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Performance of Private Retirement Scheme in Malaysia

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***ABSTRACT**--The world is aging, and Malaysia, too, does not escape from this phenomenon. The statistic of poor elderly in Malaysia had shown an increasing trend and many studies established a positive relationship between age and poverty. Various findings had shown Malaysia Employees Provident Fund alone is not enough to ensure a decent retirement period for Malaysian retirees. Private Retirement Scheme was identified as complementary retirement saving to the Employees Provident Fund. Ideally, Private Retirement Scheme will support retirement sufficiently and sustainably in Malaysia. However, the current situation showed indications of uncertainty and low return from the Private Retirement Scheme investment. Therefore, this research aims to investigate the performance of the Private Retirement Scheme in Malaysia since its' inception from 2012 until 2018. There is limited research particularly done on the performance of the Private Retirement Scheme since it was newly introduced in 2012. There is also still a lack of historical performance until recently. Hence, it is about time to find out the performance of the Private Retirement Scheme after being seven years in the market, empirically. This study will employ the Capital Asset **Pricing** Model (CAPM) using the Sharpe and Treynor Ratio to calculate the performance of the Private Retirement Scheme. Previous results showed that the performance of investments has a significant and positive relationship with the investment rate. Thus, performance is a critical factor to encourage saving for retirement. This research found that Private Retirement Scheme performance in Malaysia since its inception until 2018 is low and unsatisfactory.*

***Keywords**--Private Retirement; Private Retirement Scheme Performance; PRS*

I. INTRODUCTION

The world is aging. The elderly aged 60 and above will be more than 1.5 billion by 2050, as per the World Population Prospects (UN, 2019). This figure is comparable to 20 percent of the population, and historically speaking, the elderly are going to outnumber the children below 14 years old. Malaysia has also shown the same growing aging population phenomenon, and the nation is expected to grow into an Elderly Population by 2030. This rapid aging population happens due to the significant increase in the Malaysian expectancy rate coupled with a decrease in replacement birth rate. The increase in expectancy rate from 49 years (1950) to 74.5 years in 2019, and the replacement birth rate reduced from 5 (1970) to 1.1 in 2018 (DOSM, 2019). To illustrate the aging speed, the aging pace in Malaysia will happen within 15 years compared to others like France that took 115 years, Sweden 85 years, USA 72 years, and Singapore 19 years. Longer expectancy of life has demanded more wealth to support retirement (Gratton, & Scott, 2017) and it seems sooner to reach Malaysia. This situation will be a challenge to Malaysian society because poverty and age have shown a significant positive relationship in literature.

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Even though the total poverty incident in Malaysia is reported to be low, it stood at 1.4 percent in 2012 (using OECD underestimate poverty rate of US$1.25 per day income) and 0.4 percent in 2016 (DOSM, 2017). Nevertheless, the trend of poverty incidents among the elderly in Malaysia has shown an increasing trend. Households headed by the elderly in Malaysia has a high incidence of poverty which is at 22.7 percent in 1999 increased to 43 percent in the year 2009 (Redmond, Praino, & Siddiquee, 2017), and further increased to 71 percent in 2012 (Mohd, Senadjki, & Mansor, 2018) and stood as high as 85 percent from the total sampling of 24,217 elderly studied in 2015 (Masud, et al., 2015). The relationship of increase in age will increase the poverty rate supported by Vaghefi, et al., (2016). The issues of poverty among the elderly should be taken seriously given that the elderly are more vulnerable groups to poverty and the poverty incidence among the elderly tends to be more permanent as it is less likely for the elderly to exit from the poverty trap (Mohd, 2014). According to Mohd et al., (2018), the elderly are known to have less capacity and ability to secure continuous cashflow from working due to aging, deteriorating health, and health-related problems. Masud, et al., (2015) added that household headed by an elderly incline to be more economically unstable compared to the non-elderly headed household due to their low productivity and vulnerability (health and strength) in the workplace if they are out of the job, it will be tough for them to be rehired. The elderly also is vulnerable to unpredictable emergencies and financial shock.

The issue of lacking budgetary help during the 'brilliant age' in Malaysia is all around upheld by numerous scientists, for example, Ibrahim et al., (2012), Mansor & Abd Samad, (2013), Mohd et al., (2018) and many more. Deficient pre-retirement arranging rehearses have been distinguished as the principle financial issue in many developed countries around the globe (Singleton & Keddy, 1991). Asian benefits frameworks are probably not going to demonstrate practical in the long haul, have been shown by many, such as findings by Park & Estrada, 2012. Countries at the global level are facing increased of poor elderly, and private retirement saving is a new financial source to improve due to the fiscal burden of the countries. Masud & Haron, (2014) research found that the present more seasoned Malaysians are unguarded to neediness because of absence of sparing during more youthful years, and Mohd (2013) recognized deficient amassed assets before the retirement time frame is intensified by the low profits for the retirement venture. Execution is a fundamental factor to empower sparing, and many economists have supported this. One of them is Keynes (1936), through his Saving and Investment Theory that proved saving amount is positively correlated to its performance, and this also supported by Hashim et al., (2017).

Ideally, private retirement saving such as PRS will support retirement sufficiently and sustainably in Malaysia. However, the current situation showed evidence of uncertainty and low return from PRS investment. Therefore, this research aims to investigate the performance of PRS in Malaysia using the Sharpe and Treynor Ratio approach.According to Asher, (2011), the PRS market is underdeveloped, and retirement saving in Malaysia dominated by Employee Provident Fund (EPF). However, it is essential to highlight that only 31 percent of the Malaysian labor force is covered by EPF, compared to 62 percent of the labor force covers by voluntary savings like PRS. This is because 31 percent of the Malaysian labor force is in the private sector, and 62 percent of the Malaysian labor force are self-employed. The balance of 7 percent to make up to 100 percent are government servants covered by public pension (DOSM, 2019). The expert admits that the Malaysian financial specialists have once in a while would not join the PRS as they are questionable about the arrival of the speculations (Tengku, 2015). Besides, Malaysia Private Pension Administrator (PPA) perceives that PRS gainfulness is the greatest

crashed into getting more supporters of the plan (Tengku, 2015). Mohammed Foziah et al., (2017) found that the fundamental motivation behind why individuals waver to join the PRS is a direct result of the lack of quality of the item, particularly as far as venture execution. This is in accordance with finding from Mohamad Zabri et al., (2016) in which the creators uncovered that the purposes behind not putting resources into PRS remember the absence of certainty for the plan execution and the absence of data about the PRS conspire.

II. LITERATURE REVIEW

2.1Private Retirement Scheme (PRS)

PRS aims to improve Malaysian retirees' way of life through extra deliberate reserve funds to complement EPF. PRS is a drawn-out venture device to make adequate retirement reserves. Individuals (employees, government hirelings, and independently employed) or employers can partake as PRS supporters. The Securities Commission Malaysia regulates PRS, and the Scheme Trustees safeguard the schemes. The main characteristic that differentiates the PRS with normal unit trust is the condition imposed on PRS that it can only be withdrawn when reaching the retirement age of 55 years old. This withdrawal design is meant for retirement usage since it can only be withdrawn after the retirement age of 55 years old. Unit trusts and PRS share the same characteristics and adhere to same rules and regulations, such as following: a) have a trustee to care for the enthusiasm of the individuals and unitholders; b) are pooled and contributed by the command and rules of the assets; c) urge the financial specialists to settle on long haul sparing and venture choices; and d) underlying products (shares) are the same for both unit trusts (mutual fund) and PRS.

2.2Literature on Unit Trust and PRS performance

On account of the overriding importance of a return to any investment, numerous studies have been carried out on unit trust performance around the world as well as around the clock. However, in Malaysia, unit trust related studies are somewhat limited (Hassan & Hussin, 2018), especially literature regarding the PRS. PRS just introduced in 5 years, and there is still insufficient of historical data and performance information regarding investment profits (Mohammed Foziah et al., 2017).

The main objective of investing is to gain profit. As indicated by the old-style hypothesis, Keynesian Theory of Investment during the 1930s, there are three fundamental purposes behind contributing, (i) return, (ii) cost, and (iii) meet expectations (Keynesian, 1936). The arrival of venture is a basic factor for a speculation choice. In any event, for the Socially Responsible Investors (SRI) or otherwise called maintainable, moral, "green" or socially cognizant speculators, they esteem monetary return more than social obligation (Nilsson, 2009). Alonso-García et al., (2018) finding featured that, right off the bat, annuity frameworks need to give an adequate salary to beneficiaries in the retirement stage. Besides, members wish for a reasonable degree of benefits concerning the commitments paid. To wrap things up, the benefits framework should be financially reasonable over the long haul. McGrattan & Prescott, (2017) study suggests a higher sparing return rate for retirement compared to lower tax policy to help the retirees to accomplish supportable retirement.

The unit trusts industry in Malaysia has been undergoing tremendous growth in line with the development in the other parts of the world. Within the ten years from 2009 to 2019, the Federation of Investment Managers

Malaysia (FIMM) 2019 reports that the total net asset value (NAV) of the funds has increased by 140 percent (from RM191.75 billion to RM459.99 billion). Despite the growth in the industry, empirical studies on Malaysian unit trusts have not been particularly positive about the fund performance (Mohamad & Mohd Nassir, 1995; Chong & Kho, 2002; Taib & Isa, 2007; Hamid, Suleman, Ali Shah & Akash, 2017; Mohd, 2013; Abdullah & Abdullah, 2015; Ling, & Abdul Rahim, 2016; Abdul Rahim, Othman & Soon, 2018). In general, all these studies from 1995 until 2018 found that Malaysian unit trusts performance are weak and below the market index. Empirical evidence suggests that the unit trusts investment has not delivered the kind of performance that would be expected from a professionally managed investment, particularly in recent years.

Be that as it may, as referenced prior, there is no observational proof found on PRS execution in Malaysia as and when this examination has been composed. In any case, it is essentially fundamental to investigate into PRS execution following seven years of its initiation in the market. Yet, there is no past observational examination on PRS execution. Nonetheless, there are yearly execution reports by Morningstar Incorporation on PRS execution. As indicated by Morningstar Malaysia (2017), PRS yearly execution (finished 31 Jan 2017) shows 40 percent of assets have return beneath 3 percent. Morningstar inferred that the PRS execution has been dreary (uninspired), best case scenario. The report added that poor to negative returns of a significant number of these assets may have disheartened people from taking an interest in the plan (Ismail, 2018).

III. METHODOLOGY

3.1Data Sources and Measurement

PRS performance will be benchmark using the Net Asset Value (NAV) of the fund, which represents the total value of the fund's assets minus the total value of its liabilities. NAV is the price at which the units of the funds are traded (buy or sell) in the market. This research applied the yearly fund's NAV on the last day of each year from December 2012 to December 2018. NAV and Treasury Bill Interest Rate were collected from Bloomberg, fund fact sheets, and Annual Reports. The sample coverage is 74 percent of the total population. The total sample is 64 out of 87 funds (population) in the market. This study evaluates the performance of the 64 PRS funds in Malaysia, consisting of 29 Islamic and 35 conventional funds. A sample was chosen fairly distributed, collected from all 8 PRS providers in Malaysia. The eight PRS are RHB Investment Management Sdn Bhd, Public Mutual Bhd, AmInvestment Management Sdn Bhd, CIMB-Principal Asset Management Bhd, American International Assurance Bhd, ING Funds Bhd, Hwang Investment Management Bhd, and Manulife Unit Trust Bhd.

Table 1: Sample and Population

Provider		Sample	Population
1	Affin Hwang Asset Management Bhd	5	5
2	AIA Pension and Asset Management Sdn. Bhd	4	4
3	AmInvestment Management Sdn Bhd	18	18
4	CIMB-Principal Asset Management Bhd	10	27

5	Kenanga Investors Bhd	7	7
6	Manulife Asset Management Services Bhd	6	12
7	Public Mutual Bhd	9	9
8	RHB Asset Management Bhd	5	5
Total		64	87

Source: Private Pension Administrator (PPA), 2019

3.2Performance Measure Methodology

The fundamental model to calculate the performance of an investment is the Capital Asset Pricing Model (CAPM). CAPM has evolved into many other models, namely, Henriksson-Merton (1981) Model, Single Market Model, Composite Portfolio Performance Measures Fama and French Three-Factor Model, Treynor Ratio (1966), Carhart Four-Factor Model Sharpe Ratio (1966), Adjusted Sharpe Index, Jensen's Alpha, Raw Return, Market Adjusted Return, Adjusted Jensen's Alpha (1968) and many more. Some literature uses a combination of models. This research is going to use Sharpe Ratio and Treynor Ratio, simple but the most used and relevant formulas to measure the performance of unit trusts. These measures were introduced in 1966, and after more than five decades, they are still relevant and widely used.

The CAPM was development of Sharpe and Lintner, marks the introduction of asset pricing theory. The CAPM describes risk and expected return relationship. Treynor later on, extending the Sharpe theory by taking beta as the risk measurement instead of standard deviation into the CAPM calculation. CAPM equation explains the relationship between the performance and factors (risk) that influencing the performance. The CAPM principal prediction is that the expected return on any investment is linearly related to the covariance of the return on the investment with the return on the market portfolio. Each investment has two types of risk: (1) Systematic Risk or Market Risk, which are unavoidable, uncontrollable, unpredictable, undiversifiable in short, macroeconomic variables. Systematic risk is the risk that affects the overall market and impossible to avoid completely, and (2) Unsystematic Risk or Diversification Risk are controllable variables, microeconomic variables such as portfolio, size of the fund, transaction cost, dividends, and other unique risks.

Sharpe Ratio

a)Sharpe Ratio

William F. Sharpe (1966) discovered Sharpe Ratio by measuring the excess portfolio return over the risk-free rate relative to its standard deviation. In other words, the Sharpe ratio shows the return above the risk-free rate while considering risk.

b)Sharpe Ratio Formula

The formula for calculating the Sharpe ratio is as shown below: -

$$Sharpe\ Ratio = \frac{Portfolio\ Return - Risk\ Free\ Rate\ of\ Return}{Standard\ Deviation\ of\ Portfolio}$$

$$Sharpe\ Ratio = \frac{R_p - R_f}{\sigma_p}$$

Where: -

R_p : Portfolio return = $(NAV_t - NAV_{(t-1)}) / NAV_{(t-1)}$

R_f : Risk-free rate of return or 12 Months Treasury Bill Rate

σ_p : Standard Deviation of the portfolio

c)Interpretation of Sharpe Ratio

The Sharpe Ratio shows a ratio when the standard deviation is equal to one. When the standard deviation is equal to one for all the funds investigated, the ratio will show the return for each fund based on the same risk. Higher ratio fund means higher return fund based on the same risk, and it will be a better fund. This ratio then, can be rank accordingly and can be a good comparison for the return of funds.

Positive Sharpe Ratio indicates funds have higher returns compared to the risk-free investment. Sharp Ratio with value of 1 means that the returns on investment have a constant ratio with the risk taken and a Sharpe Ratio lower than 1 means that return on investment is less than the risk taken. The Zero value of the Sharpe Ratio means the return of the fund is equal to the risk-free rate. Meanwhile, negative ratio represents lower return compared to the risk-free rate investment and it also means that the unit trust was unable to produce any excess returns at all. Many international and local researchers used the Sharpe Ratio in explaining the performance of unit trusts. To mention some, among others, are, Das & Megaravalli, (2017), Arna & Eva, (2015), Kassim, & Kamil, (2012), Lai & Lau, (2010), Taib & Isa, (2007), Mohamad & Mohd Nassir, (1995), Carhart, (1997), and many more.

Treynor Ratio

In order to improve on PRS performance measurement, an additional model of Treynor Ratio is applied in this research. Many pieces of literature applied the combination of Sharpe and Treynor ratios into their researches such as Phoo & Samsudin, (2018), Das & Megaravalli, (2017), Arna & Eva, (2015) in evaluating unit trusts' performance.

a) Definition of Treynor Ratio

Treynor Ratio was introduced by Jack L. Treynor in 1966, building on the contribution of William Sharpe of Sharpe Ratio, towards modern portfolio theory. The Treynor ratio is almost similar to the Sharpe Ratio measure, except that the risk measure used in Treynor Ratio is beta (market risk) instead of standard deviation (total risk). The Sharpe Ratio gives an overview of the return yield against the overall risk taken. On the other hand, the Treynor Ratio shows how much the portfolio has operated in the setting of the unavoidable risks (market risk) prevailing in the economy. Whereby the company risk (unsystematic risk) is assumes ideally resolved by diversification measures taken by the fund managers. Treynor Ratio calculation based on market/ systematic/ unavoidable risk is very logical. However, a benchmark or index used to represent the market risk will affect the beta value and accuracy of the calculation. Therefore, choosing the right benchmark or index to represent market risk is very crucial. This research will use the Kuala Lumpur Composite Index as the index to represent a market risk. This is supported by the previous studies by Abdul Rahim, Othman & Soon, (2018) and Chu, (2011).

b)Treynor Ratio Formula

The Treynor Ratio is taking the return of the portfolio and subtracting the risk-free return, dividing the result (the excess return) by beta instead of standard deviation for Sharpe Ratio.

$$Treynor\ Ratio = \frac{Portfolio\ Return - Risk\ Free\ Rate\ of\ Return}{Portfolio\ Beta}$$

$$Treynor\ Ratio = \frac{R_p - R_f}{\beta_p}$$

Where: -

R_p : Portfolio return = $(NAV_t - NAV_{(t-1)})/\ NAV_{(t-1)}$

R_f : Risk-free rate of return or 12 Months Treasury Bill Rate

β_p : Beta of the portfolio

The formula above mathematically shows that a portfolio with a high beta and low excess of return will have a low Treynor Ratio. The beta (β) is elasticity or sensitivity of fund return to the movements of the market return. The higher the beta means the higher is the sensitivity of fund toward the market movement, and riskier is the investment. Thus, as compared to low-beta funds, the funds with high beta might generate higher or lower returns based on the small market movement (high risk). The higher the risk taken, the higher must be the reward (but please bear in mind it also means the harder you can fall). In other words, a fund with a higher beta has greater risk and also greater expected returns. This means the Treynor Ratio takes into account the volatility risk while calculating risk-adjusted returns. As a result, the Treynor ratio, also known as the reward-to-volatility Ratio.

Beta can be obtained by regressing fund return and the market return. The slope of the line that representing the relationship between the two is Beta. The relationship of fund returns and market return is also known as Security-Market Line. The sharper the line's slope, the greater the risk-return trade-off, the riskier the fund.

β_p = Slope that best to fit the relationship between Fund Return and Market Return

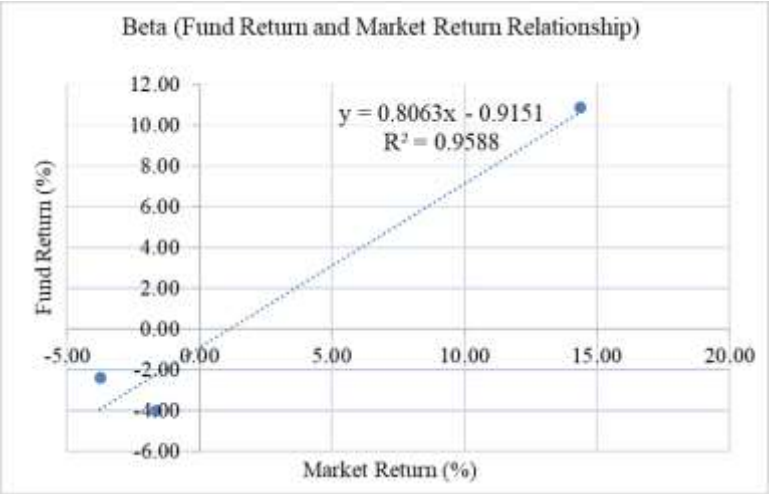

Figure 1: Fund and Market Return Relationship

Source: Author Computation

To calculate Beta, use illustrated formula as below: -

$$\beta_p = \frac{Fund\ Return\ (\%) - Risk\ Free\ Rate\ (\%)}{Market\ Return\ (\%) - Risk\ Free\ Rate\ (\%)}$$

$$\beta_p = \frac{Changes\ in\ Fund\ Return}{Changes\ in\ Market\ Return}$$

Beta measures to what extent the fund correlates with the market index or benchmark index. Therefore, beta more than 1 is considered as an aggressive fund. A beta of 1.6 means that a fund's excess return is expected to move 1.6 times the market excess returns, or it is more volatile than the market by 1.6 times. Whereas a fund with beta smaller than 1 but higher than 0 is considered to be a defensive fund or less volatile than the market. There are also funds that uncorrelated to the market risk. These funds have beta equal to 0. The market index will always take as beta=1, as the benchmark index is as volatile as the market. Be that as it may, a negative beta is a bizarre idea, in accordance with the assets showcase. A negative beta connection implies a speculation moves in the opposite way from the economic movement. At the point when the market rises, a negative-beta speculation, investment generally will fall. At the point when the market falls, the negative-beta speculation, investment will in general ascent.

Now, we go back to Treynor Ratio calculation.

$$Treynor\ Ratio = \frac{Portfolio\ Return - Risk\ Free\ Rate\ of\ Return}{Portfolio\ Beta}$$

For example, the average return generated by fund is 8 percent and risk-free rate is 3 percent. The distinction between the fund return and the free risk rate is 5 percent. Let say the fund historical beta is 2 percent, then the Treynor Ratio will be 2.5. This implies that the investment gave 2.5 units of return for every additional unit of market risk taken. Since this measure only uses systematic risk (market risk), it assumes that the investor already has an adequately diversified portfolio and, therefore, unsystematic risk (diversifiable risk) is not considered. As a result, this performance measure (Treynor Ratio) is most applicable to PRS funds and unit trusts that are identified as diversified portfolios (Treynor, 1966).

c)Interpretation of Treynor Ratio

A fund with a high Treynor ratio is always desirable compared to low or negative Treynor Ratio. A portfolio with high beta (risk) or low excess of return (or both) will have a low Treynor Ratio.

$$Treynor\ Ratio = \frac{Portfolio\ Return - Risk\ Free\ Rate\ of\ Return}{Portfolio\ Beta}$$

In other words, the ratio is the average return earned in excess of the risk-free rate per unit of market risk. The high positive Treynor Ratio infers that the speculation has included worth concerning its hazard. High Treynor Ratio implies that the speculator has gotten significant yields on each market risk he has taken. For instance, Treynor Ratio 2, infers that the fund gave two units of return for each extra unit of market risk assumed. Treynor Ratio 1, infers that the fund gave a similar unit of return for each extra unit of market risk accepted. The Treynor Ratio of 1 demonstrates that the profits on venture are relative to the market hazard taken. The Treynor Ratio lower than one shows that the profit from the fund is less than the market risk accepted, which likewise suggests that chance not worth taking. The negative Treynor Ratio suggest that the venture has performed worse than a risk-free instrument. The negative ratio represents lower return compared to risk-free rate (Treynor Ratio is negative when excess return is negative) as shown by the number of the ratio (when the beta is equal to one, beta equal to 1 is when the fund return reflects exactly the same with market return). The zero value of Treynor Ratio means that beta value is equal to 0, which also means there is no market risk at all, and this is impossible to occur.

According to Reilly & Brown, (2012) interpretation, Treynor Ratio higher than 2.0 is considered as very good, higher than 1.0 is rated acceptable and negative ratio indicates that the investment has performed worse than a risk-free instrument.

IV. RESULT AND FINDING

4.1 Sharpe and Treynor Ratio Analysis

Table 2: Sharpe and Treynor Ratio

	Sharpe Ratio			Treynor Ratio		
Ratio	Number of Funds	Percent (%)	Average Sharpe Ratio	Number of Funds	Percent (%)	Average Treynor Ratio
> 3	1	2	3.264	0		-
> 2	4	6	2.552	0		-
> 1	10	15	1.309	1	2	1.385
Below 1	25	39	0.543	30	47	0.037
Negative	24	38	-2.215	33	51	-0.168
Total	64	100	-0.203	64	100	-0.047

Source: Author computation

Both Sharpe and Treynor Ratio analysis shows consistent results. The majority or 77 percent of funds show low performance by Sharpe Ratio, and 98 percent show low performance using Treynor Ratio analysis. Low performance funds indicated by ratio below 1 and negative. More than half (51%) of the funds were found with a negative Treynor Ratio, which means, the performance is worse than risk-free investment return. A total of 98 percent recorded Treynor Ratio below than 1, which means investment risk taken is not worth taken or risk is higher than expected return (Sharpe & Treynor 1966). In general, the result shows that PRS performance in Malaysia is not impressive, weak, and unsatisfactory since the inception to 2018. Therefore, this study concludes that the PRS in Malaysia has shown unsatisfactory return from the investment, and this research results concurred with studies suggested by Mohammed Foziah, et al., (2017) and Mohamad Zabri, Shafie. et al., (2016) previously. This unsatisfactory return also in line with many previous empirical studies on Malaysian unit trusts. The scholars such as Mohamad & Mohd Nassir, (1995), Chong, & Kho, (2002), Taib & Isa, (2007), Hamid, Suleman, Ali Shah & Akash, (2017), Mohd, (2013), Abdullah & Abdullah, (2015), Ling, & Abdul Rahim, (2016), Abdul Rahim et al. (2018) found that Malaysian unit trusts performance is weak and below the market index, which is consistent with this research finding. PRS is part of the unit trust, and from this research, as expected, the empirical result shows that PRS performance and unit trusts' performance in Malaysia is not much different.

Sharpe Ratio Mean Value or Average Value stands at -0.203 with average Mod Value for Sharpe Ratio of -0.83. Similarly, Treynor ratio Mean Value is -0.047 with average Mod Value of -0.168. According to Arna & Eva, (2015), there is no significant difference between Sharpe Ratio and Treynor Ratio in generating results. Arna et al. (2015), researchers analyzed the consistency of the Sharpe Index, Treynor Index, and Jensen Index as the measurement of risk adjusted performance and found there is no significant difference between the results obtained from all the three methods used.

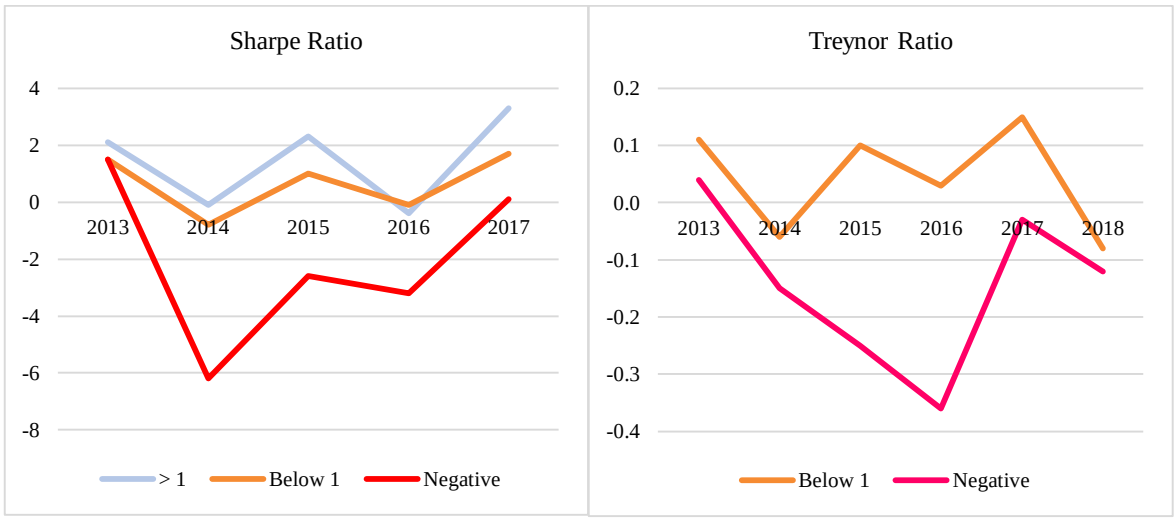

Figure 2: Sharpe and Treynor (2013-2018)

Source: Author computation

When funds are regrouped according to categories of ratios as per Table 2, and shown in graphs, it's clear that majority of funds are low performed and lingering around ratio below one and negative.

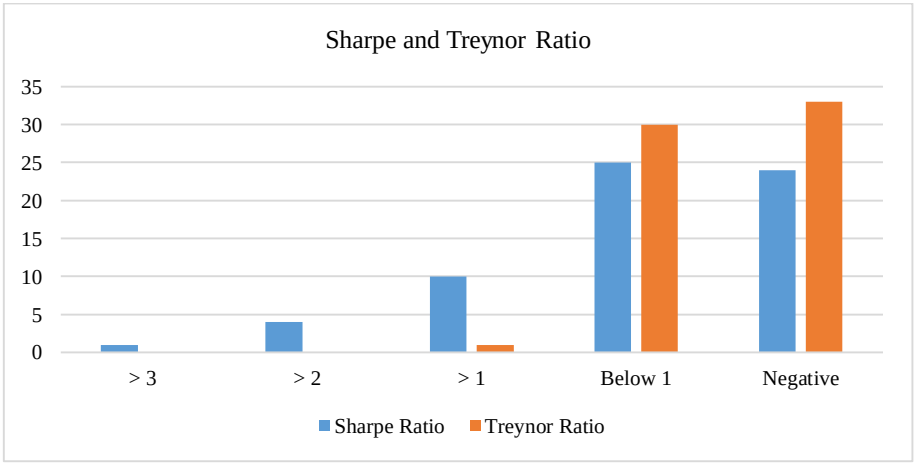

Figure 3: Sharpe and Treynor Ratio (PRS 2013-2018)

Source: Author computation

According to Phoo & Samsudin, (2018), a ratio of 3.0 or higher is considered excellent, higher than 2.0 is rated as very good, and greater than 1.0 is considered as acceptable and good by investors. The Sharpe Ratio results show only one fund out of a total of 64 funds, scored Sharpe Ratio more than 3. This excellent performance fund is Public Mutual PRS Strategic Equity Fund. However, a bulk of the funds are recorded below 1 and negative ratios of Sharpe and Treynor as illustrate in the above table. The Sharpe Ratio and Treynor Ratio in detail for all 64 funds samples, including their yearly performance, are shown in the below table.

	Fund	Average Sharpe	Yearly Sharpe Ratio				
			2013	2014	2015	2016	2017
1	Public Mutual - PRS Strategic Equity Fund	3.26				0.87	5.66
2	Kenanga Shariah OnePRS Growth Fund	2.67					2.67
3	Public Mutual - PRS Islamic Strategic Equity Fund	2.55				-0.73	5.83
4	Public Mutual - PRS Equity Fund	2.51				-1.33	6.35
5	Kenanga Shariah OnePRS Moderate Fund	2.47					2.47
6	AmPRS- Asia Pacific REITs (Type D)	1.51			1.33	2.00	1.20
7	AmPRS - Asia Pacific REITs (Type I)	1.47			1.26	2.10	1.04
8	Kenanga OnePRS Shariah Equity Fund	1.40			2.64	-1.37	2.93
9	AmPRS - Islamic Equity Fund (Type I)	1.37		0.20	2.84	-0.49	2.92
10	AmPRS - Islamic Equity Fund (Type D)	1.37		0.20	2.84	-0.49	2.93
11	Kenanga OnePRS Growth Fund	1.32		0.44	2.45	-0.27	2.65
12	CIMB Principal PRS Plus Asia Pac Ex Jpn Equity (Type A)	1.31	1.57	1.68	0.98	0.31	1.99
13	CIMB Islamic PRS Plus Asia Pac Ex Jpn Equity (Type A)	1.16	0.40	0.55	2.42	-0.21	2.62
14	Public Mutual - PRS Islamic Growth Fund	1.10	4.29	-3.42	3.97	-4.54	5.22
15	AmPRS - Growth Fund (Type I)	1.09		-0.46	2.52	-0.68	2.97
16	AmPRS - Growth Fund (Type D)	1.00		-0.74	2.71	-0.93	2.96
17	CIMB Islamic PRS Plus Growth (Type A)	0.97	2.03	-0.84	1.84	-0.31	2.12
18	Kenanga Shariah OnePRS Conservative Fund	0.95					0.95
19	CIMB Islamic PRS Plus Moderate (Type A)	0.86	2.18	-1.31	1.67	-0.30	2.06
20	AmPRS - Islamic Balanced Fund (Type I)	0.84		-0.14	1.09	-0.40	2.82
21	AmPRS - Islamic Balanced Fund (Type D)	0.84		-0.15	1.09	-0.40	2.82
22	Kenanga OnePRS Conservative Fund	0.83		0.34	1.13	0.19	1.68
23	CIMB Principal PRS Plus Growth Fund (Type A)	0.73	1.64	-1.10	0.30	0.28	2.55
24	AmPRS - Conservative Fund (Type I)	0.72		-0.56	1.78	-0.16	1.81
25	AmPRS - Conservative Fund (Type D)	0.64		-1.07	1.75	-0.20	2.07
26	AmPRS - Dynamic Sukuk Fund (Type D)	0.63		0.72	0.37	1.18	0.23
27	AmPRS - Dynamic Sukuk Fund (Type I)	0.63		0.71	0.38	1.18	0.23
28	Kenanga OnePRS Moderate Fund	0.62		-1.58	1.20	-0.03	2.88
29	Affin Hwang PRS Moderate Fund	0.48	0.87	-1.36	0.02	0.67	2.20
30	Affin Hwang PRS Growth Fund	0.45	1.01	-1.30	0.01	0.21	2.33
31	AmPRS-Tactical Bond Fund (Type I)	0.44		-1.21	1.45	1.82	-0.30
32	AmPRS-Tactical Bond Fund (Type D)	0.43		-1.21	1.45	1.82	-0.32
33	AIA PAM - Growth Fund	0.34		-0.50	1.03	-0.45	1.29
34	CIMB Principal PRS Plus Moderate Fund (Class A)	0.32	1.91	-3.10	0.06	0.38	2.33
35	AIA PAM - Moderate Fund	0.28		-0.40	0.93	-0.65	1.24
36	Affin Hwang Aiiman PRS Shariah Moderate Fund	0.23				-2.40	2.86
37	CIMB Islamic PRS Plus Conservative (Type A)	0.16	1.39	-1.47	0.49	-0.78	1.17
38	CIMB Principal PRS Plus Conservative Fund (Class A)	0.12	0.65	-1.25	0.05	0.18	0.96
39	AIA PAM - Islamic Moderate Fund	0.07		-0.54	0.57	-0.36	0.60
40	Manulife Shariah PRS - Growth Fund (Type A)	0.01		-0.67	1.78	-3.06	2.00
41	AmPRS - Islamic Fixed Income Fund (Type I)	-0.18		-2.55	0.09	0.14	1.62
42	AmPRS - Islamic Fixed Income Fund (Type D)	-0.19		-2.58	0.09	0.13	1.60
43	Manulife Shariah PRS - Moderate Fund (Type A)	-0.26		-0.93	1.61	-3.52	1.80
44	CIMB Islamic PRS Plus Equity Fund (Type A)	-0.31	3.13	-4.14	0.92	-3.43	1.98
45	Public Mutual - PRS Islamic Moderate Fund	-0.38	4.09	-5.87	1.17	-6.08	4.77
46	AIA PAM - Conservative Fund	-0.44		-0.58	0.18	-1.52	0.16
47	AmPRS - Moderate Fund (Type D)	-0.58		-5.43	1.35	-1.41	3.18
48	CIMB Principal PRS Plus Equity Fund (Type A)	-0.66	2.73	-5.51	-2.38	-0.91	2.78
49	Affin Hwang Aiiman PRS Shariah Growth Fund	-0.72	3.25	-4.30	-4.28	-1.04	2.78
50	AmPRS - Moderate Fund (Type I)	-0.72		-5.48	0.81	-1.32	3.09
51	RHB Retirement Series - Moderate Fund	-1.14	2.31	-5.39	-0.74	-4.58	2.72
52	Affin Hwang PRS Conservative Fund	-1.25	0.93	-6.89	-0.92	0.22	0.41
53	RHB Retirement Series - Growth Fund	-1.54	3.07	-5.24	-0.51	-3.97	-1.02
54	RHB Retirement Series Islamic Equity Fund	-1.55					-1.55
55	Manulife PRS - Growth Fund (Type A)	-1.98	-0.05	-5.32	-3.51	-3.14	2.12
56	Manulife PRS - Moderate Fund (Type A)	-2.28	-0.91	-6.49	-1.71	-4.06	1.78
57	RHB Retirement Series Islamic Balanced Fund	-2.36					-2.36
58	Public Mutual - PRS Conservative Fund	-3.76	0.93	-7.30	-7.24	-1.77	-3.43
59	Public Mutual - PRS Growth Fund	-3.82	4.78	-15.37	-4.47	-8.15	4.12
60	RHB Retirement Series - Conservative Fund	-4.04	0.77	-6.20	-2.31	-6.17	-6.28
61	Public Mutual - PRS Islamic Conservative Fund	-5.49	-2.18	-5.32	-1.45	-5.31	-13.17
62	Manulife PRS - Conservative Fund (Type A)	-6.00	-4.52	0.93	-17.46	-3.30	-5.67
63	Public Mutual - PRS Moderate Fund	-6.35	4.23	-32.06	-3.33	-6.06	5.45
64	Manulife Shariah PRS - Conservative Fund (Type A)	-7.18		-5.34	-13.24	-5.88	-4.24

Figure 4: Sharpe Ratio by Fund (2013-2017)

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Source: Author computation

	Fund	Average Treynor	Yearly Treynor Ratio					
			2013	2014	2015	2016	2017	2018
1	AmPRS- Asia Pacific REITs (Type D)	1.39			2.97	3.59	0.63	-1.66
2	Manulife PRS - Conservative Fund (Type A)	0.18	0.38	-0.08	0.28	0.11	0.15	0.22
3	AmPRS-Tactical Bond Fund(Type I)	0.11		-0.39	0.76	0.64	-0.03	-0.41
4	CIMB Principal PRS Plus Asia Pac Ex Jpn Equity (Type A)	0.11	0.18	0.16	0.06	0.05	0.28	-0.07
5	AmPRS-Tactical Bond Fund (Type D)	0.10		-0.35	0.69	0.58	-0.03	-0.41
6	CIMB Islamic PRS Plus Asia Pac Ex Jpn Equity (Type A)	0.07	0.02	0.05	0.18	-0.03	0.31	-0.13
7	CIMB Islamic PRS Plus Growth (Type A)	0.05	0.10	-0.05	0.10	-0.03	0.20	-0.04
8	CIMB Principal PRS Plus Conservative Fund (Class A)	0.05	0.09	-0.15	0.01	0.04	0.25	0.05
9	CIMB Principal PRS Plus Growth Fund (Type A)	0.04	0.06	-0.03	0.01	0.03	0.26	-0.08
10	Public Mutual - PRS Strategic Equity Fund	0.04				0.03	0.15	-0.05
11	CIMB Islamic PRS Plus Moderate (Type A)	0.04	0.11	-0.06	0.09	-0.03	0.18	-0.05
12	Kenanga OnePRS Conservative Fund	0.04		0.03	0.09	0.02	0.15	-0.10
13	CIMB Principal PRS Plus Moderate Fund (Class A)	0.04	0.08	-0.07	0.00	0.04	0.23	-0.06
14	Kenanga OnePRS Growth Fund	0.03		0.02	0.10	-0.02	0.14	-0.08
15	AmPRS - Conservative Fund (Type I)	0.03		-0.03	0.11	-0.01	0.14	-0.04
16	Affin Hwang PRS Moderate Fund	0.03	0.05	-0.06	0.00	0.10	0.24	-0.15
17	AmPRS - Islamic Equity Fund (Type D)	0.03		0.01	0.08	-0.03	0.14	-0.07
18	AmPRS - Conservative Fund (Type D)	0.02		-0.05	0.08	-0.01	0.13	-0.04
19	Affin Hwang PRS Growth Fund	0.02	0.05	-0.05	0.00	0.03	0.23	-0.12
20	Public Mutual - PRS Equity Fund	0.02				-0.03	0.13	-0.05
21	AmPRS - Growth Fund (Type D)	0.01		-0.02	0.06	-0.04	0.13	-0.06
22	Kenanga OnePRS Moderate Fund	0.01		-0.03	0.02	0.00	0.14	-0.06
23	Public Mutual - PRS Islamic Strategic Equity Fund	0.01				-0.02	0.12	-0.07
24	CIMB Islamic PRS Plus Conservative (Type A)	0.01	0.11	-0.09	0.03	-0.07	0.12	-0.05
25	AmPRS - Islamic Balanced Fund (Type I)	0.01		0.00	0.02	-0.02	0.13	-0.08
26	AmPRS - Islamic Balanced Fund (Type D)	0.01		0.00	0.02	-0.02	0.13	-0.08
27	Kenanga OnePRS Shariah Equity Fund	0.01			0.06	-0.05	0.10	-0.08
28	CIMB Principal PRS Plus Equity Fund (Type A)	0.01	0.08	-0.10	-0.02	-0.05	0.17	-0.03
29	Affin Hwang Aiiman PRS Shariah Growth Fund	0.00	0.13	-0.09	-0.03	-0.04	0.11	-0.05
30	CIMB Islamic PRS Plus Equity Fund (Type A)	0.00	0.17	-0.06	0.02	-0.08	0.04	-0.08
31	Kenanga Shariah OnePRS Growth Fund	0.00					0.09	-0.09
32	AmPRS - Moderate Fund (Type I)	0.00		-0.05	0.01	-0.05	0.13	-0.04
33	AIA PAM - Growth Fund	0.00		-0.03	0.06	-0.04	0.11	-0.10
34	Public Mutual - PRS Islamic Growth Fund	0.00	0.07	-0.06	0.06	-0.11	0.13	-0.11
35	Kenanga Shariah OnePRS Moderate Fund	0.00					0.09	-0.10
36	AmPRS - Growth Fund (Type I)	-0.01		-0.01	0.05	-0.03	0.13	-0.06
37	AmPRS - Moderate Fund (Type D)	-0.01		-0.05	0.01	-0.05	0.12	-0.05
38	AIA PAM - Moderate Fund	-0.01		-0.03	0.05	-0.06	0.10	-0.11
39	AmPRS - Islamic Fixed Income Fund (Type D)	-0.01		-0.09	0.00	0.01	0.11	-0.10
40	AmPRS - Islamic Fixed Income Fund (Type I)	-0.01		-0.09	0.00	0.01	0.10	-0.10
41	Affin Hwang Aiiman PRS Shariah Moderate Fund	-0.02				-0.08	0.10	-0.07
42	Public Mutual - PRS Islamic Moderate Fund	-0.02	0.07	-0.06	0.01	-0.12	0.09	-0.14
43	Public Mutual - PRS Moderate Fund	-0.03	0.06	-0.07	-0.05	-0.13	0.12	-0.09
44	Manulife Shariah PRS - Growth Fund (Type A)	-0.03		-0.03	0.05	-0.10	0.07	-0.15
45	AIA PAM - Islamic Moderate Fund	-0.04		-0.04	0.04	-0.03	0.06	-0.22
46	Manulife Shariah PRS - Moderate Fund (Type A)	-0.04		-0.04	0.05	-0.12	0.06	-0.15
47	Public Mutual - PRS Growth Fund	-0.04	0.08	-0.08	-0.06	-0.12	0.06	-0.14
48	Kenanga Shariah OnePRS Conservative Fund	-0.04					0.05	-0.14
49	Affin Hwang PRS Conservative Fund	-0.05	0.08	-0.28	-0.09	0.03	0.05	-0.08
50	RHB Retirement Series - Moderate Fund	-0.05	0.05	-0.10	-0.03	-0.17	0.07	-0.12
51	RHB Retirement Series - Growth Fund	-0.06	0.12	-0.11	-0.02	-0.18	-0.02	-0.12
52	Manulife PRS - Growth Fund (Type A)	-0.07	0.00	-0.19	-0.05	-0.10	0.07	-0.16
53	AIA PAM - Conservative Fund	-0.08		-0.09	0.02	-0.17	0.02	-0.17
54	Manulife PRS - Moderate Fund (Type A)	-0.09	-0.03	-0.21	-0.03	-0.14	0.06	-0.18
55	Public Mutual - PRS Conservative Fund	-0.12	0.04	-0.15	-0.16	-0.06	-0.07	-0.33
56	RHB Retirement Series - Conservative Fund	-0.18	0.07	-0.24	-0.14	-0.41	-0.22	-0.15
57	RHB Retirement Series Islamic Equity Fund	-0.20					-0.11	-0.30
58	AmPRS - Dynamic Sukuk Fund (Type D)	-0.21		-0.26	-0.15	-0.46	-0.08	-0.11
59	AmPRS - Dynamic Sukuk Fund (Type I)	-0.21		-0.26	-0.15	-0.46	-0.08	-0.11
60	AmPRS - Islamic Equity Fund (Type I)	-0.26		0.01	0.08	-0.03	0.14	-0.07
61	Public Mutual - PRS Islamic Conservative Fund	-0.28	-0.13	-0.35	-0.10	-0.20	-0.30	-0.62
62	RHB Retirement Series Islamic Balanced Fund	-0.40					-0.31	-0.50
63	Manulife Shariah PRS - Conservative Fund (Type A)	-0.99		-0.76	-1.59	-0.83	-0.68	-1.09
64	AmPRS - Asia Pacific REITs (Type I)	-2.00			-4.03	-5.44	-0.72	2.17

Figure 5: Treynor Ratio by Fund (2013-2018)

Source: Author computation

Sharpe and Treynor Analysis by Providers

Sharpe Analysis by providers shown that Kenanga Investors Berhad has the highest average Sharpe Ratio for the past five years in the market. However, the Sharpe Ratio scored for Kenanga Investors Berhad is not impressive and still low, which is below than 1. In conclusion, poor average PRS performances by providers are in line with the poor overall performances of individual PRS funds. Moreover, half of the providers recorded negative average Sharpe Ratio. Again, this is in line with earlier findings, discussed in earlier paragraphs.

Table 3: Sharpe Ratio by Provider (2013-2017)

	Fund	Average Sharpe Ratio	Yearly Sharpe Ratio				
			2013	2014	2015	2016	2017
1	Kenanga Investors Bhd	0.9		-0.3	1.9	-0.4	2.3
2	AmInvestment Management SB	0.6		-1.2	1.4	0.2	1.8
3	CIMB-Principal Asset M. Bhd	0.5	1.8	-1.6	0.6	-0.5	2.1
4	AIA Pension and Asset M. SB	0.1		-0.5	0.7	-0.7	0.8
5	Affin Hwang Asset Management Bhd	-0.3	1.5	-3.5	-1.3	-0.5	2.1
6	RHB Asset Management Bhd	-2.3	2.0	-5.6	-1.2	-4.9	-1.7
7	Public Mutual Bhd	-2.4	2.7	-11.6	-1.9	-3.7	2.3
8	Manulife Asset M. Services Bhd	-2.9	-1.8	-3.0	-5.4	-3.8	-0.4

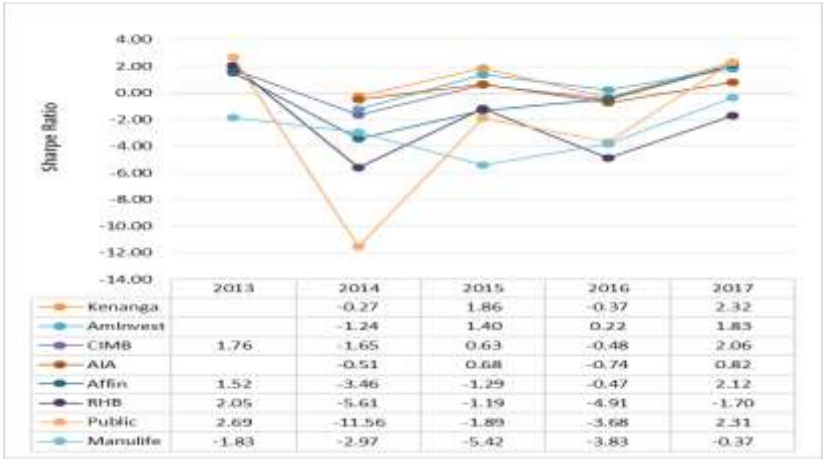
Source: Author computation

Table 4: Treynor Ratio by Provider (2013-2018)

	Fund	Average Treynor Ratio	Yearly Treynor Ratio					
			2013	2014	2015	2016	2017	2018
1	CIMB-Principal A.M. Bhd	0.04	0.10	-0.04	0.05	-0.01	0.20	-0.05
2	Kenanga Investors Bhd	0.02		0.01	0.07	-0.01	0.11	-0.09
3	Affin Hwang A.M. Bhd	0.00	0.07	-0.12	-0.03	0.01	0.14	-0.09
4	AmInvestment M. SB	-0.03		-0.10	0.04	-0.10	0.07	-0.07
5	AIA Pension and A.M. SB	-0.03		-0.05	0.04	-0.07	0.07	-0.15
6	Public Mutual Bhd	-0.04	-0.05	0.03	-0.13	-0.05	-0.08	0.05
7	RHB Asset M. Bhd	-0.12	0.08	-0.15	-0.06	-0.25	-0.12	-0.24
8	Manulife A.M. Services Bhd	-0.13	0.12	-0.22	-0.21	-0.20	-0.04	-0.25

Source: Author computation

Treynor Analysis by providers shown that CIMB-Principal Asset Management Berhad has the highest average Treynor Ratio for the past five years in the market. Again, same with Sharpe result, the Treynor Ratio scored for CIMB-Principal Asset Management Berhad is still very low, which is below than 1. In conclusion, poor average PRS performances by providers are in line with the poor overall performances of PRS, and more than half of the providers recorded negative Treynor Ratio.

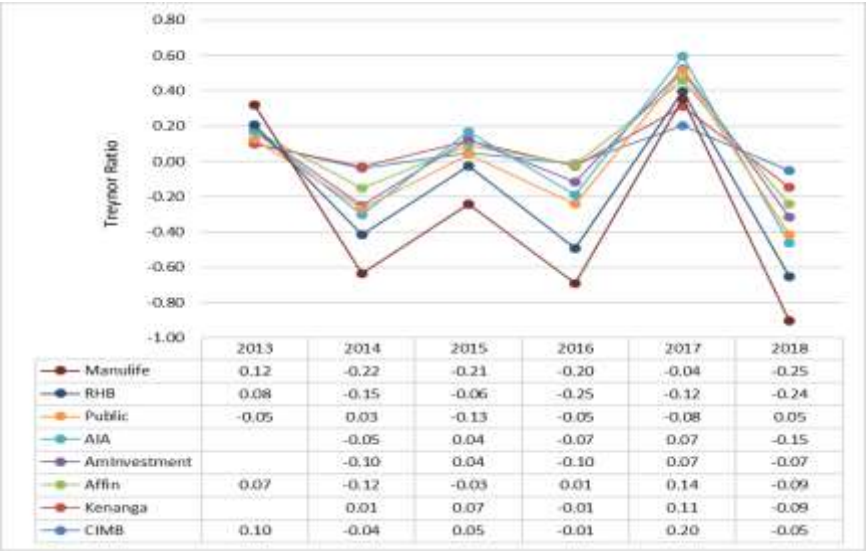


	2013	2014	2015	2016	2017
Kenanga		-0.27	1.86	-0.37	2.32
Aminvest		-1.24	1.40	0.22	1.83
CIMB	1.76	-1.65	0.63	-0.48	2.06
AIA		-0.51	0.68	-0.74	0.82
Affin	1.52	-3.46	-1.29	-0.47	2.12
RHB	2.05	-5.61	-1.19	-4.91	-1.70
Public	2.69	-11.56	-1.89	-3.68	2.31
Manulife	-1.83	-2.97	-5.42	-3.83	-0.37

Figure 6: Average Sharpe Ratio by Provider (2013-2017)

Source: Author computation

Yearly Average Sharpe Ratio Analysis by Providers shown a high fluctuation from the small number of +2 to a very high negative number up to -11. The graph shows funds from Manulife Asset Management Services Berhad persistently show poor performance with negative Sharpe Ratio for the whole period of study. High fluctuation represents high volatility and high risk of the funds. The condition of the PRS market seems not as 'calm' as other long-term investments such as Amanah Saham Bumiputera or Employee Provident Fund (EPF) that never recorded negative return. For a long-term investment, especially for retirement, the majority of investors are risk-averse, and this will be too risky to risk their retirement savings. However, this finding is only taken into the calculation of seven years investment as interim evaluation, for the fact that retirement savings can be an investment for a longer period of maybe more than 30 years of accumulation phase according to The Life-Cycle Theory by Modigliani & Brumberg, 1950, (Deaton, 2011).



	2013	2014	2015	2016	2017	2018
Manulife	0.12	-0.22	-0.21	-0.20	-0.04	-0.25
RHB	0.08	-0.15	-0.06	-0.25	-0.12	-0.24
Public	-0.05	0.03	-0.13	-0.05	-0.08	0.05
AIA		-0.05	0.04	-0.07	0.07	-0.15
Aminvestment		-0.10	0.04	-0.10	0.07	-0.07
Affin	0.07	-0.12	-0.03	0.01	0.14	-0.09
Kenanga		0.01	0.07	-0.01	0.11	-0.09
CIMB	0.10	-0.04	0.05	-0.01	0.20	-0.05

Figure 7: Average Treynor Ratio by Provider (2013-2018)

Source: Author computation

Yearly Average Treynor Ratio Analysis by Providers shown a lower fluctuation level compared to Sharpe Ratio fluctuation. However, it does not make it any better because the range of ratios is unsatisfactory that ranges from below one and -1.

V. CONCLUSION

In summary of the findings, PRS performance in Malaysia was not impressive, weak, and unsatisfactory since the inception to 2018. Performance analysis applied Sharpe and Treynor ratio measurements and both measurements produce consistent results in predicting PRS performance. Malaysia PRS performance is below risk-free rate of return, which is considered as low and undesirable to many investors. This situation giving risk-free rate investment instruments better leverage and will be more preferable for its' security, stress free and guaranteed return compared to PRS investment. Therefore, this study concludes that the demand for PRS was hampered due to the unsatisfactory return of the investment, and this research results supported by many from previous studies that found Malaysian unit trusts performance is weak and below the market index, which is consistent with this research finding.

Poor PRS performance is one major factor as to why the PRS funds have not emerged as a preferred saving mode, which also reflected the unavailability of the quality fund and underdeveloped state of the capital market. This finding is alarming and may lead to unsustainable retirement and increased in poor Malaysian elderly in future. Much effort is required in order to improve the performance of PRS, and identifying factor determinants of the performance will be the first step for a better understanding of PRS funds. Therefore, future research is suggested to explores the determinants of PRS performance. It's also worth to mention that this research period of study is rather limited. This limitation is due to newly introduced of PRS in Malaysia, in 2012. Therefore, it is recommended to reinvestigate the performance of PRS in future. On top of this, there is a recent development of PRS since February 2020, when the world was hit by COVID19 threat. Malaysia has recently, in March 2020 allows the redemption of PRS investment to reduce the financial burden of the people due to the Movement Control Order (MCO). This changes the characteristic of PRS that previously unredeemable until the investors aged 55 years old. This new development may have influence on the PRS performance in future.

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