An Application of the Black-Litterman Model with ARIMA-ARCH Views for Islamic Stock Portfolio in Indonesian Stock Exchange

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ABSTRACT— ***The aims of this research were: 1) to do forecasting return of stocks using ARIMA-ARCH method and determining the level its error estimation 2) to form the portfolio combination of optimal islamic stock using the method of Black Litterman with ARIMA-ARCH in bullish and bearish market condition 3) to compare the formed portfolio performance of Islamic stocks with some benchmark indices. The result of this research showed that the forecast of stock return of ARIMA and ARCH model can be used as the input of black litterman model view and can determine the confidence level of stocks forecasting based on the value of Mean Absolute Deviation. Using the Model of ARIMA-GARCH on Black Litterman Portfolio during 4 weeks at the bullish condition and 4 weeks at the bearish condition in which this can generally give a performance above the benchmark index, like IHSG, JII, and LQ45***

Keywords— Islamic stocks, Black Litterman model, ARIMA-ARCH models

1. INTRODUCTION

Indonesian middle class has grown significantly over the last few years, but less than ten percent of them has invested their fund. They are very potential to invest their fund in stock exchange so that the industry of stock exchange investment does have to depend on foreign investors. At the moment, the new effect account of is about five hundred investors, while based on the data taken from Deposit Insurance Agency (2015), there are more than three point half million bank accounts whose their deposit is more than one hundred million rupiah in which of that number, two millions have deposit above five billion rupiah. This number is more than enough to invest in Indonesia Stock Exchange. One of the ways to increase the role of middle up class in Indonesia is by forming islamic stock exchange because most of people in Indonesia are moslem. According to the expert, islamic stock has low risk against the crisis compared to non islamic stock because the regulation of debt composition limitation is based on the interest of islamic company issuers. Moreover, the islamic share is very desirable by middle east investors. At present, the number of islamic share has reached 336 issuers with the capitalization value of 56.4% from the capitalization of total share in stock exchange.

Economy fluctuation in Indonesia especially in stock exchange has decreased (*bearish*) since 2015 (Figure 1) and its trend decreased in 2016. The fall of stock exchange in 2015 was caused by the increase of interest rate The Fed US was the one which caused foreign investers withdrew their fund from Indonesia. In 2016, the stock index increased (*bullish*) after the policy - tax amnesty was issued by the government and the effect of brexit meant that the United Kingdom stock exchange was out of the European Union in which this made the foreigners overwhelmed the Indonesia Stock Exchange.

There will be an investion simulation in stock exchange in this research by using the stock portfolio diversification method which predicts the stocks with positive return. Stocks selected are the stocks which can be invested in a long term period. The method of mutual fund formation or portfolio generally uses the method of Mean Variance and Single Index Model. Both of them have the same weakness, that is, either a good performance in the back testing and a bad performance in forward testing. This is due to the use of expected return value which uses average return that does not describe the value of forecasting return in the future. The model which can accomodate the forecasting return of stocks and its estimation error is Black Litterman Model.

Figure 1. Price JCI at 2015 to 2016

Black Litterman Model was introduced by Robert Litterman and Fisher Black back in 1990. This model begins with the calculation of basic return from the upside down optimization based on the market capitalization weighting. Return produced from this model is called equilibrium return whose portfolio is identical with the portfolio from the return model CAPM (Idzorek. 2005). This Black Litterman Model is then combined with the return equilibrium and forecasting return at the level of confidence. This model can decrease the sensitivity over the estimation error. Stocks forecasting return used is ARIMA and ARCH model in which they are used as the input of view at the model of Black Litterman portfolio.

2. LITERATURE REVIEW

Black Litterman Model forms portfolio which can handle the portfolio of unintuitive, highly-concentrated, input sensitivity, and its size of error estimation. This problem can be found in Mean Variance Optimization which maximizes the return at the level of certain risk (Idzorek, 2005). The discussion of this model is based on the theory of bayesian and reverse optimization. Black and Litterman (1990) used the bayesian approach to combine the perspective of subjective investor over the return expected from one asset or more with expected return vector of market equilibrium from the reverse opitimization (*the prior distribution*) to produce mixed intuitive expected return (*posterior distribution*).

In order to predict the stock return and market in the future, the investor can use time series forecasting method at Black Litterman Model by using ARIMA and group model of ARCH/GARCH. GARCH model can catch the characteristics of stock return. This research used GARCH model at the formation of Black Litterman portfolio done before by Beach and Orlov (2007), Palomba (2006) and Ojagverdiyeva et al (2011) as well. GARCH model stated that the upside down predictor from the varians in the next period is the weighted average from the long term varian average. Varians is predicted at this moment and new information is caught by most of the newest residual squared (Engle, 2002).

By using the dependent time series, varians and covarians, this will make the model possible to catch the effect of data clustering. This has been proven that the varians in financial market are high at one periode and low at another period (Brooks, 2008). When the varians changed from time to time, this decribes that time series has heterokedasticity because it has changing volatility. Even though GARCH model can describe the grouping of volatility, GARCH model has a problem in volatility which is unsymetrical usually in the form of good news and bad news in stock exchange. One of the GARCH model developments over this problem is the model of EGARCH. The model of Exponential GARCH is a model that can be used to handle the data with asymmetric changes. This model was introduced by Nelson in 1991. EGARCH model does not limit the non-negative parameter to create non negative variances and error variances at present. This is not only influenced by the future error but this is also influenced by error variance in the past.

3. METHODOLOGY

3.1. Data Collection Methods

The sampling in this research used the techique of non-probability sampling by purposive sampling and there were 22 samples of Islamic stocks used in this research. The considerations or conditions determined by the researcher when sampling took place are: 1) The issuers were listed as the Islamic stocks in 2016; 2) The stocks prioritized was the stock with the biggest market capitalization; 3) The stock was prioritized to have a performance above IHSG in long term period. The type of data in this research is secondary data, that is, weekly trading price closing data of Islamic stock samples and IHSG at the periode of May 2013 to June 2016 with the number of 156 week observations. Furthermore, the interest rate data with the Bank Indonesia Certificates Sharia and the data of share in the market.

3.2. Data Processing and Analysis

3.2.1. Forecasting with ARIMA-ARCH

This model uses the software of Eviews 5 and 9 referenced by Djuanda and Junaidi (2012). The followings are the stages:

3.2.1.1. Identification Model

The most general method to choose ARIMA method through correlogram autocorrelation function (ACF) and partial autocorrelation function (PACF) (Table 1).

Table 1 Plot ACF and PACF

Model	Plot ACF	Plot PACF
AR(p)	Exponential, exponential-oscillation or sinewave	This decreases drastically at certain Lag (*cut off)* of estimation
MA(q)	This decreases drastically at certain Lag (*cut off)* of estimation	Exponential, exponential-oscillation or sinewave
ARMA(p,q)	Exponential, exponential-oscillation or sinewave	Exponential, exponential-oscillation or sinewave

3.2.1.2. Parameter Estimation Model

The best model is based on the level of variable significance, R^2, Akaike Information Criterion (AIC) and Schwarz Criterion (SC).

3.2.1.3. Evaluation of ARIMA Model

3.2.1.4. Detection of ARCH effects

The observation of the square residual pattern and ARCH-LM test. If there is a arch effect, it continues to the formation of ARCH model, if there is no arch effect, it does not continue to the prediction or ARIMA model forecasting.

3.2.1.5. Estimasi Model ARCH, GARCH, ARCH-M, TARCH dan EGARCH

The estimation is chosen based on the coeffisient of the biggest Log Likehood and AIC and the smallest SIC.

3.2.1.6. Evaluation of ARCH Model

Testing normality of error, the randomness of the residuals and ARCH effects

3.2.1.7. Prediction or forecasting

3.2.2. Build a Portfolio Black Litterman

3.2.2.1. Calculating the Average Return, Standard Deviation, Variance and Covariance.

3.2.2.2. Calculating Risk Coefficients:: $\lambda = \frac{E(R_m) - R_f}{\sigma_m^2}$ (Grinold dan Kahn, 1999)

λ : Coefficient risk
$E(R_m)$: Expected return JCI
R_f : Return rate Bank Indonesia Certificates Sharia
σ_m^2 : Variance JCI

3.2.2.3. Calculating the Value and Weight of Market Capitalization

3.2.2.4. Calculating Equilibrium Excess Returns: $\prod = \lambda \sum W_m$

$\prod$: Excess equilibrium return
$\sum$: Variance covariance excess return
W_m : Weight market capitalization

3.2.2.5. Estabilishing Investors's View

In this research, the input view of the investors was assumed that this was sought by using the model of ARIMA-ARCH forecasting. From the result obtained, there were some combinations of matrix P and Q formed. P matrix used absolute view and relative view. Absolute view with P matrix is worth 1 by using Q value of return forecasting. Relative view was determined by assuming that the use of negative correlation in each share with 1 P matix for positive return and -1 P matrix for negative return. Relative view is only used at the stock with the level of confidence 1/3 by using the market capitalization weighting. The value of Q *return* used was the difference of positive and negative return value from return forecasting.

3.2.2.6. Estabilishing the Level of Confidence

The level of confidence in this research was assumed that this was established by forecasting within 4 weeks before forecasting return for the investor's input view. Return forecasting is compared with the real return counted with the value of Mean Absolute Deviation. The value of MAD above 0.02 was assumed that there was 1/3 level of confidence obtained while the value of MAD below 0.02 was assumed that there was 2/3 level of confidence obtained.

3.2.2.7. Estabilishing omega: $\Omega = \left(\tau \, x \frac{1-\varepsilon}{\varepsilon}\right) P \sum P^T$

Ω : diagonal covariance matrix of view
τ : 0.025 scalar value (Idzorek, 2005)
P : matrix view
ε : level of confidence

3.2.2.8. Formation of Black Litterman Model: $E(r) = [(\tau\sum)^{-1} + P^T \Omega P]^{-1}[(\tau\sum)^{-1}\prod + P^T \Omega Q]$

3.2.2.9. Black Litterman Asset Allocation
Using a software of Microsoft excel referenced by Bodie, Kane, and Marcus (2010) with the aid of add-ons solver. Constrain used was the highest Sharpe ratio.

3.2.2.10. Calculating performance of the portfolio with the Sharpe ratio, Treynor ratio, Jensen alpha and Information ratio (Bodie et. Al, 2010).

Sharpe ratio = $\frac{r_p - r_f}{\sigma_p}$ Treynor ratio = $\frac{r_p - r_f}{\beta_p}$ Information ratio = $\frac{r_p - r_m}{\sigma_p}$

Jensen alpha = $r_p - \left[r_f + \beta_p(r_m - r_f)\right]$

r_p : the expected rate of return of portfolio
σ_p : the standard deviation of the portfolio
β_p : portfolio sensitivity to market

3.2.3. Determining the condition of Bullish and Bearish market.
The determination of bullish and bearish market condition is by counting the average return market. The month with the highest average return market in the periode of observation was the bullish market. The month with the average return market which was lower than that of the average return periode of observation was bearish market (Fabozzi and Francis, 1979).

4. RESULT

4.1. Forecasting Return Stock with ARIMA-ARCH.

The formation of ARIMA-ARCH model in this research is to predict the return stock in the future along with the level of confidence. Prediction was done at the periode of bullish in July 2016 after the policy of tax amnesty and the effect of brexit as well as the periode of bearish in July 2015 after the increase of interest rate of The Fed. The level of confidence in each stocks was determined by forecasting the month before, i.e., in June 2016 and June 2015. The value of return prediction obtained was compared with the real return to calculate the Mean Absolute Deviation. The tentative model of ARIMA-ARCH, MAD, and the level of trust at the bullish market can be seen in Table 2.

Table 2 Tentative Model ARMA-ARCH and Confidence Period Bullish

No	Code	Model ARMA-ARCH	MAD	Confidence	No	Code	Model ARMA-ARCH	MAD	Confidence
1	AALI	AR(4)MA(4)	0.041	0.33	12	PTPP	AR(9)MA(9) ARCH-M	0.012	0.66
2	AKRA	AR(14)MA(4) EGARCH	0.034	0.33	13	PWON	AR(1)MA(10)	0.030	0.33
3	ASII	AR(7)MA(1)	0.031	0.33	14	ROTI	AR(24)MA(4)	0.018	0.66
4	BSDE	AR(29)MA(1)	0.040	0.33	15	SCMA	AR(11)MA(11)	0.030	0.33
5	ICBP	AR(1) TARCH	0.031	0.33	16	SMRA	MA(7) EGARCH	0.034	0.33
6	INDF	AR(19)MA(19)	0.014	0.66	17	SMSM	MA(1) GARCH	0.013	0.66
7	ISAT	AR(32)MA(8) GARCH	0.011	0.66	18	TLKM	AR(1)MA(10)	0.017	0.66
8	KAEF	MA(7) EGARCH	0.033	0.33	19	TOTO	MA(2) EGARCH	0.047	0.33
9	KLBF	AR(13)MA(1) TARCH	0.029	0.33	20	UNVR	AR(19) MA(1)	0.015	0.66
10	LPPF	AR(1)MA(4)	0.016	0.66	21	WIKA	AR(9)MA(9)	0.020	0.33
11	MYOR	AR(12)MA(12)	0.011	0.66	22	WSKT	AR(33)MA(8)	0.028	0.33

Based on the result of research, it could be concluded that the data return used in the model of ARIMA-ARCH has been a stationary according to the root test Augmented Dickey Fuller and plot ACF and PACF which was close to zero average at all stocks. The identification of ARIMA model which used the plot of ACF to MA and PACF to AR showing the ARIMA TLKM model was AR(1)MA(10). The coeffisient of AR(1) and MA(10) at the model was significant statistically. The evaluation of model showed that the drop of the rest self correlation value was not significantly different from the nol at all lag. The pattern of square residual and ARCH-LM test showed that there was no heterokedasticity so that forecasting return stock could still be performed . The value of MAD from the return forecasting and real return in June 2016 was 0.017 so that the level of confidence belonging to the stock of TLKM was 2/3.

Besides the use of the ARIMA model, there was stocks which did not pass the test of heterokedasticity like in the stock of SMRA. Therefore, this research was used as the model of ARCH. After passing the method of ARIMA at the data of SMRA, it could be found that the model of MA(7). These models of ARCH used in this research was ARCH, GARCH, ARCH-M, TARCH and EGARCH. The resulf of output SMRA MA(7) as all models is the model of ARCH variance in which this showed that the coffecient was statistically significant. Based on the Log of the biggest Likehood and AIC as well as the smallest SIC obtained from the model of EGARCH was the best method. Consequently, the evaluation of normality test Jargue-Bera was not significant. This showed a normal distributed errors (Mahalingam, 2015). Result of MAD calculation value of MAD from the return forecasting with the return real at the month was of June 2016 showing that the biggest value of 0.034 so that the level of confidence towards the forecasting of SMRA share was 1/3. Besides doing the condition of market shaper, forecasting return share will be done either by showing the bearish market condition, like seen in table 3. The result of the MAD Forecasting at the level of the bearish market showed the estimation error which is more compared to that of bullish market.

Table 3 Model Tentative ARMA-ARCH and Confidence Period Bearish

No	Code	Model ARMA-ARCH	MAD	Confidence	No	Code	Model ARMA-ARCH	MAD	Confidence
1	AALI	AR(3)MA(3)	0,055	0,33	12	PTPP	AR(9)MA(9) TARCH	0,046	0,33
2	AKRA	AR(1)MA(4) GARCH	0,041	0,33	13	PWON	AR(31)MA(5)	0,021	0,33
3	ASII	AR(19)MA(1)	0,018	0,66	14	ROTI	MA(4)	0,020	0,33
4	BSDE	AR(29)MA(6)	0,046	0,33	15	SCMA	AR(15)MA(15)	0,029	0,33
5	ICBP	AR(9) MA(9)	0,039	0,33	16	SMRA	AR(7) MA(2) ARCH-M	0,012	0,66
6	INDF	AR(17)MA(1)	0,036	0,66	17	SMSM	MA(1) EGARCH	0,006	0,66
7	ISAT	MA(4)	0,034	0,66	18	TLKM	AR(15)MA(1)	0,008	0,66
8	KAEF	MA(12)	0,021	0,33	19	TOTO	MA(3)	0,008	0,66
9	KLBF	AR(4)MA(11) GARCH	0,018	0,66	20	UNVR	MA(8)	0,026	0,33
10	LPPF	AR(4)MA(5)	0,031	0,33	21	WIKA	AR(9)MA(9)	0,016	0,66
11	MYOR	AR(1)MA(12)	0,036	0,33	22	WSKT	MA(9) ARCH-M	0,017	0,66

4.2. Portfolio Black Litterman

4.2.1. Estabilishing Equilibrium Return

In forming the portfolio of Black Litterman, equilibrium return was needed from the calculation of market weight, covariance and lambda. Market weight was counted based on the market capitalization of each share which was considered by the reserchers unlikely the same in long term periode. Lambda or risk coeffisient was the value of risk averse from what the investors wanted. The result of the Lambda calculation could be obtained -2.2. The bigger the lambda, the bigger value of basic equilibrium return.

4.2.2. The Formation of P Matrix

The view of the investor can be obtained at one, two and some stockss as well as the whole stocks. Black and Litteman (1992) gave freedom to develop the model. The view of the investors can be given absolutely when the investors determine the forecasting return of a stock with high level of certain confidence and can use the relative view among the stocks. Relative view can possibly use the related information with a negative relationship of a stock with other stocks. When an issuer company has direct competitors at other companies which can give negative effect of stock movement so that the investors can give their view that the return of a stock is a lot better compared to other stocks.

At the formation of matrix P of relative view within the first week of bullish periode, it could be found out that there was a negative correlation between AALI and WSKT stocks as well as negative correlation between TOTO stock and BSDE, KAEF and KLBF stock. The result of forecasting showed that the stock of AALI had negative *return* so that its matrix P was worth -1 value while WSKT was worth +1 value. Share of TOTO had negative return while share of BSDE, KAEF and KLBF had positive return so that the share of TOTO was worth -1 at matrix P, and the total value of BSDE, KAEF and KLBF was +1. By dividing the value 1 with the capitalization weight of BSDE, KAEF and KLBF market, it could be found out that matrix P for BSDE was 0.33, KAEF was 0.05 and KLBF was 0.61.

The absolute view used 1 matrix P of each share (Becker dan Gurtler, 2009) in each level of confidence 1/3 and 2/3 while the relative view only used the level of confidence 1/3. The higher the level of trust, the bigger value of return combination with return forecasting. After the formation of matrix P, the next formation was the formation of omega with the value of 0.025 (Idzorek, 2005) so that expected return of new combination was formed as the basic portfolio weighting.

4.2.3. Portfolio at Bullish Period

Based on the sample selection of islamic sample and the measurement of its performance, there were 22 shares used in the calculation. The processing of the 22 shares had created the portfolio of optimal stocks consisting of 3 to 5 stocks per week. The number of porfolio formed tended to be similar to the result obtained at the same research

carried out before in the form of islamic stock portofolio that Masri (2012) using group of JII share. Portfolio which was formed was two and seven shares. Meanwhile the same other research by Hadiyoso (2016) with the use of islamic stock group, the portfolio which could be formed was 43 stocks. The big difference formed was caused by the difference of the criteria during the selection of share sample. In this research, the number of stock capitalization criteria was added and weekly transaction liquidity was very smooth. The consequence of the stock selection with the smallest market capitalization was the restriction of portfolio usage practically in absorbing the size of investment by investors without affecting the price of stock. Above all, the number of big diversification affected the cost of expensive processing especially the evaluation of weekly portfolio. Portfolio at the periode of bullish gave the return above the IHSG at the first, second and third week. From the value of return and some performance assessment, it showed that portfolio of the third week gave the best performance compared to the portfolio of other weeks. The portfolio at the periode of bullish can be seen in Table 4.

Table 4. Portfolio Black Litterman Period Bullish

No	Kode	Week 1	Week 2	Week 3	Week 4
1	AALI	0	0.105	0	0.1218897
2	ICBP	0	0	0.683	0
3	ISAT	0.098	0.234	0	0
4	MYOR	0.689	0.451	0	0.5787256
5	PTPP	0.211	0	0	0
6	SMSM	0	0	0	0.2993846
7	TLKM	0	0	0.300	0
8	TOTO	0	0.049	0.016	0
9	WIKA	0	0.158	0	0
	Return	0.183	0.004	0.678	0.036
	Return IHSG	0.027	0.017	0.003	0.039
	Sharpe Ratio	4.879	0.157	18.325	1.158
	Treynor Ratio	0.251	0.006	0.618	0.076
	Jensen Alpha	0.163	-0.007	0.674	0.017
	Information ratio	4.139	-0.448	18.227	-0.077

The first week portfolio obtained the positive return from the MYOR share which owned the return share until 25%, but this still obtained small negative return from PTPP share. The second week portfolio obtained two negative return from TOTO and WIKA shares. However, the risk was reduced from the positive return obtained by AALI. The third week portfolio increased the return significantly at the share of ICBP and TOTO as well as TLKM which obtained positive return. The fourth week portfolio invested thoroughly at the positive return, but this week, IHSG obtained high return because a lot of shares obtained positive return. Generally, the portfolio at the periode of bullish invested the share of MYOR during 3 weeks. If we do the simulation of investment as many as 1000 unit at Black Litterman portfolio, IHSG, JII and LQ45 at the periode of bullish and compare the performance, as seen at Figure 1, the value of portfolio investment at the periode of bullish is far above the value of benchmark index investment.

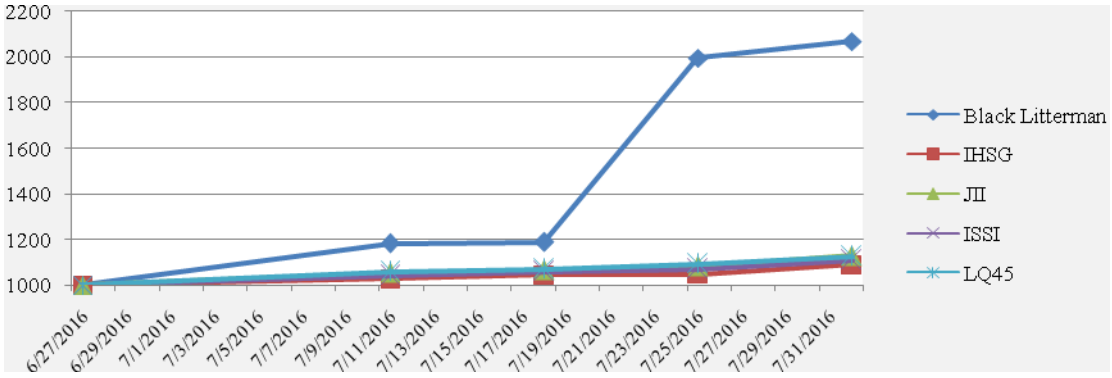

Figure 2 The comparison of simulation performance of Black Litterman portfolio with IHSG, JII, ISSI and LQ45 at the periode of bullish

4.2.4. Portfolio at Bearish Period

Portfolio in bearish periods showed a portfolio first week, second and third gain return on JCI. Portfolio first and second week still earn a positive return while the third and fourth weeks portfolios earn negative returns. Generally the Black Litterman in bearish periods can reduce the risk of a negative trend of the market index. The fourth portfolio return under the JCI gained due to errors in the estimation of confidence level. In the period of MAD value bearish

stock forecasting obtain higher error compared to the period bullish so many stocks that have a level of trust bullish period into 1/3 2/3 bearish period. Some portfolio performance measurement showed first week bearish period has the best portfolio performance compared portfolios weeks thereafter as shown in Table 5.

Portfolio at the periode of bearish showed that the first, second, and third week porfolio obtained return above IHSG. First and second week portfolio still obtained positive return while the third and fourth week portfolio obtained negative return. Generally, the Black Litterman model at the periode of bearish can lessen the risk from market negative index. The fourth portfolio obtained the return below IHSG. This was caused by the error within the estimation of confidence level. At the periode of bearish, the value of stocks *forecasting* MAD obtained higher error compared to the periode of bullish so that there were many stocks with the level of trust 2/3 at the periode of bullish which became 1/3 at the periode of bearish. Portfolio at the periode of berish can be seen at Table 5.

Table 5 Portfolio Black Litterman Period Bearish

No.	Kode	Week 1	Week 2	Week 3	Week 4
1	AALI	0.161	0.244	0.065	0.312
2	AKRA	0	0	0.083	0
3	BSDE	0	0	0	0.124
4	INDF	0	0	0.425	0
5	KAEF	0.041	0	0	0.255
6	KLBF	0	0.279	0	0
7	LPPF	0	0	0.015	0
8	MYOR	0.015	0	0	0
9	PTPP	0	0	0	0.259
10	SMRA	0	0	0.063	0
11	SMSM	0	0.048	0	0
12	TLKM	0	0.092	0.347	0
13	TOTO	0.469	0	0	0
14	WIKA	0.312	0.335	0	0.048
	Return	0.098	0.0004	-0.004	-0.011
	Return IHSG	-0.024	-0.0005	-0.011	-0.006
	Sharpe Ratio	37.017	0.0127	-0.134	-0.284
	Treynor Ratio	0.178	0.0003	-0.003	-0.009
	Jensen Alpha	0.111	0.0009	0.007	-0.003
	Information ratio	46.333	0.0286	0.228	-0.117

This proves during bearish periods portfolio Black Litterman can obtain the possibility of loss passes index. Some performance assessment showed that the first week portfolio at the periode of *bearish* performed better portfolio performance that the portfolio the week after. The first week portfolio could get big positive return from the stock of TOTO, but the high return TOTO discontinued at the second and third week which recorded the negative return. The second week portfolio obtained a lot of negative return from some stocks unless the share of KLBF which reduced the disadvantage of negative return of other shares. Portofolio at the third week invested at some positive and negative return shares. The advange and disadvantage covered up each other. Therefore, the portfolio return almost reached zero. The fourth week portfolio obtained negative return which was over the negative return of IHSG. This proved that at the period of bearish, the portfolio of Black Litterman could obtain the possibility of disadvantage which was over the negative index return as seen at Figure 3.

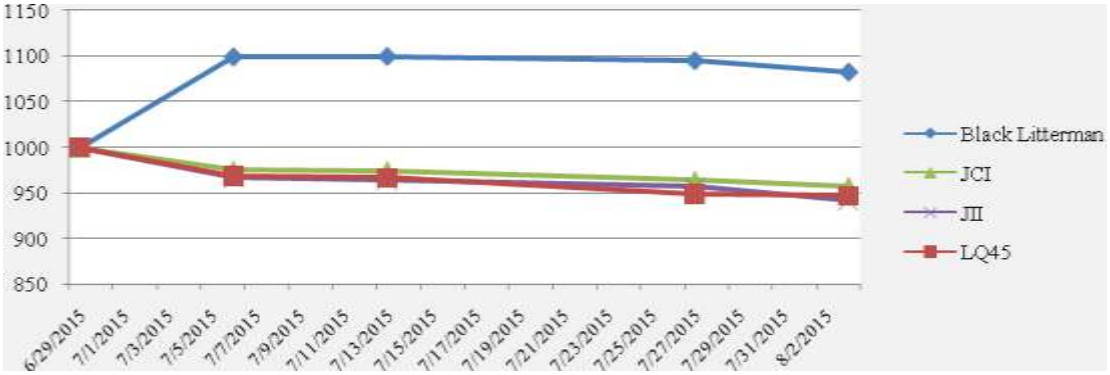

Figure 3 graphs The comparison of simulation performance of Black Litterman portfolio with IHSG, JII, ISSI and LQ45 at the periode of bearish

5. DISCUSSION AND SUGGESTION

5.1 Discussion

Forecasting of stock return is very important to do in the process of investment because the activity of investment is the activity which will be done in the future not in the past so that the value of return expected at the portfolio is better not to use average return in the past. The use of ARIMA-ARCH model valued can be done in forecasting return of stock and can give the value of confidence level with the comparison of return forecasting with the real return to find the Mean Absolute Deviation a week before.

The model of Black Litterman is a model of portfolio formation which is more flexible compared to the model of other portfolio in which there is a flexibility for the investors to give the value of risk averse, the view of stock return in the future and the level of confidencet. Besides that, this model gives flexibility to give value of investor's view which is absolute and relative. The value of view can give at one, two or some stocks and this can also be given thoroughly. This flexibility gives the freedom to the investors to combine some types of research about stocks as well as their wide understanding to develop the model of Black Litterman. The relative perspective at the model of Black Litterman can possibly be used if investors know the negative correlation between one stock and other stocks.

In this research, it is possible to invest portfolio with weekly evaluation. The value of stock percentage in portfolio can have permanent value, more and few value and change to other shares each week depending on the decision of portfolio evaluation the weekly evaluation can be done by using the calculation of Black Litterman model as the basis and the investor can also make the decision at the end of its preference, like paying attention to the condition of macro economy ant others. Weekly evaluation of portfolio is quite effective in this research because the forecasting of weekly return stock with ARIMA-ARCH is easier compared to the forecasting of daily return because the value of daily return change is less significant. The use of ARIMA-GARCH model at the Black Litterman portfolio during 4 weeks at the condition of bullish and 4 weeks at the condition of bearish can give performance above the benchmark performance index, like IHSG, JII, and LQ45.

5.2 Suggestion

Based on the result obtained in this research, the model of Black Litterman in the field of stock, like the use of Artificial Neural Network can be developed further in the future to forecast the share and determine the level of confidence.

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