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Risk-Return Trade-off: Amanah Saham Bumiputera Versus Tabung Haji

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Abstract: This research explores the risk-return trade-off and the income return on investment in Amanah Saham Bumiputera (ASB) with Tabung Haji (TH) over an observed period from 1994 through 2020. Specifically, the study examines any potential theoretical connections between the performance of these two-unit trusts. Within the frameworks of the Capital Asset Pricing Model (CAPM) and the Modern Portfolio Theory (MPT), this research uses long run OLS regression and the Engle-Granger cointegration test (1987) to estimate the annual announced nominal dividends of both funds over a 27-year period. The empirical evidence supports the existence of a unidirectional equilibrium relationship between the stated dividends of the two funds, from TH to ASB. However, there is an absence of a dynamic relationship between them. The study also observed a statistically significant positive correlation between ASB's dividends and TH's throughout the entire sample period. This evidence strongly suggests that the two funds are competing with one another and technically related in terms of dividend distributions. In terms of systematic risk, both funds have a significantly low negative beta, which suggests an inverse relationship with the stock market performance. Concerning coefficient of variation analysis, ASB seems to be the preferred portfolio with the given rate of return. Therefore, it is clear that both ASB and TH are credible unit trusts coupled with a diversification effect. Consequently, it is essential for the top management of ASB and TH to step up operational and allocative efficiencies in their portfolio management to provide steadily increasing dividend payments to their unitholders in the long run.

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1. Introduction

Lembaga Tabung Haji (TH) is a quasi-governmental agency that is regulated by Tabung Haji Act 1995 (Tahir, 2017). Established in September 1963, TH focuses on three main activities: hajj management, depository services, and investments. Today, TH is considered as one of the successful business experiments initiated by the government for the Muslims in Malaysia. TH itself provides not only an alternative saving for Muslims but also plays an essential role in supporting the development of Malaysia's Islamic finance system. TH has become a symbol of Malaysian Muslims' economic strength, controlling about 53% stake in Bank Islam Malaysia Berhad (BIMB). The strategy of this TH has long been acknowledged internationally, and the similar model has been effectively adopted in numerous Muslim nations throughout the world. Indonesia is one of the proponents leading to Badan Pengelola Keuangan Haji (BPKH) in July 2017 in South East Asia. Like TH, BPKH's primary objective is to manage Hajj finances, including revenue creation, asset management, and portfolio diversification. ' (BPKH, 2020).

TH has been actively involved in financial services and investment, particularly in the Islamic banking segment, since its inception in 1963. As part of TH's diversification strategy, its plantation business segment was set up in 1972. The main objective was to provide good income streams for TH from the plantation sector. On 26 May 2005, TH Plantations Sdn Bhd was upgraded into TH Plantations Berhad (THPB) and subsequently listed at Bursa Malaysia in April 2006. However, it is to note that its major plantation activities are in Sarawak and Kalimantan, Indonesia (Berhad, 2019). Steady annual demand for crude palm oil (CPO) from China and India makes this palm oil production somewhat a lucrative business. Given that Malaysia is the second-largest producer of palm oil globally, there are many incentives offered by the government for the local companies.

Table 1 below summarizes the key business segments of TH and BIMB Holdings Berhad has been the major contributor to TH's income streams since its inception. TH suffered the most from the cumulative losses incurred in its subsidiary, TH Heavy Engineering Berhad (THHE), a publicly listed company that focuses on fabricating offshore steel structures in the oil and gas industry. T'HHE's share price went from RM1.72 in 2008 to RM0.04 in early December 2018. TH's oil and gas sector has not been a good turf, and a corporate restructuring exercise was executed in 2019, shifting more than half of TH's productive assets into fixed income investment (Reserve, 2019). THHE is undergoing a major corporate restructuring, and its turnaround plan is expected to be announced in August 2022 (Berk & van Binsbergen, 2017). Besides BIMB, TH Plantations Berhad is also listed at Bursa Malaysia, with a market capitalization estimated at RM424 million in March 2021.

Table 1. Key business segments of TH

Company	Equity Holding
Malakoff Corp Berhad	10.36%
BIMB Holdings Berhad	53.47%
TH Plantations Berhad	73.84%
TH Properties Sdn Bhd	100%
TH Hotel and Residence Sdn Bhd	100%

Source: Bloomberg Database (2018) and TH Annual Reports

Amanah Saham Bumiputera (ASB) is a special unit trust offered exclusively to Malaysian Bumiputeras. This fund was launched in January 1990 and managed by Amanah Saham Nasional Berhad (ASNB), a subsidiary company of Permodalan Nasional Berhad (PNB). Like TH unit trust, this ASB investment is established to provide alternative savings for Bumiputeras. Essentially, ASB is regarded as a long-term investment capable of generating consistent and competitive returns for its investors (Bakar, Nawāwī, & Salin, 2015).

As for the financial year 2020, almost 82% of ASB's portfolio was allocated to equity investment, while the remaining 18% was channeled into fixed income securities and other asset classes. In terms of international portfolio diversification, ASB seemed less aggressive as only 7% of its portfolio was invested internationally (ASB, 2020). Table 2 below presents ASB's ten most significant equity investments at Bursa Malaysia Securities Berhad. It is essential to highlight that the finance sector (Maybank and CIMB Group) is a focused segment that makes up almost 24% of ASB's total equity investment. Interestingly, TH is also fond of investing in the finance sector, as indicated by its controlling stake in BIMB Holdings Berhad. Equity investment in the finance sector can provide lucrative returns to both funds in the long run.

Table 2. ASB's ten most significant investments at Bursa Malaysia

Listed Company	Percentage of Net Asset Value (NVA)
Maybank Banking Berhad	22.22%
Sime Darby Plantation Berhad	10.55%
Sime Darby Berhad	4.39%
Tenaga Nasional Berhad	3.83%
Axiata Group Berhad	2.70%
Petronas Chemicals Group Berhad	2.36%
Maxis Berhad	2.10%
Digi.Com Berhad	1.64%
Telekom Malaysia Berhad	1.56%
CIMB Group Holdings Berhad	1.37%

Source: ASB Annual Report 2020

Empiricistically, the primary objective of this study is to comprehend the risk-return profile of these two competing funds and compare their performance from 1994 to 2020. It is vital to recall that TH and its investment arms were established in the early 1960s as part of the government's initial initiatives to reduce urban and rural extreme poverty. ASB was established in 1979 and is part of the new economic policy of the Malaysian government, which encourages savings among Malaysian Bumiputeras. A constant increase in income is indicative of a sound investment strategy, which would ultimately benefit shareholders and other stakeholders. Consequently, we must comprehend the risk-return tolerance of these two funds and the amount to which a pioneer fund management firm such as TH could impact the performance of ASB over time.

2. Literature Review

In this empirical study, the relationship between the efficient historical rate of return for ASB and TH is explained by two main ideas. These theories are Capital Asset Pricing Model (CAPM) and Modern Portfolio Theory (MPT). Since the beginning, ASB and TH's ability to deliver attractive dividend payments by consistently enhancing their portfolios' value is an outstanding achievement to ponder over. The remarkable historical performances of these two funds are undoubtedly driven by their operation teams to forestall the systemic and unsystematic risks in their investment portfolios. Concerning Modern Portfolio Theory, ASB and TH operation teams' ability to act as know-how investors by spreading and diversifying the relevant risks has delivered a remarkable track record by steadily paying out solid dividend payments to their unitholders. The usability of both theories within the research theme is discussed at length in the following sub-section.

2.1 The Single-Index Model (SIM)

Developed in 1963, the single-index model (SIM) was an attempt by William Sharpe to explain excess return from equity investment. This model suggests that the stock return is strongly influenced by the market coupled with firm-specific unexpected components (Sharpe, 1963). Because of this, the performance of every stock is subjected to the performance of a market index like the Kuala Lumpur Composite Index (KLCI). The major setback of SIM is its inability to explain the magnitude of expected return, which is the main issue in asset pricing. Fisher and Jordon (1994) explain that estimating expected returns is challenging for every investor. There is a high possibility that the actual return will be less than expected from the equity investment. The SIM can be mathematically expressed as:

$$(R_{it} - R_{rf}) = \sigma_i + \beta_i (R_{mt} - R_{rf}) + \varepsilon_{it} \quad \ldots\ldots(1)$$

where:

$(R_{it} - R_{rf})$	=	Excess return on security 'i'
R_{rf}	=	Risk-free rate of return (proxied by 3-month Treasury Bill)
σ_i	=	Abnormal return
R_{mt}	=	Expected return of the market
β_i	=	Beta of security 'i'
$(R_m - R_{rf})$	=	Equity market premium
ε_{it}	=	Residual returns

The residual returns above are assumed to be independent and normally distributed with mean zero and constant variance. The SIM was later revised and further improved by William Sharpe, Jack Treynor, John Lintner, and Jan Mossin in the late 1960s. Due to its simplicity and pragmatic feature, many empirical researchers still use the SIM to compute stock betas, compare individual stock performance, and evaluate its intrinsic value (Nandan & Srivastava, 2017).

2.2 The Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model has undergone several modifications until it was made popular in 1970 by Williams Sharpe in his published book *Portfolio Theory and Capital Market*. In essence, this model introduces the concepts of systematic risk and unsystematic risk in the study of asset pricing. According to CAPM, an investment portfolio must deliver an equal return to its cost of capital and investors must be compensated for assuming the relevant risks. In addition to this, the theory suggests a positive relationship between risk and expected return made by the investors on their portfolio (E. F. Fama & MacBeth, 1973; Lintner, 1975; Sharpe, 1970) In addition, CAPM suggests that individual investment in the market portfolio involves systematic risk and unsystematic risk (Sharpe, 1970). Systematic risk contains the risk of natural market risks, and this type of risk is simply unavoidable. This risk may arise due to changes in interest rates or uncertainty in the economic conditions. Unsystematic risk is attributable to firm-specific risk related to the portfolio or the stocks per se. Therefore, this is a stand-alone risk not associated with market sentiment. The CAPM is still one of the leading theories in portfolio management, and the original model has been revised over the years for better predictive capability (French, 2016). In essence, the bona fide CAPM formula can be expressed as follows:

$$R_i = R_{rf} + \beta_i (R_m - R_{rf}) \quad \ldots\ldots(2)$$

where:

R_i	=	Expected return on security 'i'
R_{rf}	=	Expected return of the market
R_m	=	Beta of security i
β_i	=	Equity market premium
$(R_m - R_{rf})$	=	Expected return on security 'i'

Based on the above formula, the risk-free rate of return is the rate of return of an investment with zero risks enjoyed by any investor. The investor can potentially earn a risk-free investment over a specified time on their investment portfolios or stocks (E. F. Fama & French, 2004). Besides this risk-free rate of return, the real risk-free rate (R_{rf}) can also be derived by subtracting the current inflation rate from the Treasury bond yield that matches the investment duration (Sharpe, 1970). These are the critical elements in the CAPM that assist investors in decision-making.

The equity market premium refers to an additional rate of return that investors will earn because of investing in the market portfolio with a risk-free rate of return. The compensation earned by investors varies based on the level of risk associated with specific companies or the overall portfolio. In addition, this equity market premium (also known as a market-risk premium) fluctuates over time as market risk fluctuates over a given period. (Sharpe, 1970). Thus, the "*beta*" in the above formula represents the systematic risk of an individual stock or a portfolio. The *beta* measures the supply or portfolio's relative volatility in the capital market. It means that any changes in the capital market conditions will oscillate both portfolio and individual stock performances and their potential rate of return to the investors. The CAPM is a widely-used pricing model due to its easy computation of an investor's required rate of return, and the issue of systematic risk (or undiversifiable risk) is well addressed in this model. The CAPM only considers systematic risk as it argues that most investors (individual and institutional players) can have well-diversified portfolios in reality. The element of unsystematic risk can have well-diversified portfolios in existence in which the component of unsystematic risk can be practically eliminated. It is worthy to note that several earlier studies and even the most recent ones, have provided evidence in support of the theory of the CAPM (Ansari, 2000; Dhankar & Kumar, 2007; E. F. Fama & MacBeth, 1973; Miller & Scholes, 1972).

Similar to other earlier pricing models, the CAPM is subject to some limitations. The major setback can be seen from the model's factor inputs, primarily the risk-free rate of return. As mentioned earlier, this rate is based upon the yield on short-term government securities like 3 Month Treasury Bill rate, and it is known that this rate changes daily in the money market. Hence, this proxy for the risk-free rate is exposed to market volatility. Secondly, the CAPM is criticized for its somewhat unrealistic assumptions. One of the debatable assumptions is the investor's ability to borrow and lend at a risk-free interest rate. In real life, the only federal government could take such a position, and even institutional players like commercial banks are not allowed to perform such a function. Therefore, the CAPM model's security market line (SML) might be less steep (lower required rate of return) than the model initially predicted. The issue of beta stationarity has also been criticized by many (Banz, 1981; Basu, 1977; E. F. Fama & MacBeth, 1973; Reinganum, 1981). The value of 'the portfolio's expected return cannot be estimated with accuracy because the beta itself varies over time. These highlighted limitations have casted doubt on the fundamentals of the CAPM model.

2.3 Modern Portfolio Theory (MPT)

It is interesting how Markowitz (1952) explains the risk-return trade-off from his modern portfolio theory. The theory investigates the risk-averse attitude of investors whose objective is to maximize their expected return from portfolio investment with a given level of market risk. This theory discusses 'the portfolio's risk and return and looks into the investment diversification effect that influences the overall portfolio's performance. Moreover, this theory indicates that an investor can form a well-diversified portfolio with different asset classes by maximizing potential returns at a given level of market risk (Markowitz, 1952) Alternatively, an investor can also construct a portfolio of stocks at the lowest possible level of risk with the given expected return rate by considering some statistical measures that eventually lead to an efficient portfolio (Ross, 2013).

Conventionally, most investors are risk-averse as they prefer investing in a less risky market than the riskier one. It means that risk-averse investors look for opportunities to invest in different asset classes or markets to maximize their return on investment from individual stocks or portfolios. Thus, MPT theory enlightens the investors to diversity their investment in various markets such as government treasury bonds, blue-chip stocks, and even money market financial instruments (Elton, Gruber, Brown, & Goetzmann, 2009; Sears, 1993). The MPT also asserts that the government bond negatively correlates with stocks and holds a significantly lower variance. An efficient portfolio is specially designed to help investors enjoy handsome returns with a given level of risk (E. F. Fama, 1970).

In summary, the CAPM and MPT theories apply to the explanation of the distribution of income return or dividends from both ASB and TH investments. Unquestionably, the two funds have provided outstanding returns over the past two decades, as seen by their track records. Based on CAPM and MPT, it is evident that the portfolio's total success will depend on the fund management's capacity to comprehend and implement effective techniques in developing efficient portfolios that offer desirable results ' (Berk & van Binsbergen, 2017).

3. Data & Methodology

The study employs time-series econometrics to model the secondary annual data from 1994 to 2020. The dividends declared by ASB and TH can be seen in their separate yearly reports. Only nominal dividends announced by ASB and TH are evaluated in this study, and their bonus dividends are entirely ignored. To determine TH's small annual premium, we add its announced dividend to the 2.5 percent zakat payment. The sample period of 27 years is excellent since it encompasses nearly six economic cycles and two significant economic crises, notably the Asian Debt Crisis of 1997-1998 and the US Subprime Mortgage Crisis of 2007-2010. The ordinary least square (OLS) regression and Engle-Granger two-steps cointegration approach (EG) are used to determine the risk-return profile of TH and ASB and the hypothesized link between their dividend distributions. In modeling non-stationary time series data, the OLS long-run regression serves as the baseline estimation, whereas the EG is our preferred method. Using a series of early EG tests, we can later demonstrate that the linear combination of these two non-stationary variables may be stationary. The cointegration test, also known as an error-correction model, relies on the assumption of stationarity, which is the basic premise (ECM).'

3.1 Independent and Dependent Variables

The TH's dividend is designated as the predictor or independent variable that explains changes in the response. From the historical perspective, the TH fund was set up much earlier than ASB, as TH started its unit trust operations in 1963. TH has been the benchmark for ASB in gauging its performance. In this study, the ASB's dividend is our response variable or the variable of interest, and it is imperative to look at its profit distribution in the past 27 years. As part of the model specification process, 'the TH's dividend change is the control variable that directly influences ASB's dividend pay-out. At this point, causality is established to validate the direction of causation. Concerning the CAPM, the model specifies the independent and dependent variables whereby the market return is the critical determinant of the portfolio's expected return (E. F. a. F. Fama, K. R, 1992; French, 2016).

3.2 Estimation Methods

Based upon the bona fide capital asset pricing model (CAPM) by Sharpe (1964), Lintner (1965), and Mossin (1966), this study uses the Ordinary Least Squares (OLS) linear regression function to estimate the value of portfolio beta. Subsequently, the Engle-Granger Cointegration test (henceforth, EG) is deployed further to investigate the dividend distribution of TH and ASB. EG methodology is warranted because the observed variables in this study might have a stochastic trend in time series. This attempts to measure the equilibrium and dynamic relationships between risk and potential return on both funds. "Our model specification is based on a linear model whereby we hypothesize that TH's dividend payment directly influences ASB's dividend distribution in the short and long run. Empirically, our bi-variate ECM is formulated as follows:

$$ASB_t = \alpha + \beta_1 TH_t + \varepsilon_t \quad (t=1,2,\ldots N=T) \quad \ldots\ldots(3)$$

where:

α	=	Intercept of the regression model
β_1	=	ASB's declared dividend at the time t
ASB_t	=	TH's declared dividend at the time t
TH_t	=	Error term (assumed to be normally distributed)
ε_t	=	Intercept of the regression model

To enhance the methodological robustness, we consider standard deviation (σ) to measure the total variability of an investment that includes both stand-alone assets and portfolios. Unlike CAPM, which focuses only on systematic risk, total risk comprises firm-specific risks and systematic risk. From a practical viewpoint, total variability seems to be the main determinant of the market anomalies, which is highly consistent over time and across financial markets (Blitz, Van Vliet, & Baltussen, 2019). The coefficient of variation (CV) analysis is also incorporated in this study since CV can uncover some new insights (Krishnamoorthy & Lee, 2014; Reed, 2020). The CV is a valuable statistic that helps investors determine how much risk is assumed in one particular investment. In finance, the lower the CV, the better the risk-return trade-off for the investors. Mathematically, the CV is expressed as follows:

$$CV = \frac{\sigma}{\mu} \quad \ldots\ldots(4)$$

where:

σ = population standard deviation

μ = population mean

The CV is a perfect measurement when the objective is to measure the degree of dispersion of a variable in a way that does not rely on the variable's measurement unit. By this virtue, the CV is practically unitless, allowing those CVs to be compared.

4. Empirical Results

We regress ASB's dividends on the TH's dividends over the 27-year observation period from 1994 through 2020. This section explains the empirical findings from OLS regression analysis and the EG cointegration test. In this part, descriptive statistics on dividend distributions and diagnostic test findings are also presented and explained.

4.1 Descriptive Statistics and Pearson Correlation Analysis

Figure 1 below shows the investment performance of ASB and TH over 27 years. Their dividend yields have been somewhat affected by two major economic crises – the Asian Debt Crisis of 1997 and the US Subprime Crisis of 2007. The former led to the International Monetary Fund (IMF) intervention to rejuvenate the regional economy. The economic activities in Asia started picking up after the affected countries subscribed to the IMF's prescriptions. As for the global financial crisis initially triggered by the sub-prime crisis in the United States, signs of solid economic recovery were only observed between 2012 and 2016 after a series of central bank interventions into the banking systems in the US and Europe. Looking at the line chart closely, we can see how volatile and vulnerable the dividend yields from both funds have been over the observed period. Any demand or supply disruption in the commodity markets and even weak sentiment in the financial markets would most definitely affect the performance of these two funds.

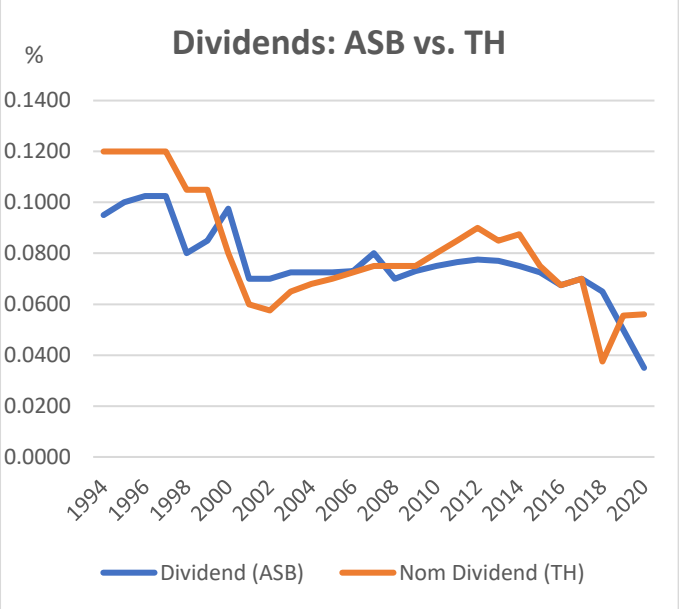

Figure 1. Dividend Payments of ASB and TH: 1994-2020
Source: Permodalan Nasional Berhad and Lembaga Tabung Haji

Table 3 and Table 4 below show an analysis of portfolio beta and risk-return trade-off between the two competing funds and the stock market performance over the study period. The Kuala Lumpur Composite Index (KLCI) is used as a proxy for market return, and we can see high variability in this market index. The descriptive statistics of these three portfolios in Table 4 show a clear trade-off between risk and return. The TH portfolio offers the highest return but at the expense of a higher total risk level (as measured by standard deviation). Unlike ASB and TH dividends, the market return has been incredibly volatile and remains unpredictable, with its mean return settling at the lowest level of 3.38%, accompanied by a high value of the standard deviation of 21.48%. During the 27, the market portfolio registered its best annual performance of 45.17%, much higher than ASB and TH dividends.

According to the estimates of the CAPM for the portfolio's static beta in Table 3, both funds have negative betas. Intriguingly, the negative beta indicates an inverse association with the stock market. This may reveal the presence of the diversification effect in ASB and TH, as both are anticipated to do better when the market falls. According to Sharpe (1964) and Lintner, the substantial standard deviation of the annual returns of the market portfolio (see KLCI return) supports its market risk Mossin (1966). In addition, the significant max-min spread in the market portfolio supports this conclusion. With a beta of -0.0081, there is essentially no correlation between the ASB and market portfolios. In the case of TH, its beta value is -0.0117, which implies that TH and the market portfolio are theoretically moving in opposite. TH's portfolio would likely increase by 0.117% if the stock market fell by 10%. "

Based upon Markowitz's modern portfolio theory, risk-averse investors could enjoy their best return on investment by choosing an optimal mix of their risk-return tolerance. CV use is the best in assisting investors in their decision-making, and a lower CV value is preferred. As shown in Table 4, it is obvious that ASB has the lowest CV value among these three investment alternatives. To earn a 1 percent return hypothetically, ASB's investors must be willing to take up 0.1942 units of risk. Comparatively, TH bears a slightly higher CV at 0.2729 units of risk. On the other hand, the market portfolio is the riskiest among them. The findings from the CV analysis are consistent with the results from the analysis of total risk as proxied by the standard deviation

Table 3. CAPM - Beta of Portfolio

Portfolio	Beta
ASB	-0.0081
TH	-0.0117
Market	1.00

Table 4. MPT – Descriptive Statistics and CV

Variable	Mean	Std. Deviation	Max	Min	CV
ASB Dividend (%)	7.62%	1.48%	10.25%	3.50%	0.1942
TH Dividend (%)	8.06%	2.20%	12.00%	3.75%	0.2729
KLCI Return (%)	3.38%	21.48%	45.17%	-51.98%	6.3550

From the CAPM's perspective, we can see that the TH portfolio has a better diversification effect than ASB. The TH portfolio appears more volatile than the ASB on a total risk basis. Optimal portfolio selection and efficient risk management are critical as Bursa Malaysia remains a very volatile marketplace, as indicated by its absolute risk and max-min spread. The efficient market hypothesis theory is tested again because some funds (usually the hedge funds) can consistently outperform the stock markets (Jegadeesh, 1993).

From Figure 2, we can see that the distribution of ASB dividends is left-skewed, and the low p-value from Kolmogorov Smirnov's test (1.40%) confirms this non-normality. On the contrary, we observe the normal distribution of TH dividends, as shown in Figure 3, due to its high p-value of 8.80% (exceeding the 5% significance level). For continuous data, it is essential to ensure that your data follow a normal distribution, as any deviation from normality could cause your statistical tests to be invalid and inaccurate.

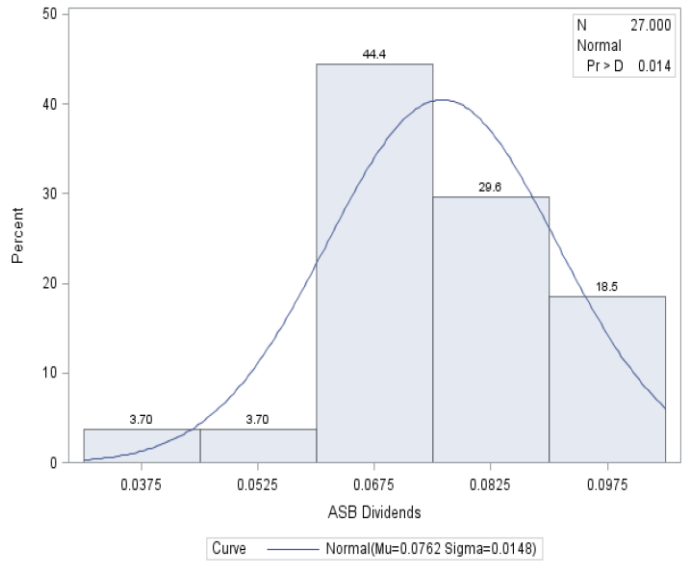

Figure 2. Distribution of ASB Dividends from 1994 through 2020

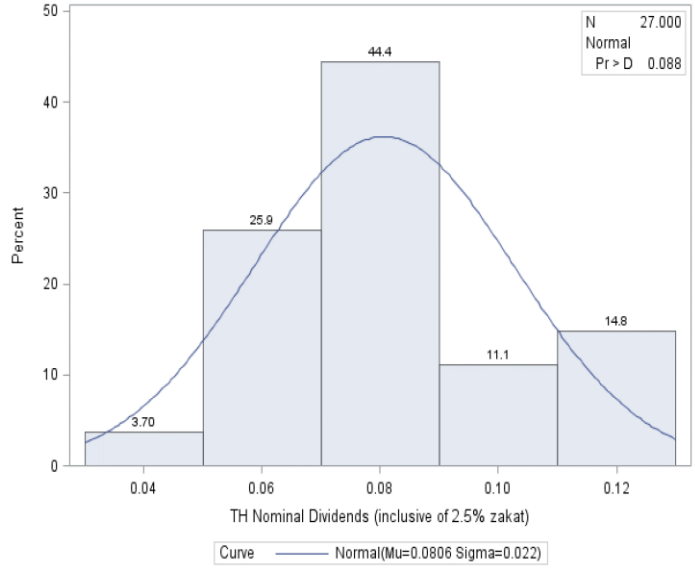

Figure 3. Distribution of TH Nominal Dividends from 1994 through 2020

From Table 5 below, it is evident that there is a positive correlation between their dividends, and this coefficient is statistically significant. This is in line with our earlier expectation that the two funds are somewhat related. Given the high value of the correlation coefficient of 0.8127, the magnitude of this positive association is seen as very strong and credible for ASB and TH.

Table 5. Pearson Correlation Coefficients (N=27)

Ho: Rho = 0 (p-value)

Variable	ASB Dividend
ASB Dividend	1.00
TH Dividend	0.8127 (< 0.0001)

4.2 OLS Regression Analysis

Our baseline study is based on this long-run regression, and Table 6 reveals a substantial positive correlation between ASB and TH dividends. This first finding is consistent with our hypothesis that the TH fund may be able to influence the dividend distribution of ASB. In addition, the coefficient of determination or R-squared of the model is reasonably high (0.6469), indicating that this estimated model is well-fitting.

Table 6. Parameter Estimates of Long-run Regression
Dependent Variable: ASB Dividend

Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	0.0322	0.0065	4.93	<0.0001
TH Dividend	1	0.5454	0.0782	6.97*	<0.0001
R-Squared	0.661	Adj R-Square	0.647		

*Significant at 1% level

4.3 Engle-Granger Cointegration Test

The long-run regression results only provide us with the baseline assessment. This time series analysis is further augmented via the EG test deployment that could potentially capture our model's short-term and long-term relationships. The procedures in the EG test are strictly followed, and all the basic requirements for this test must be fulfilled before we present the final findings. First, all data series must go through the unit root test via the Augmented Dickey-Fuller procedure, and the test results show they are integrated at first difference or I(1). A similar difficulty is also applied to the long-run residuals, and the results show they have no unit root. Next, a cointegrating regression is executed, and this error-correction model is found efficient at lag 1. The empirical estimates of the model as presented in Table 7 below.

Table 7. Parameter Estimates of ECM(1)
Dependent Variable: ASB Dividend

Variable	DF	Parameter Estimate	Standard Error	t value	Pr > t
Intercept	1	-0.0015	0.0017	-0.87	0.3958
ldASB	1	0.1421	0.2708	0.53	0.6047
Lr	1	-0.8269	0.4138	2.00	0.0588*
ldTH	1	-0.0737	0.2370	-0.31	0.7588
R-Squared	0.271	Adj R-Square	0.1672		

*Significant at 5%

Remember that our hypothesis expects a positive correlation between the dividends of ASB and TH. Since the p-value of the error-correction term at lag 1 (denoted by Lr) is less than the threshold of 5%, the EG cointegration results indicate a substantial long-term link between these two variables. Notably, the individual p-value for the significance test on this error-correction term is divided by two because ECM is based on the assumption of one-tail residuals distribution. Almost 83 percent of the model's adjustments towards equilibrium occur rapidly. However, the evidence does not indicate the existence of a short-term relationship between our two investigated variables.

Table 8. Test of First and Second Moment Specification (White test)

DF	Chi-Square	Prob > ChiSq
9	16.40	0.059

Concerning the diagnostic tests of our estimated model, the high p-values in Table 8 (White test) and Table 9 (Autocorrelation test) strongly support our null hypothesis of homoscedasticity and absence of serial correlations between the residuals, respectively. All in all, the estimated model from this empirical study is virtually free from any diagnostic shortcomings. For this reason, the statistical properties of the model are valid and reliable.

Table 9. Autocorrelation Test

Durbin-Watson D	1.645
Pr < DW	0.1666
Pr >DW	0.8334
No. Observations	25
1st Order Autocorrelation	0.024

We use the cumulative sum of residual tests to validate our model's parameter stability, commonly known as the CUSUM test. As shown in Figure 4 below, we can confirm stability in both short-run and long-run parameters as the distribution of short-run residuals (red dots) from our estimated model fall within the lower and upper limits. Based on those diagnostic tests carried out, our model is deemed efficient and credible. There seems to be a significant long-term relationship between ASB's dividends and TH's historical dividends from bi-variate ECM.

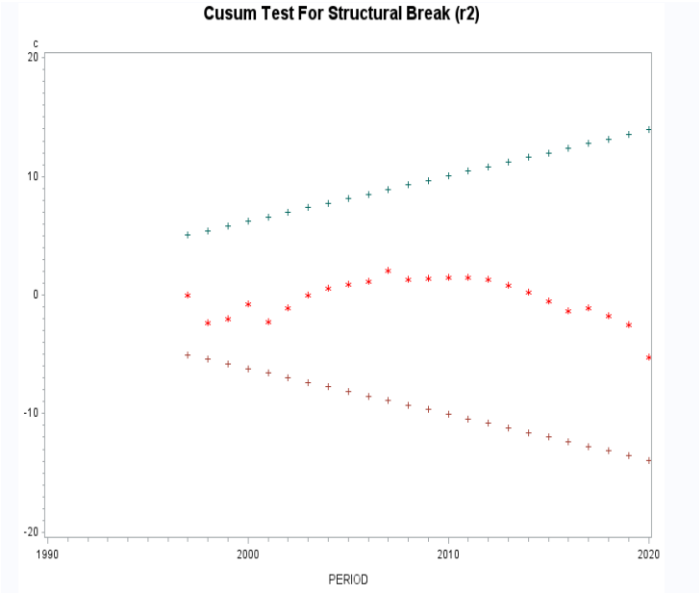

Figure 4. Full Sample Period: 1994-2020

5. Conclusion and Limitations

Our primary purpose is to examine the risk-return trade-off and the income return (proxied by declared dividends) on ASB and TH investments from 1994 to 2020. Specifically, we are interested in any possible correlations between the performance of these two investment companies. Within the framework of the Capital Asset Pricing Model and the Modern Portfolio Theory, we employ long-run OLS regression and the Engle-Granger cointegration (1987) test as estimation tools, and the empirical findings support the existence of a unidirectional equilibrium relationship between the income returns of both funds running from TH to ASB. Nevertheless, there is no dynamic interaction between them. The study finds a statistically significant positive association between TH's dividends and ASB's dividends throughout the sample period. This evidence strongly shows that the two funds are not only vying to attract new deposits but that their dividend pay-outs are also technically interconnected. From the standpoint of CAPM, both funds have extremely low negative betas, indicating a relatively weak inverse association with the total stock market performance. Despite its drawbacks, the Capital Asset Pricing Model (CAPM) is very effective in financial management. Based on the examination of the coefficient of variation, ASB appears to be the best portfolio with the provided rate of return. Therefore, it is evident that ASB and TH are trustworthy, well-diversified unit trusts with potential profits. Thus, the top management of these two funds must improve their operational and allocative efficiencies to reward unitholders with steadily rising dividends over the long term.

This study has some limitations that need to be noted. It is a well-known fact that the CAPM is frequently attacked for its unrealistic assumptions, and the model also has a methodological flaw in which the beta cannot explain changes in stock returns, as demonstrated by several empirical investigations over the years. It is overly simplistic to rely solely on market risk to explain stock returns; other significant elements need greater attention and have more reasonable explanatory power. Future researchers may explore the Fama-French 3-Factor Model (E. F. Fama, 1970) as an alternate model for evaluating the expected return of individual stocks and portfolios. This three-factor model is now widely recognized by professional investors due to its more realistic assumptions and its ability to explain variances in stock returns in a unique way. This study has discussed the topic of risk assessment on stock returns in an orderly fashion, but the distinctions between systematic risk and total risk must be clarified in light of their respective merits. Future researchers are strongly encouraged to replace this bivariate ECM with a more robust model within econometric time series to boost the proposed model's prediction potential. The Johansen-Juselius cointegration test is the optimal method for analyzing the multivariate aspects of the stock return.

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