, and 4.3. This shows that incorporating downside coskewness in the DCAPM framework is even a better option when compared to all the other models mentioned in the study.

Table 4.4: Results for Downside Beta and Coskewness Based Models

Portfolios	Return	$D\beta^E$	$OD\gamma^E$	R^2	Adj R^2	$OD\beta^E$	$D\gamma^E$	R^2	Adj R^2
HH	5.90	1.617 (-2.480)	0.161 (-1.902)	.787	0.723	2.900 (1.070)	-3.32 (.37)	0.799	0.755
HL	5.334	0.621 (-1.475)	0.225 (-0.649)	.582	0.522	1.230 (0.222)	-2.43 (.72)	0.581	0.513
LH	5.261	0.203 (-2.535)	0.314 (0.458)	0.251	0.232	0.584 (1.408)	-1.462 (.07)	0.210	0.202
LL	-.597	-0.079 (0.497)	-.157*** (1.804)	.435	0.426	-1.181 (1.284)	0.619 (.53)	0.450	0.411
HIGH-LOW	**6.507**	**1.696**	**0.318**	-	-	**4.081**	**-3.94**	-	-

Note: The t-stat is indicated in brackets. A significance level of 1%, 5%, or 10% is indicated by the symbols *, **, and ***, respectively.

The results for incorporating coskewness and downside coskewness in CAPM and DCAPM models respectively are encouraging as their adj R-squared shows improvement, especially in the case of downside coskewness-based DCAPM. Our results validate the concept of incorporating higher moments like coskewness and downside coskewness as has been done by Doan et al. (2014). They favor the higher moments as important in capturing asymmetric variations in average stock returns across different market conditions in which systematic coskewness plays a more influential role. However, their results do not encompass the downside risk framework and favor the inclusion of coskewness to beta only. Our study compares the alternative frameworks and concludes that the downside risk framework is a better option compared to its counterpart. Furthermore, we also conclude that the adj R-squared is still low; resultantly, we can add Fama and French (2015) base factors in our two-factor Islamic capital asset pricing model as suggested by Naqvi et al. (2018).

5. Conclusion

Islamic finance is growing at a fast pace, especially after the 2008 crisis. Islamic stocks carry a smaller portion of the contribution in the total Islamic financial market. This is due to two major reasons: study on a suitable asset pricing model based on risk measures is almost non-existent for Islamic stocks, and the definition to qualify Islamic stocks is very restrictive leading to a narrower investment opportunity for an investor. This study examines the different risk measures to get a better asset pricing model for Islamic stock in Pakistan Stock Exchange.

The original risk measures are beta and downside beta, while coskewness and downside coskewness are introduced as the returns in Pakistan Stock Exchange deviate from normality. To remove the correlation between beta and downside beta, we double-sort the stock returns based on beta and downside beta to yield four different types of portfolios. The collinearity problem between beta and coskewness, and downside beta and downside coskewness is addressed using the orthogonal components of the respective risk measures. Likewise, Islamic stocks are qualified for less than a 50% debt ratio based on the literature on Islamic jurisprudence along with standard non-debatable conditions.

The results indicate that the different risk measures in the different models have a considerable relationship with the portfolio returns. However, the R-squared values are very low for models based on beta/downside beta and coskewness/downside coskewness. The models with two risk measures like beta/downside beta and coskewness/downside coskewness show decent adj R-squared with the downside framework model outpacing its counterpart. The results also support a positive risk-return relationship for CAPM and DCAPM; whereas, for CAPM with coskewness, this relationship is weaker.

This study provides a milestone for a suitable asset pricing model for Islamic stocks. In the times when the government of Pakistan is promoting Islamic banking and finance, this study comes as the need of the hour wherein Islamic stocks are defined under the parameters of Islamic fiqh. Furthermore, the suitable asset pricing model, in this regard, yields a combination of downside risk and downside coskewness in one model. This will help investors price a financial asset more accurately. This is important for investors, especially the fund managers, who strive for a good investment decision. Contrarily, these investors will be forced to hold cash offering no return leading to an inefficient financial decision.

This research is also useful for its contribution to the literature in this area more precisely in the pricing of Islamic stocks. It also focuses on Pakistan and will be a source of information for market players.

This study is an indicator of alternative methods of pricing Islamic stock. It will motivate for more research in this area that may in turn contribute to a better asset pricing model for Islamic stocks. A possible suggestion to extend this work is to incorporate kurtosis. However, to orthogonalize kurtosis from coskewness and beta will be a challenging task. A better approach might be adding factors like size, value, momentum, investment, and profitability that are not considered in this study.

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