**THE ANALYSIS OF MARKET TIMING, EXCHANGE RATE OF US DOLLAR, AND INFLATION TO EQUITY FUND PERFORMANCE DURING 2011-2017**

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***ABSTRACTs:***

*The objective of this paper is to explore return of equity fund, impact of market timing, inflation and Exchange rate of US Dollar. Henrikson and Merton as well as Treynor and Mazuy method is used to see return of equity fund, impact of market timing, inflation and Exchange rate of US Dollar. Inflation and exchange rate of US Dollar is added to Henrikson and Merton Model as well as Treynor and Mazuy Model. The result are equity fund return are affected by market return, market timing abiliy of investment manager are not significantly exist in equity fund. Inflation and exchange rate of US Dollar affect equity fund return so investor need to pay attention to both variable when investing in equity fund.*

***Keywords:*** *market timing, equity fund, return, Inflation, Exchange Rate*

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**Introduction**

Since Government introduced mutual fund in 1996 to market and now become well known as an instrument to invest. Mostly the high networth understand to invest in Mutual Fund, because they got return more higher than time deposits. Eventhough, they has experience that the return is less than time deposits rate. Mutual Funds has return more higher than time deposits rate in Long term period. Based on that, performance mutual fund become hot discussion in investor.

Mutual fund can be classified into Bond Fund, Combination Bond and equity is called Mixed Fund, Equity fund and others. Equity Fund is a instrument that investor hope to get higher return for their investment. Equity fund has portfolio investment in Equity but there is small cash. Financial Services Agency stated

Mutual fund is managed by someone called Fund Manager to give results of return as required investor. Fund Manager has two skills when they manage the funds especially Equity Fund. The two skill are Stock Selection and Market timing. Manurung (2008, 157) define market timing as ability to predict market in bearish or bullish state then to build portfolio appropriate with the situation to fulfill investor requirement. Market timing also define as ability of investment manager to manage portfolio, investment manager that have market timing ability will buy stock when beta of the stock is above one that indicate market will go up, and will sell the stock when beta of the stock under 1 that indicate market will go down.

Research of equity fund has mostly been done by academician in developed market. Sharpe (1966) reported and suggested mutual fund performance. Treynor (1966) reported how to measure mutual fund performance. Jensen (1968) reported the empirical research of Mutual Fund Performance for period 1945 to 1964 in USA. Grinblat and Titman (1992) reported the persistence of mutual fund performance. Ippolito (1993) reported mutual fund performance for period 1965 – 1991 in USA. Ktohari and Warner (2001) reported Evaluating Mutual Fund Performance. Manurung (2002) reported performance of Indonesia’s mutual fund and Effect of Size of Mutual Fund. Pollet and Wilson (2008) reported about How Does Size Affect Mutual Fund Behavior.

Mutual fund Manage by Investment Manager that he has skill in market timing and stock selection. Treynor and Mazuy (1966) suggested a model to see the market timing of Fund Manager. Then Henrikson and Merton (1981) also suggested a model of the market timing. Both model has different in forming the variable market timing in model.

Based on explanation above, there is limited research about equity fund in Indonesia, especially effect of macro-variable to equity fund performance. This research want to explore market timing but also want to explore the inflation and exchange rate variable to the equity fund performance. Inflation and exchange rate variable added to model of Henrikson and Merton Model and Treynor and Mazuy Model to see the both effect variable.

**Theoritical Review**

Mutual fund is a portfolio of instrument investment that it depend to type on instrument Investment. Discussion of mutual fund should discussion about it’s return or sometimes called its performance. The performance of mutual funds is always discussion about Capital Asset Pricing Model (CAPM). The CAPM is introduced by Sharpe (1964), Lintner (1965) and Mossin 1966) to explain return the stocks or portfolio that is affected by it’s risk and others. The CAPM is as follows:

 (1)

This model is sometimes called by One Factor Model. Then this model is critiqued by Ross (1976) and introduced Arbitrage Pricing Theory (APT) that said return a stock or portfolio affected by many factor.

Then Fama and French (1993) introduced a model that return of a stock or portfolio affected three factor is called Fama-French Three Factor Model. The model is as follows:

 (2)

The Jagadesh and Timtan (1993) proposed Momentum factor which is a strategies which buy stocks that have performed well in the past and sell stocks that have performed poorly in the past generate significant positive returns over 3- to 12-month holding periods. Then Carharts (1997) combined Fama-French Three Factors Model and Momentum variabel from Jagadesh and Titman, and called as Carhart Four Factor Models. The Model is asfollows:

 (3)

This Research is to explore evaluation of Equity fund performance in Indonesia. Evaluation performance has suggested by Sharpe (1966), Treynor (1965) and Jensen, Information Ratio and M2. Because this research want to explore the market timing skill of Fund Manager and Inflation and Exchange rate factor. Market timing skill model proposed by Henrikson and Merton (1981) and Treynor and Mazuy (1966) as follows:

Henrikson and Merton model:

 (4)

Treynor and Mazuy Model:

 (5)

ε is other factor, that it entered variable macroeconomics such as Inflation and Exchange rate. Inflation has positive effect to stock return and also Exchange rate has positive effect to stock return or portfolio return.

Sharpe (1966) has explored equity fund performance for and suggested mutual fund performance. His suggestion become a measurement of equity fund performance. Treynor (1966) reported how to measure mutual fund performance. His suggestion become a measurement of equity fund performance. Jensen (1968) did research of the empirical research of Mutual Fund Performance for period 1945 to 1964 in USA. He found that there is very little evidence that any individual fund was able to do significantly better than that which we expected from mere random chance. Grinblat and Titman (1992) explored the persistence of mutual fund performance. They found that that there is positive persistence in mutual fund performance. Ippolito (1993) reported mutual fund performance for period 1965 – 1991 in USA. He found that return of equity fund that managed by investment manager are not better than berchmark return. Ktohari and Warner (2001) reported Evaluating Mutual Fund Performance. They concluded that It is hard to detect abnormal performance, particularly for a fund whose style characteristics differ from those of the value-weighted market portfolio. Manurung (2002) explored performance of Indonesia’s mutual fund and Effect of Size of Mutual Fund. He found that Size of mutual fund affected equity fund performance. Pollet and Wilson (2008) did research about How Does Size Affect Mutual Fund Behavior. They found that size affected mutual fund performance.

**Methodology**

As mentioned in the title, the paper want to see determinant equity fund return, so Equity fund return is calculated as follows:

 (6)

where

Rt = return equity fund at t

NAVt = Net Asset Value at t

Dt = distribution income at t

Then, this research want to explore market timing for the equity fund to see the fund manager’s skill. Market timing is included in the model by using dummy variable (D). If market return is higher than risk-free rate, D = 1; others D = 0. There are two model to see it such as:

1. Henrikson and Merton Method

Henrikson and Merton (1981) introduced a model to explore market timing. Their method suggest that high beta (β, positive) portfolio is to be expected in market with good performance, and lower beta portfolio is also to be expected in market with worse performance. The model as follows:

 (7)

When β2 is positive, it indicates that market timing ability exist in portfolio performance.

1. Treynor – Mazuy Method

Treynor and Mazuy (1966) introduce a model to explore market timing. Their propose a model as follows:

 (8)

When β2 is positive, it indicates that market timing ability exist in portfolio performance

Because this research want to explore effect of variable Exchange rate and inflation to Equity fund return, so Henrikson and Merton (1981) and Treynor and Mazuy (1966) model are modified as follows:

Henrikson and Merton Model

 (9)

Treynor and Mazuy Model

 (10)

**Data**

Data is used monthly data of NAV (net Assets Values) that it is published by Fund Manager of the equity fund. Data of NAV equity fund is collected from Financial Services Agency (Otoritas Jasa Keuangan, in Indonesia Language). The period of data is January 2011 until Desember 2017. Data of Inflation is gathered from Central Bureau of Statisitcs. Data of Exchange rate is collected from Bank Indonesia.

**Analysis**

The analysis of this research will divide into two part such as descriptive analysis that will be explained in the first analysis and causal-effect analysis that will be explained after descriptive analysis.

***Descriptive Analysis***

This analysis will explained about the descriptive data that it be used in paper. Table 1 below show the descriptive data. Equity fund rate of return are varies from -0,281% to 99,84%. There are seven out of twenty three equity fund that resulted negative in rate of return and sixteen equity fund resulted in positive rate of return. Among seven equity fund that resulted in negative rate of return are from -0,281% to -0,0692%. Meanwhile equity fund that resulted in positive rate of return are varied from 0,0171% to 99.84%. From minimum return perspective, shown fluctuate from -26,93% to -9,88%, but there are one equity fund with rate of return equal to 0%. Maximum return resulted in 109,63%, that resulted from equity fund with the highest average rate of return.

Equity fund considered to be risky can be seen from its standard deviation. Standard deviation of these equity fund are varied from 1,8% to 6,9%. This varieties of standard deviation shows how risky to invest in equity fund.

Table 1: Descriptive of Statistics Equity Fund, Inflation and Exchange rate



## Market Timing

## This research want to explore market timing the equity fund using Henrikson and Merton Model and Treynor and Mazuy Model. Henrikson and Merton Model will be explained first before Treynor and Mazuy Model. Tabel 2 show Henrikson and Merton Model (equation 4) which is in β2 positive stated market timing. R2 stated that variation of dependent variable could be explained by variation of all independent variable. Value of R2 for equity fund have at least 84% except for equity fund of Grow-2 Prosper is 22.65%. All model are significantly different from zero by significant level of 1%.

#### Table 2: Henrikson and Merton Model (Equation 4)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **NO** | **Equity Fund** | **α** | **β1** | **β2** | **R2** | **F Statistic** |
| 1. | Bahana Dana Prima | -0,000575 | 1,167554 | -0,091609 | 0,890439 | 329,1574 |
|  | ***- T Statistic*** | -0,210707 | 1,657767 | -0,620861 |  |  |
| 2. | Batavia Dana Saham Optimal | 0,000315 | 1,121065 | -0,042360 | 0,920760 | 470,6052 |
|  | ***- T Statistic*** | 0,141690 | 19,52261 | -0,352109 |  |  |
| 3. | Batavia Dana Saham | -0,001592 | 0,926644 | 0,150736 | 0,876071 | 286,3007 |
|  | ***- T Statistic*** | -0,627430 | 14,14346 | 1,098165 |  |  |
| 4. | BNI Reksa Dana Berkembang | -0,003464 | 1,199408 | -0,025586 | 0,877192 | 289,2822 |
|  | ***- T Statistic*** | -1,134424 | 15,21264 | -0,154897 |  |  |
| 5. | BNP Paribas Equity | -0,002631 | 1,089939 | 0,060213 | 0,962591 | 1.042,114 |
|  | ***- T Statistic*** | -1,749597 | 28,06528 | 0,740059 |  |  |
| 6. | BNP Paribas Maxi Saham | -0,002347 | 1,061587 | 0,081956 | 0,950809 | 782,8261 |
|  | ***- T Statistic*** | -1,377395 | 24,12864 | 0,889134 |  |  |
| 7. | BNP Paribas Pesona | -0,001242 | 1,074170 | 0,004572 | 0,967304 | 1.198,199 |
|  | ***- T Statistic*** | -0,915560 | 30,66715 | 0,062308 |  |  |
| 8. | CIMB-Principal Total Return Equity Fund | 0,000184 | 1,201398 | -0,205155 | 0,889814 | 327,0619 |
|  | ***- T Statistic*** | 0,067599 | 17,10965 | -1,394588 |  |  |
| 9. | Danareksa Mawar | -0,003677 | 0,957460 | 0,168104 | 0,933935 | 572,5359 |
|  | ***- T Statistic*** | -1,974150 | 19,90744 | 1,668324 |  |  |
| 10. | First-State Indoequity Sectoral Fund | -0,002592 | 1,051384 | 0,070118 | 0,960136 | 975,4527 |
|  | ***- T Statistic*** | -1,721047 | 27,03852 | 0,860713 |  |  |
| 11. | First-State Indoequity Value Select Fund | -0,001496 | 1,032339 | 0,060365 | 0,950761 | 782,0105 |
|  | ***- T Statistic*** | -0,908727 | 24,28293 | 0,677750 |  |  |
| 12. | First-State Indoequity Dividend Yield Fund | -0,001496 | 1,032339 | 0,060365 | 0,950761 | 782,0105 |
|  | ***- T Statistic*** | -0,908727 | 24,28293 | 0,677750 |  |  |
| 13. | Grow-2-Prosper | -0,010948 | 0,604869 | 0,656613 | 0,226531 | 11,86149 |
|  | ***- T Statistic*** | -0,991475 | 2,121359 | 1,099185 |  |  |
| 14. | Mandiri Investa Cerdas Bangsa | 0,997078 | 1,175217 | -0,059602 | 0,873399 | 279,4017 |
|  | ***- T Statistic*** | 331,1599 | 15,11550 | -0,365907 |  |  |
| 15. | Manulife Dana Saham | -0,001423 | 1,042938 | -0,105845 | 0,925279 | 501,5144 |
|  | ***- T Statistic*** | -0,726997 | 20,64045 | -0,999857 |  |  |
| 16. | Manulife Saham Andalan | -0,003329 | 1,127979 | 0,011430 | 0,931753 | 552,9301 |
|  | ***- T Statistic*** | -1,584168 | 20,78722 | 0,100543 |  |  |
| 17. | Panin Dana Maksima | -0,001307 | 1,178261 | -0,017686 | 0,800953 | 162,9698 |
|  | ***- T Statistic*** | -0,326371 | 11,39133 | -0,081616 |  |  |
| 18. | Panin Dana Prima | -0,000905 | 1,109559 | -0,006889 | 0,849756 | 229,0616 |
|  | ***- T Statistic*** | -0,283456 | 13,46091 | -0,039893 |  |  |
| 19. | AXA Citra Dinamis | -0,001216 | 1,062770 | 0,023742 | 0,967703 | 1.213,491 |
|  | ***- T Statistic*** | -0,905834 | 30,65585 | 0,326892 |  |  |
| 20. | BNP Paribas Infrastruktur Plus | -0,002087 | 1,150644 | 0,005883 | 0,943320 | 674,0372 |
|  | ***- T Statistic*** | -1,076951 | 2,299391 | 0,056113 |  |  |
| 21. | BNP Paribas Solaris | -0,002190 | 1,163196 | -0,077686 | 0,865847 | 261,3945 |
|  | ***- T Statistic*** | -0,715031 | 1,470852 | -0,468887 |  |  |
| 22. | Dana Ekuitas Prima | -0,002824 | 1,143913 | 0,105602 | 0,916225 | 442,9406 |
|  | ***- T Statistic*** | -1,150538 | 18,04938 | 0,795337 |  |  |
| 23. | Danareksa Mawar Fokus 10 | -0,003798 | 1,104891 | -0,071484 | 0,897964 | 356,4171 |
|  | ***- T Statistic*** | -1,523161 | 1,716169 | -0,529980 |  |  |

*Source: Compile by Authors*

Using Henrikson and Merton model, as presented in Table 2, market return closely correlated with equity fund return. Based on the analysis of equity funds listed above, there are no equity funds presented in the table are with market timing ability of its investment manager, there are some equity funds are affected negatively by its investment manager poor market timing ability as shown in negative figure of market timing coefficient (2).

## Treynor and Mazuy Model

Table 3 show the Treynor and Mazuy Model (equation 5) which is in β2 positive to state market timing. R2 stated that variation of dependent variable could be explained by variation of all independent variable. Value of R2 for equity fund have at least 84% except for equity fund of Grow-2 Prosper is 22.65%. All model are significantly different from zero by significant level of 1%. This result are similar with Henrikson and Merton model that has been explained above.

#### Table 3: Treynor and Mazuy Model (Equation 5)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **NO** | **Equity Fund** | **β0** | **β1** | **β2** | **R2** | **F Statistic** |
| 1. | Bahana Dana Prima | -0,001360 | 1,122532 | -0,371677 | 0,890127 | 3,281079 |
|  | ***-T Statistic*** | -0,621832 | 2,145150 | -0,392934 |  |  |
| 2. | Batavia Dana Saham Optimal | 0,000126 | 1,096785 | -0,289135 | 0,920777 | 470,7123 |
|  | ***- T Statistic*** | 0,071016 | 25,74562 | -0,375472 |  |  |
| 3. | Batavia Dana Saham | -0,001440 | 1,023352 | 1,378033 | 0,877989 | 291,4378 |
|  | ***- T Statistic*** | -0,714348 | 2,121701 | 1,580569 |  |  |
| 4. | BNI Reksa Dana Berkembang | -0,004102 | 1,195153 | 0,177970 | 0,877198 | 289,2999 |
|  | ***- T Statistic*** | -1,678048 | 20,43159 | 0,168314 |  |  |
| 5. | BNP Paribas Equity | -0,002323 | 1,123653 | 0,383936 | 0,962589 | 1.042,056 |
|  | ***- T Statistic*** | -1,929065 | 38,99577 | 0,737121 |  |  |
| 6. | BNP Paribas Maxi Saham | -0,001725 | 1,103473 | 0,386978 | 0,950590 | 779,1785 |
|  | ***- T Statistic*** | -1,262023 | 33,72904 | 0,654370 |  |  |
| 7. | BNP Paribas Pesona | -0,001220 | 1,076758 | 0,030102 | 0,967305 | 1.198,203 |
|  | ***- T Statistic*** | -1,123264 | 41,43321 | 0,064079 |  |  |
| 8. | CIMB-Principal Total Return Equity Fund | -0,001184 | 1,092815 | -1,095165 | 0,889009 | 324,3930 |
|  | ***- T Statistic*** | -0,541695 | 20,90008 | -1,158712 |  |  |
| 9. | Danareksa Mawar | -0,002772 | 1,050704 | 1,042063 | 0,933794 | 571,2264 |
|  | ***- T Statistic*** | -1,856612 | 29,41306 | 1,613796 |  |  |
| 10. | First-State Indoequity Sectoral Fund | -0,002282 | 1,091620 | 0,480165 | 0,960189 | 976,7957 |
|  | ***- T Statistic*** | -1,893748 | 37,86253 | 0,921347 |  |  |
| 11. | First-State Indoequity Value Select Fund | -0,004900 | 1,092896 | 1,049527 | 0,909420 | 406,6197 |
|  | ***- T Statistic*** | -2,660209 | 24,79401 | 1,317214 |  |  |
| 12. | First-State Indoequity Dividend Yield Fund | -0,001279 | 1,067975 | 0,447102 | 0,950855 | 783,5933 |
|  | ***- T Statistic*** | -0,971546 | 33,89117 | 0,784923 |  |  |
| 13. | Grow-2-Prosper | -0,006484 | 0,950658 | 3,446293 | 0,222749 | 11,60673 |
|  | ***- T Statistic*** | -0,731601 | 4,482781 | 0,899021 |  |  |
| 14. | Mandiri Investa Cerdas Bangsa | 0,996179 | 1,153621 | 0,018834 | 0,873190 | 278,8750 |
|  | ***- T Statistic*** | 412,9034 | 19,98202 | 0,018048 |  |  |
| 15. | Manulife Dana Saham | -0,001948 | 0,983344 | -0,686053 | 0,925302 | 501,6830 |
|  | ***- T Statistic*** | -1,243646 | 26,23392 | -1,012535 |  |  |
| 16. | Manulife Saham Andalan | -0,003236 | 1,133699 | 0,049846 | 0,931748 | 552,8904 |
|  | ***- T Statistic*** | -1,923394 | 28,15840 | 0,068491 |  |  |
| 17. | Panin Dana Maksima | -0,001871 | 1,177747 | 0,205246 | 0,800991 | 163,0081 |
|  | ***- T Statistic*** | -0,583400 | 15,34813 | 0,147969 |  |  |
| 18. | Panin Dana Prima | -0,001587 | 1,118538 | 0,390885 | 0,849985 | 229,4730 |
|  | ***- T Statistic*** | -0,621319 | 18,30357 | 0,353857 |  |  |
| 19. | AXA Citra Dinamis | -0,000994 | 1,074062 | 0,083579 | 0,967673 | 1.212,338 |
|  | ***- T Statistic*** | -0,924012 | 41,73813 | 0,179679 |  |  |
| 20. | BNP Paribas Infrastruktur Plus | -0,002077 | 1,154342 | 0,051166 | 0,943322 | 674,0607 |
|  | ***- T Statistic*** | -1,338795 | 31,09156 | 0,076240 |  |  |
| 21. | BNP Paribas Solaris | -0,003105 | 1,129978 | -0,147158 | 0,865515 | 260,6487 |
|  | ***- T Statistic*** | -1,264947 | 19,23439 | -0,138576 |  |  |
| 22. | Dana Ekuitas Prima | -0,002460 | 1,206565 | 0,792659 | 0,916471 | 444,3599 |
|  | ***- T Statistic*** | -1,253892 | 25,69720 | 0,933934 |  |  |
| 23. | Danareksa Mawar Fokus 10 | -0,004470 | 1,070954 | -0,249565 | 0,897715 | 355,4525 |
|  | ***- T Statistic*** | -2,236752 | 22,3930 | -0,288682 |  |  |

*Source: Compile by Author*

Based on analysis above with Treynor and Mazuy to detect market timing ability as presented in Table 3, market return closely correlated with equity fund return. As for market timing, there are no indication that investment manger market timing ability significantly affect equity fund return, even there are some equity fund return which negatively affected by investment manager market timing ability.

Based on analysis from Table 2 and Table 3 founded that all equity fund have market timing that positively affect equity fund return, but also some equity fund negatively affected by market timing, which mean market timing reduce equity fund return. After all, these coefficients are not significantly affecting equity fund return, which indicate investment manager does not have market timing ability.

## Inflation and Exchange Rate

This research also want to explore effect Inflation and Exchange rate to equity fund. As mentioned above, this research added inflation and exchange rate variable to Henrikson and Merton Model, and Treynor and Mazuy Model to explore effect of both variable. Table 4 below show coefficient of Henrikson and Merton Mode, R2 and F Statistic. Value of R2 for equity fund have at least 85,9% except for equity fund of Grow-2 Prosper is 24%. It is higher than R2 is in Henrikson and Merton Model without inflation and exhange rate variabel. All model are significantly different from zero by significant level of 1%. This result are similar with Henrikson and Merton model that has been explained above.

#### Table 4: Henrikson and Merton model with additional variable Inflation, and exchange rate of US Dollar (Equation 3)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NO** | **Equity Fund** | **β0** | **β1** | **β2** | **β3** | **β4** | **R2** | **F Statistic** |
| 1. | Bahana Dana Prima | 0,000615 | 1,083905 | -0,131127 | 0,002563 | -0,297675 | 0,905041 | 188,2338 |
|  | ***- T Statistic*** | 0,116807 | 15,29860 | -0.935804 | 0,228469 | -3,455790 |  |  |
| 2. | Batavia Dana Saham Optimal | -0,006523 | 1,070805 | -0,091947 | 0,020642 | -0,233315 | 0,932696 | 273,6938 |
|  | ***- T Statistic*** | -1,534339 | 18,72507 | -0,812983 | 2,279313 | -3,355840 |  |  |
| 3. | Batavia Dana Saham | 0,002913 | 0,859653 | 0,131238 | -0,006929 | -0,212790 | 0,887629 | 156,0078 |
|  | ***- T Statistic*** | 0,581145 | 12,75207 | 0,984347 | -0,649000 | -2,596297 |  |  |
| 4. | BNI Reksa Dana Berkembang | -0,002393 | 1,185138 | -0,029358 | -0,001758 | -0,044522 | 0,877553 | 141,5441 |
|  | ***- T Statistic*** | -0,378343 | 13,93161 | -0,174495 | -0,130469 | -0,430480 |  |  |
| 5. | BNP Paribas Equity | -0,007948 | 1,086129 | 0,040038 | 0,013699 | -0,052281 | 0,964794 | 541,2359 |
|  | ***- T Statistic*** | -2,626122 | 26,68006 | 0.497285 | 2,124951 | -1,056312 |  |  |
| 6. | BNP Paribas Maxi Saham | -0,007493 | 1,025488 | 0,045536 | 0,015420 | -0,169273 | 0,957564 | 445,6553 |
|  | ***- T Statistic*** | -2,282652 | 23,22396 | 0,521430 | 2,205186 | -3,153106 |  |  |
| 7. | BNP Paribas Pesona | -0,006317 | 1,040100 | -0,030546 | 0,015105 | -0,161326 | 0,973844 | 735,3412 |
|  | ***- T Statistic*** | -2,510134 | 30,72497 | -0,456242 | 2,817596 | -3,919812 |  |  |
| 8. | CIMB-Principal Total Return Equity Fund | 0,001082 | 1,134427 | -0,131127 | 0,002563 | -0,297675 | 0,905041 | 188,2338 |
|  | ***- T Statistic*** | 0,116807 | 15,29860 | -0,935804 | 0,228469 | -3,455790 |  |  |
| 9. | Danareksa Mawar | -0,007584 | 0,943794 | 0,147616 | 0,010790 | -0,078198 | 0,936212 | 289,8683 |
|  | ***- T Statistic*** | -1,997564 | 18,48168 | 1,461602 | 1,334283 | -1,259524 |  |  |
| 10. | First-State Indoequity Sectoral Fund | -0,007292 | 1,037965 | 0,047043 | 0,012781 | -0,083019 | 0,962819 | 511,4346 |
|  | ***- T Statistic*** | -2,417211 | 25,57933 | 0,586185 | 1,988954 | -1,682780 |  |  |
| 11. | First-State Indoequity Value Select Fund | -0,007849 | 0,957409 | 0,133182 | 0,008293 | -0,175731 | 0,915387 | 213,6658 |
|  | ***- T Statistic*** | -1,701667 | 15,43079 | 1,085347 | 0,844044 | -2,329614 |  |  |
| 12. | First-State Indoequity Dividend Yield Fund | -0,008831 | 1,015987 | 0,026749 | 0,019638 | -0,112748 | 0,956747 | 436,8677 |
|  | ***- T Statistic*** | -2,758890 | 23,59780 | 0,314144 | 2,880254 | -2,153952 |  |  |
| 13. | Grow-2-Prosper | -0,023021 | 0,522211 | 0,572234 | 0,036039 | -0,389670 | 0,240051 | 6,238591 |
|  | ***- T Statistic*** | -1,013942 | 1,709948 | 0,947419 | 0,745161 | -1,049491 |  |  |
| 14. | Mandiri Investa Cerdas Bangsa | 0,998112 | 1,115453 | -0,087205 | 0,001365 | -0,211348 | 0,880410 | 145,3978 |
|  | ***- T Statistic*** | 164,4255 | 13,66101 | -0,540012 | 0,105569 | -2,128996 |  |  |
| 15. | Manulife Dana Saham | -0,005008 | 0,991452 | -0,144942 | 0,012498 | -0,214353 | 0,935798 | 287,8706 |
|  | ***- T Statistic*** | -1,331095 | 19,58996 | -1,448064 | 1,559389 | -3.483.664 |  |  |
| 16. | Manulife Saham Andalan | -0,004492 | 1,071313 | -0,022078 | 0,006717 | -0,215851 | 0,939689 | 307,7212 |
|  | ***- T Statistic*** | -1,096240 | 19,43625 | -0,202531 | 0,769492 | -3,221023 |  |  |
| 17. | Panin Dana Maksima | -0,003998 | 1,080379 | -0,077897 | 0,013325 | -0,377759 | 0,820543 | 90,30434 |
|  | ***- T Statistic*** | -0,506697 | 10,18033 | -0,371139 | 0,792844 | -2,927825 |  |  |
| 18. | Panin Dana Prima | 0,000720 | 1,039488 | -0,037844 | 0,000559 | -0,244827 | 0,859795 | 121,1148 |
|  | ***- T Statistic*** | 0,112573 | 1,208133 | -0,222392 | 0,041014 | -2,340445 |  |  |
| 19. | AXA Citra Dinamis | -0,005729 | 1,060591 | 0,007167 | 0,011558 | -0,040514 | 0,969366 | 624,9498 |
|  | ***- T Statistic*** | -2,112200 | 29,07050 | 0,099326 | 2,000451 | -0,913394 |  |  |
| 20. | BNP Paribas Infrastruktur Plus | -0,004713 | 1,121201 | -0,018446 | 0,008603 | -0,126732 | 0,946282 | 347,9093 |
|  | ***- T Statistic*** | -1,204383 | 2,129926 | -0,177176 | 1,032034 | -1,980214 |  |  |
| 21. | BNP Paribas Solaris | -0,001403 | 1,083362 | -0,116596 | 0,003329 | -0,286614 | 0,878921 | 143,3661 |
|  | ***- T Statistic*** | -0,232510 | 13,34473 | -0,726193 | 0,258974 | -2,903874 |  |  |
| 22. | Dana Ekuitas Prima | -0,005938 | 1,084045 | 0,063751 | 0,011864 | -0,241640 | 0,925466 | 245,2305 |
|  | ***- T Statistic*** | -1,236502 | 16,78228 | 0,499021 | 1,159788 | -3,076930 |  |  |
| 23. | Danareksa Mawar Fokus 10 | -0,002873 | 1,053532 | -0,095085 | 0,001084 | -0,181368 | 0,904039 | 186,0637 |
|  | ***- T Statistic*** | -0,572868 | 1,561618 | -0,712637 | 0,101460 | -2,211225 |  |  |

*Source: Compile by Author.*

Based on Henrikson and Merton model with additional inflation variable and exchange rate of US Dollar, there are only six equity fund affected by inflation, which are positive correlation and significant. There are fifteen equity fund affected by exchange rate of US Dollar which are negative and significant

## Treynor and Mazuy Model with Inflation and US Dollar conversion rate

Table 5 below show coefficient of Henrikson and Merton Model adding inflation and exchange rate of US Dollar variable, R2 and F Statistic. Value of R2 for equity fund have at least 85,9% except for equity fund of Groq-2 Prosper is 23.73%. It is higher than R2 is in Henrickson and Merton Model without inflation and exhange rate variable. All model are significantly different from zero by significant level of 1%. This result are similar with Henrikson and Merton model that has been explained above.

#### Table 5: Treynor and Mazuy Model with additional inflation and exchange rate of US Dollar variable. (Equation 4)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NO** | **Equity Fund** | **β0** | **β1** | **β2** | **β3** | **β4** | **R2** | **F Statistic** |
| 1. | Bahana Dana Prima | -0,000252 | 1,019348 | -0,567525 | 0,002045 | -0,294181 | 0,904472 | 186,9965 |
|  | ***- T Statistic*** | -0,049157 | 17,64070 | -0,632882 | 0,182134 | -3,410727 |  |  |
| 2. | Batavia Dana Saham Optimal | -0,006982 | 1,021490 | -0,526630 | 0,020387 | -0,231753 | 0,932586 | 273,2178 |
|  | ***- T Statistic*** | -1,689769 | 21,94943 | -0,729188 | 2,254381 | -3,336208 |  |  |
| 3. | Batavia Dana Saham | 0,002958 | 0,946494 | 1,274842 | -0,007004 | -0,211412 | 0,889446 | 158,8953 |
|  | ***- T Statistic*** | 0,612799 | 17,40774 | 1,510863 | -0,662961 | -2,604914 |  |  |
| 4. | BNI Reksa Dana Berkembang | -0,002922 | 1,179739 | 0,160836 | -0,002116 | -0,041755 | 0,877540 | 141,5278 |
|  | ***- T Statistic*** | -0,475781 | 17,05394 | 0,149819 | -0,157409 | -0,404373 |  |  |
| 5. | BNP Paribas Equity | -0,007818 | 1,109498 | 0,289593 | 0,013760 | -0,052545 | 0,964826 | 541,7370 |
|  | ***- T Statistic*** | -2,661542 | 33,53160 | 0,563976 | 2,140101 | -1,063900 |  |  |
| 6. | BNP Paribas Maxi Saham | -0,007207 | 1,048303 | 0,209696 | 0,015590 | -0,170399 | 0,957494 | 444,8892 |
|  | ***- T Statistic*** | -2,258952 | 29,17180 | 0,376020 | 2,232608 | -3,176749 |  |  |
| 7. | BNP Paribas Pesona | -0,006512 | 1,024871 | -0,138268 | 0,014989 | -0,160554 | 0,973810 | 734,3543 |
|  | ***- T Statistic*** | -2,663022 | 37,20745 | -0,323464 | 2,800505 | -3,904994 |  |  |
| 8. | CIMB-Principal Total Return Equity Fund | -0,000225 | 1,010697 | -1,250105 | 0,001443 | -0,233953 | 0,898204 | 174,2654 |
|  | ***- T Statistic*** | -0,042711 | 17,04337 | -1,358392 | 0,125233 | -2,643032 |  |  |
| 9. | Danareksa Mawar | -0,006960 | 1,026001 | 0,941965 | 0,011119 | -0,080041 | 0,936212 | 289,8699 |
|  | ***- T Statistic*** | -1,887921 | 24,70821 | 1,461749 | 1,378027 | -1,291354 |  |  |
| 10. | First-State Indoequity Sectoral Fund | -0,007175 | 1,066375 | 0,370544 | 0,012827 | -0,083121 | 0,962904 | 512,6479 |
|  | ***- T Statistic*** | -2,452162 | 32,35493 | 0,724460 | 2,002833 | -1,689580 |  |  |
| 11. | First-State Indoequity Value Select Fund | -0,007344 | 1,033130 | 0,899226 | 0,008548 | -0,177053 | 0,915538 | 214,0834 |
|  | ***- T Statistic*** | -1,641046 | 20,49567 | 1,149531 | 0,872737 | -2,353150 |  |  |
| 12. | First-State Indoequity Dividend Yield Fund | -0,008855 | 1,034603 | 0,288966 | 0,019598 | -0,112266 | 0,956848 | 437,9348 |
|  | ***- T Statistic*** | -2,852388 | 29,58642 | 0,532487 | 2,884251 | -2,150828 |  |  |
| 13. | Grow-2-Prosper | -0,019872 | 0,821145 | 3,023895 | 0,037841 | -0,401142 | 0,237339 | 6,146175 |
|  | ***- T Statistic*** | -0,899757 | 3,300744 | 0,783254 | 0,782790 | -1,080260 |  |  |
| 14. | Mandiri Investa Cerdas Bangsa | 0,997232 | 1,080733 | -0,116287 | 0,000801 | -0,207224 | 0,879988 | 144,8168 |
|  | ***- T Statistic*** | 168,8803 | 16,24849 | -0,112660 | 0,061949 | -2,087246 |  |  |
| 15. | Manulife Dana Saham | -0,005679 | 0,912318 | -0,874554 | 0,012133 | -0,212197 | 0,935617 | 287,0097 |
|  | ***- T Statistic*** | -1,552276 | 22,13746 | -1,367455 | 1,515139 | -3,449519 |  |  |
| 16. | Manulife Saham Andalan | -0,004614 | 1,059789 | -0,116380 | 0,006647 | -0,215406 | 0,939679 | 307,6672 |
|  | ***- T Statistic*** | -1,159440 | 23,64329 | -0,167306 | 0,763156 | -3,219473 |  |  |
| 17. | Panin Dana Maksima | -0,004802 | 1,049834 | -0,088963 | 0,012808 | -0,373972 | 0,820240 | 90,11891 |
|  | ***- T Statistic*** | -0,626236 | 12,15538 | -0,066374 | 0,763175 | -2,900853 |  |  |
| 18. | Panin Dana Prima | 2,697636 | 1,033478 | 0,237517 | 7,164463 | -0,241051 | 0,859792 | 121,1119 |
|  | ***- T Statistic*** | 0,000434 | 14,77136 | 0,218755 | 0,005270 | -2,308163 |  |  |
| 19. | AXA Citra Dinamis | -0,005653 | 1,063338 | 0,006185 | 0,011607 | -0,040877 | 0,969362 | 624,8708 |
|  | ***- T Statistic*** | -2,146067 | 35,84081 | 0,013434 | 2,013385 | -0,923037 |  |  |
| 20. | BNP Paribas Infrastruktur Plus | -0,004851 | 1,112534 | -0,066687 | 0,008519 | -0,126150 | 0,946267 | 347,8102 |
|  | ***- T Statistic*** | -1,276253 | 25,98746 | -0,100377 | 1,024129 | -1,974133 |  |  |
| 21. | BNP Paribas Solaris | -0,002368 | 1,031183 | -0,338532 | 0,002729 | -0,282362 | 0,878280 | 142,5073 |
|  | ***- T Statistic*** | -0,402967 | 15,57951 | -0,329581 | 0,212170 | -2,858004 |  |  |
| 22. | Dana Ekuitas Prima | -0,005878 | 1,125214 | 0,586982 | 0,011854 | -0,241194 | 0,925721 | 246,1377 |
|  | ***- T Statistic*** | -1,262721 | 21,45899 | 0,721345 | 1,163448 | -3,081616 |  |  |
| 23. | Danareksa Mawar Fokus 10 | -0,003555 | 1,008156 | -0,365881 | 0,000670 | -0,178520 | 0,903647 | 185,2253 |
|  | ***- T Statistic*** | -0,728516 | 18,33989 | -0,428897 | 0,062695 | -2,175679 |  |  |

*Source: Compile by Author*

Based on Treynor and Mazuy Model with additional inflation and exchange rate of US Dollar variable, there are only seven equity fund which affected by inflation, which are positive correlation and significant. There are sixteen equity fund which affected by exchange rate of US Dollar variable, which they are negative and significant.

This finding research mostly support the previous research but investor should take care to invest in mutual funds. The next research should use another methodology to see the good results for example Panel data Model and Vector Autoregressive Methods.

**Conclusion**

Based on previous analysis, there are several recommendation:

1. Investor can chose equity fund without think about investment manager ability.
2. When Exchange Rate of US Dollar decrease, investor can sell their equity fund unit, because equity fund are overprice in this position.
3. Government need to make new policy regarding exchange rate of US Dollar so that equity fund return are not decreasing in value.

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