Post-war Relation Between Beta and Returns in Sri Lankan Stocks

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Abstract

Recent empirical studies with inconsistent findings on the beta-return relationship in Sri Lanka cast concerns about the beta's ability to explain the cross-sectional variation in post-war stock returns. Therefore, this study investigated the beta-return relationship of firms listed on the Colombo Stock Exchange using the data from 2009 to 2020. The results generated with the Fama and MacBeth (1973) cross-sectional regression model and Pettengill et al. (1995) cross-sectional regression models suggest a significant positive unconditional beta-return relationship. However, a significant conditional beta-return relationship could not be observed. Even though the same tests were conducted for four sub-periods, evidence was not adequate to claim a consistent relationship. This could be an indication of the long-term nature of the beta-return relationship. While the approach adopted in this study largely resembles previous studies, the extended time period covering the post war period helps clear the doubts on the beta's ability to predict stock returns during the post war period.

Keywords: Beta, Capital Assets Pricing Model, Colombo Stock Exchange, conditional relation, return

Introduction

The unconditional risk-return relationship in stock markets in Asia is either weak or negative, making the unconditional Capital Assets Pricing Model (CAPM) inapplicable in Asian markets (Lam, 2001). For example, studies such as Samarakoon (1997) have found an unconditional negative relationship between beta and stock return during the civil war period. In contrast, Thilakarathne and Jayasinghe (2014) found an unconditional positive relationship between risk and return. Furthermore, Nimal (1997) denies a relationship between beta and return. These contradictory pieces of evidence raise concerns about a possible change in the beta-return relation during the post-war period in the Colombo Stock Exchange. Nevertheless, this contradictory evidence can be partly due to data quality, proxies, biases, missing data and methods used in previous studies. The period used to estimate the beta can also substantially affect the estimation accuracy of the relationship (Zozulya et al., 2021).

Importantly, when the relationship is substantially symmetrical in up and down markets, the unconditional relationship between risk and return can be weak or insignificant. For example,

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Verma (2011) has found such a symmetrical relationship in up and down markets. Nevertheless, some studies like Karacabey and Karatepe (2004) and Lam (2001) provide evidence for asymmetrical relationships. These evidences suggest that investigations on the unconditional relationship between beta and return have several limitations. Riyath and Jahfer (2018) argue that this empirical rejection of the unconditional version of the CAPM arises mainly due to the inefficiency of the market index.

Thus, by modifying the Fama and MacBeth (1973) approach, Pettengill et al. (1995) introduced a conditional relationship between beta and return. Here, the relationship between beta and return is expected to be positive in up markets and negative in down markets. Following this procedure, many other researchers like Fletcher (2000), Isakov (1999), Karacabey and Karatepe (2004) and Lam (2001) found supportive evidence for CAPM when the sample period is divided into up and down markets. Moreover, Elsas et al. (2003) and Fletcher (1997) provide evidence of the conditional relationship in Europe. Nevertheless, empirical evidence derived from developed markets does not portray the dynamics in emerging markets due to factors such as unique market structures, institutional background, history, level of market integration and risk-free local return (Theriou et al., 2010).

Even though very few studies, such as Samarakoon (1997), Nimal (1997), and Thilakarathne and Jayasinghe (2014), have tested the CAPM's fundamental assumptions and validity unconditionally in the Colombo Stock Exchange, evidence remains mixed (Riyath & Jahfer, 2018). Hence, beta appears to be irrelevant in predicting stock returns. Therefore, Sriyalatha (2009) suggests applying the conditional approach proposed by Pettengill et al. (1995), where the relationship is investigated separately for the up-market and down-market. Along with this, Sriyalatha (2010), Anuradha (2011), and Nimal and Fernando (2013) provide empirical evidence to support the conditional nature of the risk-return relationship in the Colombo Stock Exchange. Nevertheless, Nishantha (2018) provides inconclusive results relating to the conditional four-moment CAPM for the stock returns from the 2000 to 2016 period. Apart from these, studies conducted to investigate this topic in the Colombo Stock Exchange are rare.

With the ending of the thirty-year-long civil war in May 2009, the stock market indexes of the Colombo Stock Exchange grew significantly, making it one of the best-performing markets between mid-2009 and 2010 (Jayasundara et al., 2019; Pallegedara, 2013). Further, a significant reduction in inflation could also be observed after May 2009 due mainly to reduced defence expenditure and decreased interest rates (Pallegedara, 2013). Concurrently, stock returns rose rapidly from January 2009 and never dropped to the pre-January 2009 levels. Moreover, foreign participation in the Colombo Stock Exchange also increased to 50 percent in the first half of 2013 from 25 percent in 2012 (Dayaratne, 2014). These facts highlight that the dynamics in the Colombo Stock Exchange have dramatically changed during the post-war period. Nevertheless, the beta-return relationship has not been adequately examined in the post-war period of the Colombo Stock Exchange. For example, among the few available studies, Sriyalatha (2010), Anuradha (2011), and Nimal and Fernando (2013) considered the data until 2006 only. Also, Riyath and Jahfer (2018) used stock returns during the 1999-2013 period, which covers only four years into the post-war period.

Therefore, on the one hand, the results of the unconditional beta-return relationship are conflicting. On the other hand, there is a lack of studies conducted with the conditional approach covering a sufficient number of years in the post-war period. Therefore, the relationship between beta and return in the post-war Colombo Stock Exchange remains largely unknown. Further, despite market symmetry playing a major role in investigating the beta-return relationship, it has never been tested in the Colombo Stock Exchange. Hence, this study investigates the ability of beta to explain the cross-sectional variation in post-war stock returns in the Colombo Stock Exchange both unconditionally and conditionally, using 11-year post-war data from 2009 to 2020. To guarantee a positive risk-return relationship, the average excess market return must be positive, and the risk premium in up and down markets should be symmetrical (Fletcher, 2000; Karacabey & Karatepe, 2004; Pettengill et al., 1995). Therefore, this study also examines the symmetry of returns in up and down markets in the Colombo Stock Exchange during the same sample period. While the approach adopted in this study largely resembles previous studies, the extended time period covering the post-war period helps clear the doubts on the beta's ability to predict stock returns during the post-war period.

Literature Review

The simplicity of CAPM, coupled with supported empirical investigations such as Black et al. (1972); Fama and MacBeth (1973), made it the most popular asset pricing model even today (Davis, 2001; Rossi, 2016; Sekreter, 2017). Markowitz's portfolio selection theory is a quantitative tool for allocating assets and evaluating the trade-off between risk and return. The CAPM states that the expected return of an asset must be a function of the risk-free rate, beta, and the expected risk premium (Lam, 2001). This relationship between risk and return must be linear (Fernando & Samarakoon, 2020; Zozulya et al., 2021). Generally, investors naively extrapolate a firm's past performance into the future (Lakonishok et al., 1994). Thus, as per CAPM, beta is the single relevant risk measure for investment (Black et al., 1972; Fama & MacBeth, 1973), and a positive relationship between beta and return is generally expected (Nikolaos, 2010; Riyath & Nimal, 2016). Therefore, an optimal portfolio can be constructed if expected returns, variance, and covariance for each asset can be accurately estimated (Markowitz, 1991). Hence, following the work of Markowitz (1952), numerous other studies, such as Sharpe (1964), Black et al. (1972), Fama and MacBeth (1973), and Black and Scholes (1974) developed methods to make the best estimates for these variables (Riyath & Jahfer, 2018).

In contrast to the positive risk-return relationship claimed in CAPM, Hawawini et al. (1983) observed a negative risk-return trade-off in the French stock market, even though the evidence was insufficient to arrive at a robust conclusion. Such a negative risk-return relation was also observed in the United States over eleven months of the year, but not in January (Tinic & West, 1984). Further, Nikolaos (2010) found a negative beta-return relationship in down markets. Therefore, a positive risk-return relationship became an unnecessary condition for capital markets. Evidence suggests that the risk-return relationship is either weak or negative in Asian stock markets (Lam, 2001), including the Colombo Stock Exchange (Samarakoon, 1997).

Even though the beta remained the most prevalent risk measure for expected return calculations, literature against CAPM, such as Reinganum (1981), began to emerge in the late 1970s under the market anomalies literature. Similar studies suggest that betas are not stable and are time-varying (Wijethunga & Dayaratne, 2015). For example, contrary to CAPM prediction, Basu (1977, 1983) noticed that stocks with high earnings yield earned significantly high returns, while stocks with low earnings yield earned significantly low returns (Campbell et al., 2012). However, according to Jaffe et al. (1989), there were no valid prior studies to prove the relationship between stock return and earnings yield. Consequently, Jaffe et al. (1989) found that the relationship between earnings yield and return is not just reflected in the month of January, but also in the rest of the eleven months. This finding supports those of Basu (1977, 1983).

Moreover, Chopra et al. (1992) showed that beta alone cannot explain the variation in stock returns if there are size effects and prior returns are included. For example, Banz (1981) found the size effect, where firms with low market capitalization account for higher average risk-adjusted returns than firms with high market capitalization. Similarly, De Bondt and Thaler (1985) found that a portfolio formed by buying stocks whose value has declined over the past three to five years and selling securities whose value has risen over the last three to five years has produced a higher average expected return, contrary to the predictions of traditional CAPM. Moreover, securities with high book-to-market ratios had higher average returns, contrary to the predictions of traditional CAPM (Chan et al., 1991; Rosenberg et al., 1985). Further, Bhandari (1988) revealed that firms with high leverage account for higher returns than firms with low leverage. Nevertheless, high leverage must generally increase a firm's risk, eventually absorbing this risk increment by a more significant beta coefficient.

Further, Jegadeesh (1990) argued that the stocks with higher realized returns over a few months continue to hit high returns over the next month, representing a short-term momentum. In contrast, Jegadeesh (1990) found that stocks with declining realized returns in recent months continued to exhibit poor performance for yet another month, and that could be altered immediately. Later, Jegadeesh and Titman (1993) confirmed that this momentum lasts more than one month. However, the pattern in short-term momentum is quite the opposite of the long-term return reversal studied in overreaction studies.

Even though very few studies, such as Samarakoon (1997), Nimal (1997) and Thilakarathne and Jayasinghe (2014) have tested the CAPM's fundamental assumptions and validity unconditionally in the Colombo Stock Exchange, evidence remains mixed (Riyath & Jahfer, 2018). Interestingly, according to Riyath and Jahfer (2018), the unconditional relationship is significantly negative during the post-war period (06/2009-09/2013) and contradicts the positive relationship observed by Thilakarathne and Jayasinghe (2014). According to Sriyalatha (2009), the unconditional risk-return relationship in the Colombo Stock Exchange is weak. Hence, beta appears to be insignificant in predicting stock returns. Therefore, Sriyalatha (2009) suggested applying the conditional approach proposed by Pettengill et al. (1995). By doing so, Sriyalatha (2010) provided empirical evidence to support the conditional nature of the risk-return relationship in the Colombo Stock Exchange. Moreover, Anuradha (2011), Nimal and Fernando (2013), and Riyath and Jahfer (2018) found a significant positive relationship between beta and return during up markets and a significant negative relationship in down markets on the Colombo Stock Exchange. However, Nishantha (2018) provided inconclusive results relating to the conditional four-moment CAPM for the stock returns from the 2000 to 2016 period.

This literature review suggests that the beta cannot be the single factor that predicts stock returns. Therefore, this literature casts doubt on the ability of the CAPM to explain the risk-return relationship in stock markets, particularly in emerging economies. Consequently, given the validity of CAPM as a model to predict stock return has been debated, the conditional approach has emerged as a tool for investigating risk-return relations in stocks. However, not only is the evidence mixed concerning both developed and emerging capital markets, but also less has been done in Sri Lanka in this regard. This casts a doubt on the risk-return relation in the Colombo Stock Exchange, particularly in the post-war period.

Methodology

Data and Sample

The sample period of this study covers an eleven-year and three-month (135 months) period from January 2009 to March 2020. Since the sample period extends beyond five years, the period was subdivided into four time periods considering the economic changes. These subperiods were termed (1) the early post-war period (January 2009 to January 2011), (2) the construction boom period (February 2011 to January 2015), (3) the post-2015 presidential election period (February 2015 to March 2019), and (4) the post-Easter Sunday Attacks period (April 2019 to March 2020). The changes in the market performance during these four subperiods can be observed in Figure 1.

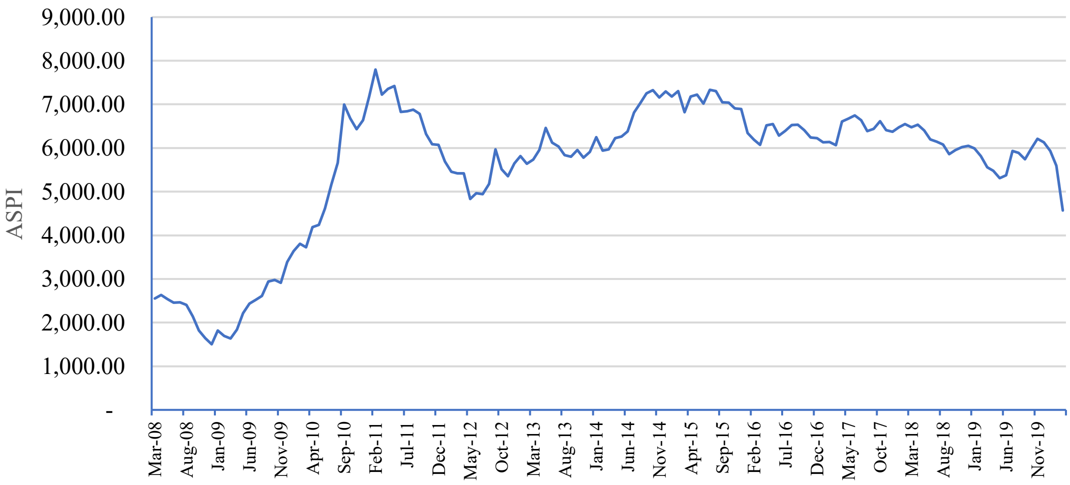

Figure 1: Variation in ASPI (2008-2020)

Marking the beginning of the first subperiod, a substantial increase in the market performance can be observed since 2009, with the end of the 30 years of civil war. Marking an end to the first sub-period, this steep positive slope was transformed into a steep negative slope from February 2011. However, from May 2012 until January 2015, the performance of the Colombo Stock Exchange gradually increased due mainly to the government-funded and foreign-aided boom in the construction industry. For example, the construction sector reported an impressive growth of 21.6 percent in 2012 compared to 14.2 percent in 2011 (Silva et al., 2018). Ending the second subperiod, the stock returns started gradually declining again since the 2015 presidential election. This drop may be mainly attributed to the unstable political climate in the country at that period (Wanniarachchige & De Silva, 2022). Marking another turning point, the stock market performance drastically dropped immediately after the Easter Sunday Attacks in April 2019. For example, ASPI hit an all-time low since June 2010 in March 2020. The spread of the COVID-19 pandemic could also be held responsible for this sharp decline. Data after March 2020 was not obtained because, during this period, the performance of the Colombo Stock Exchange was largely distorted due to the Covid-19 pandemic (Roshana et al., 2020; Sandamini & Rajeevan, 2021).

Four criteria were used when selecting the stocks for the sample. First, any company that operated continuously throughout the entire sample period was qualified to be considered for the sample. Second, out of the companies qualified under the first criterion, any company registered under the bank, finance, and insurance sector was excluded due to their inherent differences, similar to the approach adopted by Gunaratne and Anuradha (2017), Riyath and Nimal (2016) and Fogelberg and Griffith (2000). Third, the companies for which all the required data for the entire sample period were not available were excluded from the sample. Finally, since this study considers only the capital gain and dividends in calculating the stock return, the stocks with other forms of returns, such as bonus issues, rights issues, and stock splits, were excluded from the sample. Therefore, the resultant sample of this study contains 55 stocks listed on the Colombo Stock Exchange. Monthly data for these stocks, such as stock prices and dividends, were collected from the data library of the Colombo Stock Exchange.

Moreover, three-month Treasury bill rates from June 2008 to October 2021 were collected from the data library of the CBSL. Using these data, an average monthly Treasury bill rate was calculated for each month of the sample period to be used as the risk-free rate. Three-month Treasury bill rates could not be found for October 2014, November 2014, January 2018, December 2018, and January 2019. Therefore, these missing values were filled by interpolating average monthly Treasury bill rates of neighboring months employing linear interpolation. Including these data, the final data set is composed of 7,425 firm-month observations.

The measurement and analysis procedure adopted in this study is explained in sections 3.2-3.5 primarily using STATA’s rolling window regression command (asreg) developed by Shah (2017) with Fama–MacBeth standard errors (fmb). This procedure was repeated for each sub-sample period. These were repeated for each sub-sample period.

Measurement and Analysis

This study assesses the unconditional and conditional relationship between beta and stock return and tests the market symmetry. To this end, first, each stock's monthly excess returns were calculated, employing Equation 1. In the equation, R_{it} is the excess return of the stock *i* in the month *t*, P_{it} is the price of the stock *i* at the end of the month *t*, D_{it} is the dividend paid for stock *i* in the month *t* (for months with multiple dividend payments, the total dividend is used for D_{it}), P_{it-1} is the price of the stock *i* at the beginning of the month *t* and R_{ft} is the risk-free rate in the month *t*.

$$R_{it} = \left\{\frac{[(P_{it} - P_{it-1}) + D_{it}]}{P_{it-1}}\right\} \times 100 - R_{ft} \quad (1)$$

Second, monthly excess returns on the market portfolio were calculated using Equation 2. For this purpose, the all-share price index was used. In the equation, *t* denotes time. Further, R_{mt} is the excess return on the market portfolio in period *t*. $ASPI_t$ is the all-share price index at the end of month *t,* and $ASPI_{t-1}$ is the all-share price index at the beginning of month *t*, and R_{ft} is the risk-free rate in month *t*.

$$R_{mt} = \left\{\frac{[(ASPI_t - ASPI_{t-1})]}{ASPI_{t-1}}\right\} \times 100 - R_{ft} \quad (2)$$

$$R_{it} = \alpha_i + \hat{\beta}_{0i} R_{mt} + \hat{\beta}_{1i} R_{mt-1} + \hat{\beta}_{2i} R_{mt-2} + \hat{\beta}_{3i} R_{mt-3} + \varepsilon_{it} \quad (3)$$

Third, using the calculated monthly excess returns for individual stocks (R_{it}) and excess returns on the market portfolio (R_{mt}), betas were estimated employing the first step of the two-stage rolling window regression approach adopted to examine the beta-return relationship by most studies, such as Fletcher (1997), starting from Fama and MacBeth (1973) as illustrated in Equation 3. The rolling window spans over 13 months (-6 to +6). In the equation, R_{it} is the excess return on share *i* in the period *t* estimated using Equation 1. Moreover, R_{mt} is the excess return on the market portfolio in period *t* estimated using Equation 2. Further, R_{mt-1}, R_{mt-2}, and R_{mt-3} are a set of lagged excess returns on the market. And, α_i is the intercept of asset *i* and $\hat{\beta}_{0i}$ is the beta of stock *i* estimated by the regression model specified in Equation 3. Finally, ε_{it} is the error term for stock *i* at period *t*. The portfolio approach that most of the literature has adopted was not considered in this study, as the number of portfolios formed has no major impact on the test (Fernando & Nimal, 2009).

Unconditional relation between beta and return

To assess the unconditional relation between beta and return, a monthly cross-sectional regression was estimated using the second step of the Fama and MacBeth (1973) regression model specified in Equation 4. In the equation, R_{it} is the excess return on share *i* in the period *t*, μ_{it} is the error term for stock *i* and period *t*, $\hat{\beta}_{0i}$ is the estimated beta of stock *i* from Equation 3, and both $\hat{\gamma}_{0t}$ and $\hat{\gamma}_{1t}$ are coefficients for each month when estimated using the second step of the Fama–MacBeth regression procedure. According to Pettengill et al. (1995), if $\bar{\hat{\gamma}}_{1t}$ is greater than zero, there is a positive risk-return trade-off.

$$R_{it} = \hat{\gamma}_{0t} + \hat{\gamma}_{1t} \hat{\beta}_{0i} + \mu_{it} \quad (4)$$

Conditional relation between beta and return

Equation 5 was used to test the systematic conditional relationship between beta and return following the cross-sectional regression model used by Pettengill et al. (1995). In the equation, R_{it} is the excess return on stock *i* in the period *t*, μ_{it} is the error term for stock *i* and period *t*, $\hat{\beta}_i$ is the estimated beta of stock *i*, $\hat{\gamma}_{2t}$ is the monthly risk premium estimates of upmarket months

($R_{mt} > 0$), $\hat{\gamma}_{3t}$ is the monthly risk premium estimates of down-market months ($R_{mt} < 0$). The ghost variable is equal to one ($\delta = 1$) if the market excess return is positive, and $\delta = 0$ if the market excess return is negative.

$$R_{it} = \hat{\gamma}_{0t} + \hat{\gamma}_{2t}\,\delta_t\,\hat{\beta}_{0i} + \hat{\gamma}_{3t}\,(1\text{-}\delta_t)\hat{\beta}_{0i} + \mu_{it} \qquad (5)$$

Then the coefficients $\hat{\gamma}_{2t}$ and $\hat{\gamma}_{3t},$ respectively, were obtained using the Fama and MacBeth (1973) procedure for the conditional test of CAPM. According to Pettengill et al. (1995), if $\bar{\hat{\gamma}}_{2t} > 0$ and $\bar{\hat{\gamma}}_{3t} < 0$, a systematic conditional relationship between beta and return exists. The conditional beta return relationship in explaining cross-sectional variation in up markets was tested using the hypothesis $\bar{\hat{\gamma}}_{2t} > 0$. Moreover, the conditional beta return relationship in explaining cross-sectional variation in down markets was tested using the hypothesis $\bar{\hat{\gamma}}_{3t} < 0$.

The symmetry of the risk premium of up and down markets

The method adopted by Pettengill et al. (1995), as specified in Equation 6, was used to test the symmetry of the risk premium of up and down markets. As stated by Fletcher (1997), the sign of the $\hat{\gamma}_{3t}$ coefficients needs to be reversed, and the average value must be recalculated to test the symmetry. Accordingly, this study reversed the sign of $\hat{\gamma}_{3t}$ coefficients and obtained the time series mean $\bar{\hat{\gamma}}_{3t}$ before substituting it into Equation 6. Then, the symmetry of risk premium of up and down markets was tested using mean values and the standard two-population t-test (adjusted t-statistic) with the hypothesis $\bar{\hat{\gamma}} = 0$.

$$\bar{\hat{\gamma}} = \bar{\hat{\gamma}}_{2t} - \bar{\hat{\gamma}}_{3t} \qquad (6)$$

$$t(\bar{\hat{\gamma}}_{k}) = \bar{\hat{\gamma}}_{k} \;/\; [\, \mathrm{sd}\,(\bar{\hat{\gamma}}_{k}) \,/\, \sqrt{T}\,] \qquad (7)$$

According to Riyath and Jahfer (2018), considering the individual value of cross-sectional regression coefficient estimates and relevant t-tests is inadequate to make statistical inferences. Hence, these hypotheses were further tested by the estimated average values of cross-sectional regression coefficients of the aforesaid equations 3, 4, and 5 using Fama and MacBeth (1973) adjusted t-statistic as specified in Equation 7. In the equation, $\hat{\gamma}_{k}$ is the average of the k^{th} coefficient estimate of cross-sectional regression, sd ($\hat{\gamma}_{k}$) is the standard deviation of the $\hat{\gamma}_{k},$ and T is the number of time-series observations.

Results and Discussion

Unconditional Beta-Return Relationship

The results relating to the unconditional relation between beta and return derived using Equation 4 are shown in Table 1. The results support a positive risk-return trade-off for the entire sample period ($\bar{\hat{\gamma}}_{1t} = 1.388$; $p = 0.009$). This suggests that high beta stocks exhibit higher returns than low beta stocks when the entire sample period is considered, confirming the central prediction of CAPM. Nevertheless, similar results could not be observed for the sub-sample periods, even though weak evidence prevails to claim a positive risk-return trade-off during the early post-war sub-sample period ($\bar{\hat{\gamma}}_{1t} = 3.866$; $p = 0.051$).

Table 1: Test of unconditional beta return relationship

Period	$\bar{\hat{\gamma}}_{1t}$		t	$\bar{\hat{\gamma}}_{0t}$
Entire period (Jan 2009 – Mar 2020)	1.388	***	2.64	-8.446
Early postwar (Jan 2009 – Jan 2011)	3.866	**	2.05	-5.831
Construction boom (Feb 2011 – Jan 2015)	0.668		0.91	-8.619
Post 2015 presidential election (Feb 2015 – Mar 2019)	0.496		1.10	-8.777
Post Easter Sunday attacks (Apr 2019 – Mar 2020)	0.228		0.13	-9.038

Notes: The coefficients $\hat{\gamma}_{1t}$ and $\hat{\gamma}_{0t}$ were estimated using rolling window regressions. ***, ** and * indicate statistical significance at 1, 5 and 10 percent levels, respectively

Conditional Beta-Return Relationship

The results relating to the test of the systematic conditional relationship between beta and return derived using Equation 5 are shown in Table 2. The results support a positive relationship in up markets in the entire sample period ($\bar{\hat{\gamma}}_{2t}$ = 12.288; $p < 0.001$). The results suggest that the high beta stocks exhibit high returns during up markets. The early post-war period also shows a similar pattern ($\bar{\hat{\gamma}}_{2t}$ = 9.968; p = 0.012). However, contrary to the literature, a significant negative relationship could not be observed with down markets ($\bar{\hat{\gamma}}_{3t}$ = 0.127; p = 0.735). Hence, investors of the Colombo Stock Exchange cannot expect higher returns from lower beta stocks during down-market conditions.

The ASPI has shown an abnormal increase immediately after the end of the civil war up to early 2011 (Riyath & Jahfer, 2018). These abnormal changes might have affected the beta-return relationship in the Colombo Stock Exchange, leading to contradictory results in the down market. The construction boom period does not show a significant conditional relationship in up ($\bar{\hat{\gamma}}_{2t}$ = 11.777; p = 0.084) and down ($\bar{\hat{\gamma}}_{3t}$ = 0.073; p = 0.905) markets. The other sub-sample periods either do not consist of up markets or do not contain the number of up markets necessary to make meaningful statistical significance. Thus, the results of the conditional test do not fully support the prediction of CAPM that beta is related to return.

Table 2: Test of conditional beta return relationship

Period	Up markets ($\bar{\hat{\gamma}}_{2t}$)		Down markets ($\bar{\hat{\gamma}}_{3t}$)
Entire period (Jan 2009 – Mar 2020)	12.288	***	0.127
	(4.94)		(0.34)
Early postwar (Jan 2009 – Jan 2011)	9.968	**	-0.203
	(0.14)		(-0.12)
Construction boom (Feb 2011 – Jan 2015)	11.777	*	-0.073
	(3.23)		(-0.12)
Post 2015 presidential election (Feb 2015 – Mar 2019)	-		0.496
			(1.10)
Post Easter-Sunday attacks (Apr 2019 – Mar 2020)	-		-1.165
			(-0.99)

Notes: The coefficients $\hat{\gamma}_{2t}$ and $\hat{\gamma}_{3t}$ were estimated using rolling window regressions. The *t*-statistics are within parentheses. ***, ** and * indicate statistical significance at 1, 5 and 10 percent levels, respectively.

Symmetry of the Risk Premium of Up and Down Markets

Table 3 shows the results relating to the symmetry of the risk premium in up and down markets derived using Equation 6. The hypothesis that the relationship between beta and return in up-market and down-market months is symmetrical is not rejected, both for the overall sample period (t = -1.5; p = 0.868) and the four sub-sample periods. This suggests that the estimated risk premiums are similar during up and down markets. This result supports one of the necessary conditions for a positive risk-return trade-off. Nevertheless, as Pettengill et al. (1995) claim, mere symmetry of risk premiums in up and down markets does not guarantee a positive risk-return tradeoff if there exists a systematic conditional relationship between beta and return. However, the non-existence of a systematic conditional relationship in the sample of this study does not support a positive risk-return tradeoff.

Table 3: Symmetry of the Risk Premium in Up and Down Markets

Period	n_1	n_2	$\bar{\hat{\gamma}}_{2t}$ - $\bar{\hat{\gamma}}_{3t}$	t
Entire period (Jan 2009-Mar 2020)	770	6655	-.576	-.15
Early postwar (Jan 2009-Jan 2011)	550	825	-.062	-1.35
Construction boom (Feb 2011-Jan 2015)	165	2475	-.138*	-1.75
Post 2015 presidential election (Feb 2015-Mar 2019)	0	2750	-	-
Post Easter Sunday Attacks (Apr 2019-Mar 2020)	55	605	25.504	.60

Notes: The n_1 and n_2 are the number of up-market months and the number of down-market months. The coefficients $\bar{\hat{\gamma}}_{2t}$ and $\bar{\hat{\gamma}}_{3t}$ are the time-series averages of $\hat{\gamma}_{2t}$ and $\hat{\gamma}_{3t}$ estimated using rolling window regressions. The mean difference is denoted by $\bar{\hat{\gamma}}_{2t}$ - $\bar{\hat{\gamma}}_{3t}$.

Conclusions

A number of studies failed to reveal the relation between beta and returns predicted by the CAPM. Pettengill et al. (1995) introduced a conditional test that predicts the existence of a positive relation between beta and returns in up markets and a negative relation in down markets. This study investigated both the unconditional and conditional relationships between stock beta and returns of the firms listed on the Colombo Stock Exchange using data from 2009 to 2020, published by the Colombo Stock Exchange and CBSL, along with the cross-sectional regression models of Fama and MacBeth (1973) and Pettengill et al. (1995). Further, the study adopted the approach of Pettengill et al. (1995) to evaluate the symmetry of up and down markets.

There is a positive unconditional beta-return relationship in the Colombo Stock Exchange when the entire sample period is considered. This implies that using beta as a systematic risk measure for asset selection purposes is valid in the Colombo Stock Exchange. This finding is consistent with Thilakarathne and Jayasinghe (2014) in relation to the Colombo Stock Exchange. Similar findings were revealed by Marozva (2019), Nurwulandari (2020), and Nurwulandari (2021), who found that the expected excess returns are positively and significantly related to stocks' systematic risks as measured by betas for the Johannesburg Stock Exchange and Karachi Stock

Exchange, respectively. Nevertheless, this finding contradicts Samarakoon (1997), Nimal (1997) and Anuradha (2011) relating to the Colombo Stock Exchange.

Moreover, a significant positive beta-return relationship was evident in the up market as expected. Nevertheless, there was no significant negative beta-return relationship in down markets, contrary to the expectation. Therefore, even though the beta is related to returns in up markets, the relationship in the down markets is not evident. Thus, conditional beta is not a reliable tool for portfolio management. These results are consistent with Fernando and Samarakoon (2020), Fernando et al. (2021) and Shah et al. (2015). Nevertheless, recent studies employing the model proposed by Pettengill et al. (1995) for developed and developing markets, such as Shah et al. (2021), have found a conditional relationship between beta and stock returns both in up and down markets. Further, there is market symmetry of up and down markets in a conditional setting.

Key implications of this study are twofold. First, using unconditional beta as a systematic risk measure for asset selection purposes has a higher value (Marozva, 2019; Nurwulandari, 2020, 2021), while conditional beta is not a reliable tool for portfolio management (Fernando & Samarakoon, 2020; Fernando et al., 2021; Shah et al., 2015). The findings of this study support the validity of beta in predicting long-term returns in an unconditional setting, while the ability of beta in explaining short-term returns and its conditional relationship are still debatable. Second, this study empirically justifies the theoretical relationship between beta and stock returns in one of the emerging stock markets and thus, contributes to the existing body of knowledge pertaining to the validity of beta in explaining the expected returns of companies.

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