

Tracking Error Analysis of Premier ETF LQ-45

Premier ETF LQ-45 (R-LQ45X) is the first equity ETF in Indonesia that aims to deliver returns equal to the benchmark: LQ-45 Index. We can compare the performance of R-LQ45X with the benchmark through tracking error analysis. From the t-test, tracking error of 0.20% since inception period indicate there is no significant performance difference between Premier ETF LQ-45 and LQ-45 Index.

Figure 1. R-LQ45X Screen



Source: Indo Premier Online Trading (IPOT) platform, 12nd February 2013

With sovereign credit rating upgrades into investment grade by two global rating agencies (Fitch upgraded Indonesia to BBB- with a stable outlook on December 2011, while Moody's upgraded to Baa3 with a stable outlook on January 2012), Indonesia will become one of favorite investment destination in the future. Strong and stable economic growth, low public debt ratios, and a prudent overall macro policy in Indonesia are some of the factors for the rating upgrade (Fitch Rating, 2011).

The upgrade will attract foreign capital inflow into portfolio investment as well as foreign direct investment in Indonesia. One of the portfolio investment instruments that considering phenomenal

in global market nowadays is Exchange Traded Fund (ETF). ETFs are mutual fund that traded in the stock exchange. Investors get benefit from a diversified portfolio and get equivalent return of an index that the ETFs tracked (optimal portfolio).

The first equity exchange traded fund in Indonesia, Premier ETF LQ-45 (R-LQ45X), was launched on 18 December 2007 by Indo Premier Investment Management and uses LQ-45 Index issued by Indonesia Stock Exchange as the benchmark. LQ-45 Index consists of 45 stocks listed in Indonesia Stock Exchange and accounting around 67% of total market capitalization.

Investors can buy or sell R-LQ45X units by doing subscription or redemption on specified units in primary market through authorized participant or doing buy and sell units through stock exchange. The differences are the minimum unit size through authorized participant is larger than through stock exchange and the price per unit in authorized participant is intraday indicative NAV while price per unit in stock exchange depend on the supply and demand of the R-LQ45X (minimum size in primary market = 1 basket / 200 lot / 100,000 units and minimum size in secondary market = 1 lot / 500 units). **Figure 1** shows the primary market and secondary market of R-LQ45X through Indo Premier Online Trading (IPOT) platform.

Considering the increasing popularity if ETFs investment, we intends to investigate the efficiency of R-LQ45X in terms of tracking error. Tracking error can be separated into two categories, price-to-index tracking error and the NAV tracking error (Hill & Mueller, 2001).

Price-to-index tracking error is based on a certain trading time of an ETF, and the level of deviation between market return and target index return is the scheme of measurement. The NAV tracking error is defined as the difference in return between the target index and the NAV. We will analysis the NAV tracking error since it is more widely accepted.

Based on Grinold, R. and Kahn, R. in their book titled "Active Portfolio Management" (McGraw-Hill, 1999), the tracking error formula is the root mean square of the active return or commonly calculated as the standard deviation of the active returns:

$$TE = \omega = \sqrt{\text{Var}(r_p - r_b) = \sqrt{E[(r_p - r_b)^2]} - (E[r_p - r_b])^2}$$

The conventional two-sample t-test is applied first to investigate the significance of the tracking error between Premier ETF LQ-45 NAV and LQ45 Index. The t-test will be conducted using Minitab® Statistical Software version 16.2.2 with 95% confidence level ($\alpha = 0.05$). If the p value is greater than the given level of significance we may accept the null hypothesis. Otherwise reject the null hypothesis.

The research data used is from Indonesia Stock Exchange, Bloomberg data, and Indo Premier Investment Management. The sample period for the data is from December 18, 2007 to September 28, 2012, with total of 1,167 observations.

Figure 2 below provides descriptive statistics of the variables return included in this research. Variable RILQ45 is the return of LQ-45 Index, variable RNAVRLQ45X is the return of R-LQ45X NAV, and variable RPXRLQ45X is the return of R-LQ45X Last Price. We use the daily data from December 18, 2007 until September 28, 2012, counting 1,167 observations.

Figure 2. Statistics of Variables Used

Variable	Total Count	Mean	Minimum	Maximum	Median	Std Dev	Skewness	Kurtosis	Jarque Bera
RILQ45	1167	0.0002	-0.1263	0.0980	0.0010	0.0193	-0.5428	6.7782	2291.35
RNAVRLQ45X	1167	0.0002	-0.1260	0.0983	0.0010	0.0192	-0.5253	6.8127	2310.53
RPXRLQ45X	1167	0.0002	-0.2231	0.1735	0.0000	0.0223	-0.7046	18.5176	16770.11

RILQ45: Return of LQ-45 Index

RNAVRLQ45X: Return of R-LQ45X NAV

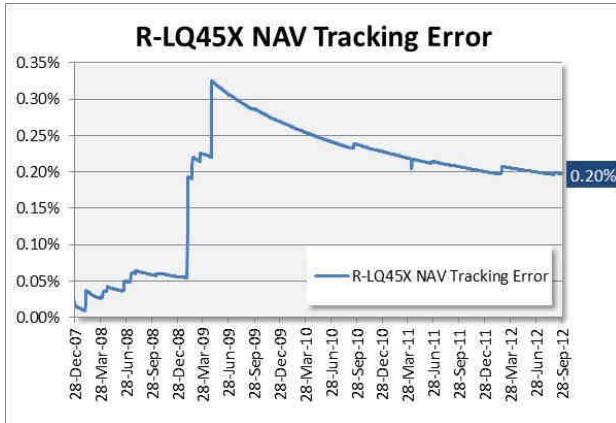
RPXRLQ45X: Return of R-LQ45X Last Price

RNAVRLQ45X have mean return 0.0002 with minimum return -0.1260, maximum return 0.0983, and median return 0.0010 from 1,167 daily observations. The standard deviation from RNAVRLQ45X is 0.0192. The RNAVRLQ45X variable is negatively skewed (skewed to the left) with value -0.5253. While in terms of kurtosis, RNAVRLQ45X show positive value: 6.8127 (leptokurtic distribution). The Jarque Bera normality test (significant at 5%) result (score: 2310.53) shows that the null hypothesis of the normality of the data should be rejected (the series are not normally distributed).

Based on J. Egan, William in his paper titled "The Distribution of S&P 500 Index Returns", the t-distribution with location/scale parameters is very good fit to the distribution of the daily percentage returns of the S&P 500 Index. It is suggesting that all index return is not normally distributed including LQ45 Index. Because the distribution is t-distribution, the t-test can be used to identify the tracking error and pricing efficiency of Premier ETF LQ45 (R-LQ45X).

The tracking error of R-LQ45X (NAV vs LQ-45 Index) is 0.20% as shown in figure below.

Figure 3. Premier ETF LQ45 Tracking Error



In order to check whether the tracking error is significant or not, we run the t-test of R-LQ45X NAV return (variable NAVR) and LQ45 Index return (variable LQ45R) using Minitab® Statistical Software version 16.2.2 with 95% confidence level ($\alpha = 0.05$). The result displays a table of the sample sizes, sample means, standard deviations, and standard errors for the two samples. The sample sizes that we use for LQ45R and NAVR are 1167 observations. The sample mean of LQ45R is 0.0002 and the sample mean of NAVR is also 0.0002. The standard deviation of LQ45R and NAVR is 0.0193 and 0.0192 respectively. While the standard error for LQ45R and NAVR is both 0.00056. The second table gives a confidence interval for the difference in population means. From the result above, 95% confidence interval is (-0.001564,

0.001558) which include zero (suggesting that there is no difference). Next is the hypothesis test result. The t-stat is -0.00, p-value of 0.997, and 2331 degrees of freedom.

Figure 4. Two-Sample T-Test and CL: LQ45R, NAVR

Two-sample T for LQ45R vs NAVR				
	N	Mean	StDev	SE Mean
LQ45R	1167	0.0002	0.0193	0.00056
NAVR	1167	0.0002	0.0192	0.00056
Difference = mu (LQ45R) - mu (NAVR)				
Estimate for difference: -0.000003				
95% CI for difference: (-0.001564, 0.001558)				
T-Test of difference = 0 (vs not =): T-Value = -0.00 P-Value = 0.997 DF = 2331				

Since the p-value is greater than α ($0.997 > 0.05$), the null hypothesis of equal return cannot be rejected, suggesting the return of the two series are considered to have no significant difference during the period. In other words, this result is a strong indication that the return of R-LQ45X (NAV) is similar with the return of LQ-45 Index.

Susanto Chandra

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