

Value of Moral Bounded: Portfolio Management with Shari'a Compliance Paradigm (Study of Indonesian Markets)

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The Islamic Finance Compliant portfolio continues to receive special attention because of its enormous potential. The increasing number of requests for Shari'a financial products in the global market is an indication that Shari'a Finance Compliant is not only attractive to Muslims, but has become part of the solution of international investors. Reviewing the formation of counterparts based on Islamic principles provides an indication that products based on Shari'a Compliant can continuously reduce risk. By specifically entering Shari'a shares as part of the portfolio, it will increase the value of the portfolio optimization. Therefore, this study intends to analyze the level of compliance of Shari'a stocks which is then followed by a series of treatments including weighting, optimization with the Karush Kuhn Tucker method (KKT), and Ward's Linkage method. The results of this study are sufficient to prove that the better quality of moral bounded, have a better value at risk portfolio.

Key words: *Moral Bounded, Shari'a Compliance, Shari'a Stocks, Single Index Model, Ward's Linkage.*

Introduction

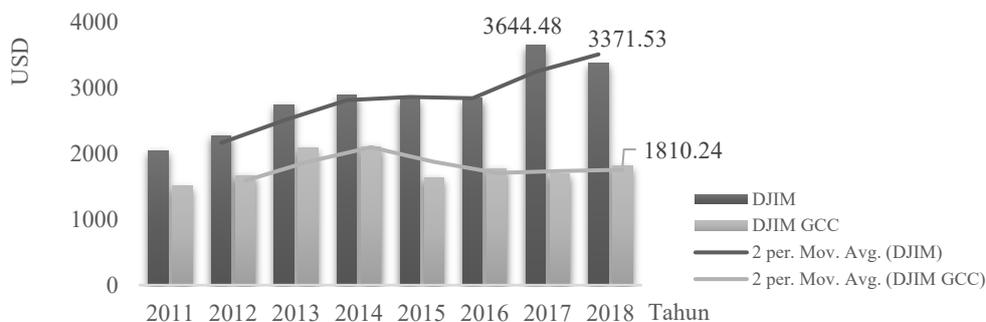
Pepinsky (2012) is attributed to testing the development and social change, of contemporary Islamic finance. The evidence is insufficient to indicate that Muslim compliance doctrine is the only indicator in the selection of Shari'a financial instruments. It is possible that Shari'a financial instruments in Indonesia are not only sought after by Muslims, but also by individuals globally. Pepinsky's result clarifies Abduh and Omar's (2007) examination that consumer attitudes towards Shari'a financial instruments in Indonesia. The results of this study proves that there is no evidence of Islamic piety as a determinant of the use of Islamic financial instruments in Indonesia. The globalization of Islamic finance has recently shown a pattern of significant financial system movements in several Muslim countries around the world. Gait and Worthington (2008) explain the traditional opinion that Muslims who adhere to moral boundaries of Shari'a are the main users of Islamic financial products. This analogy is very rational as the existence of a group of Muslims who must obey will increase the demand for special Shari'a instruments. An additional argument suggested by industrial research is that obedient Muslims are a large and untapped market segment.

In addition to this research, Boudt, Reza, and Wauters (2017) simulated a weighting study on market capitalization, Shari'a fundamental values, weighing on risk, and risk-free assets. The results of this research revealed that compliance effects have a significant influence on the performance of the portfolio formed. Kim (2018) tried to provide optimal portfolio preferences by incorporating Islamic stocks into the DCC-GARCH simulation model to see the effects of risk diversification. The study revealed that hedging ratio is generally low, but the risk of Korean stocks can be effectively protected by taking short-term assets from Islamic stocks. The two previous results can be seen as a foundation to Derigs and Marzban (2009). Their research succeeded in positioning the Shari'a compliance paradigm not only assessed at the individual level but also at the level of portfolio management. Islamic teachings explicitly describe the order of compliance that must be met in the investment game if you want to be categorized as an Islamic investment. The basic strategy of Shari'a compliance measured from individual assets to asset management in the portfolio will have a better performance only if, all of them fulfill the value of compliance with Shari'a.

Bakri and Karim (2017) reviewed the macroeconomic process of the integration of Islamic stock markets in Malaysia, Indonesia, Japan, China, Hong Kong, Britain, India, Pakistan, Canada, Sri Lanka and the US. The average correlation produced shows that the Islamic stock market is still less integrated. This is indicated to provide the benefits of portfolio diversification in this type of market. Indonesia provides an interesting context to explore Islamic financial instruments. Population pluralism followed by a cycle of modernization and globalization does not diminish the moral values of diversity and customary bounded ones. In 1999, the two largest stock markets of Dow Jones built the Dow Jones Islamic Market Index

(DJIM) and the Financial Times Stock Exchange (FTSE) built the Global Islamic Index Series (GIIS). Differing from its counterparts, the Shari'a financial compliance system is in a bounded moral manner, resulting in limited financial instruments. Implicitly, the moral bounded also creates a protective value for the instruments formed. Investors globally translate the moral bounded as a new segmentation of alternative financial instruments. This Shari'a financial instrument is not only sought after by Muslim investors but also by investors globally. Figure 1 describes the increasing trend of asset value from Islamic investments in the global market of Dow Jones Islamic Market (DJIM) which is a market in the United States and the Gulf Country Council (GCC) region. It is seen that the upward trend reached 3371.53 USD in the DJIM global stock index group (close price December 2018, Helen et al., 2017, Hussain et al., 2017, Ilhan et al., 2019, Irshad, 2017, Jacqueline and Paul, 2017).

Figure 1. Index of DJIM and GCC DJIM for 2011-2018



Source: Dow Jones Islamic Market (DJIM) 2018

The issuance of the Financial Services Authority (OJK) Regulation number 35 / POJK.04 / 2017 concerning Criteria and Issuance of Shari'a Securities has become a strong foundation for the operation of Shari'a financial instruments in Indonesia's Shari'a Capital Market. Table 1 presents trends in the development of Islamic investment products in Indonesia from 2013 to 2018. The capitalization of the Indonesian Shari'a Stock Index in the past five years has reached 3,704.54 trillion rupiah in 2017, an increase of 14.29% from the previous year. The value of Sukuk Corporations also continued to increase significantly to reach IDR 33.68 trillion in September 2018. The trend in the value of Net Assets (NAB) of Shari'a mutual funds in November 2018 reached 33.97 trillion rupiah, took over 6.8% of the market from NAV of national mutual funds which were recorded at 499.52 trillion rupiah.

Table 1: Development of Shari'a stock market capitalization, sukuk, and Shari'a mutual funds (Rp billion) in Indonesia in 2013-2018

Year	Shari'a Stocks	Corporation Sukuk	Shari'a Mutual Fund
2013	2557.85	11.99	9.43
2014	2946.89	12.92	11.15
2015	2600.85	16.11	11.02
2016	3175.05	20.43	14.91
2017	3704.54	26.39	28.31
2018	3543.32	33.68	33.97

Source: Shari'a Capital Market Statistics (2018); Financial Services Authority (OJK) 2018.

Majid and Kassim (2010) found that investors can benefit from diversifying on the Islamic stock market based on economic class groupings. Islamic investment is based on five main principles which include a prohibition of interest (usury), prohibition of excessive uncertainty (gharar), a prohibition on speculation (maysir), risk, and redistribution, and a prohibition on investing in 'unethical' industries (Shanmugam and Zahari 2009). Popularity of Shari'a instruments in Indonesia provides significant development optimism. IDX with the composition of the Indonesian Shari'a Stock Index (ISSI) consists of all shares with the principle of compliance with Shari'a which are listed on the IDX. Besides ISSI, the Jakarta Islamic Index (JII) is also a Shari'a stock group consisting of 30 issuers with the highest capitalization value and highest trading liquidity throughout the year.

Hypothesis Construction

The existence of a moral bounded that must be adhered to in the Shari'a portfolio deepens the aspect of this research on the fundamental characteristics of Shari'a in determining the performance of the portfolio instruments to be formed. In this study the formulation of the problem built is as follows:

1. How is the profile of the Shari'a stock instruments that are obedient to the moral bounded Islam?
2. Is the asset governance that complies with Shari'a bounded morals able to improve the consequences of individual risk in Shari'a stock instruments and Shari'a portfolios?

Shari'a assets will experience preprocessing so that they can be categorized as an index that complies with Islamic rules. This is a part of a logical effort to sterilize asset preferences that bring harm to investors. Required rules in Islamic finance are mitigation in asset protection rights of investors.

H1: Stocks with Shari'a labels do not necessarily comply with the Shari'a rules already set.

H2: There is an improvement in the risk value of the individual asset class along with increasing compliance (value of moral bound) of Shari'a.

Majid and Kassim (2010) found that investors could benefit from diversification in the Shari'a stock market. Quantitative criteria such as debt / equity ratio, and interest-based leverage will also cause systemic risk from the lower share of Shari'a. If the opportunity for the diversification of benefits can be modeled optimally in the continuity of the combined assets formed, it is possible that portfolio performance will be better in both the domestic and global markets.

H3: There is an improvement of the value at risk in the pattern of the composition of potential Shari'a stock instrument groups along with the increase in bounded moral value.

Research purposes

Based on the background and formulation of the problem, the objectives of this study include:

1. Identify the level of compliance of Shari'a stock instruments listed in the Indonesian Shari'a Stock Index (ISSI) group.
2. Arranging potential Shari'a shares into a joint asset in a compliant Shari'a portfolio.
3. Identifying the value at risk and portfolio returns by distinguishing based on the level of moral compliance.
4. Evaluating the Shari'a portfolio's value of performance that is obedient to moral bounded.

Shari'a Finance: Moral Bounded in Indonesia

Moral bounded, based on Islamic rules, forms a Shari'a principle in product publishing, Shari'a contract making, trade transaction contracts, and other asset allocation activities. POJK No. 35 /POJK.04/2017 concerning Criteria and Issuance of Sharia Securities list confirms five basic principles of Shari'a that must be fulfilled. National Shari'a Council (DSN), MUI has issued a fatwa number: 40 / DSN-MUI / X / 2003 which is also contained in the Financial Services Authority Regulation Number 35 /POJK.04/2017 concerning Criteria and Issuance of List of Sharia Securities determining ratio limits quantitative finance that must be obeyed after being sterile from qualitative rules is:

- a) Total interest-based debt compared to total assets not more than 45% (forty-five percent), and
- b) Total interest income and other non-halal (haram) income are compared with the total business income and other income, not more than 10% (ten percent).

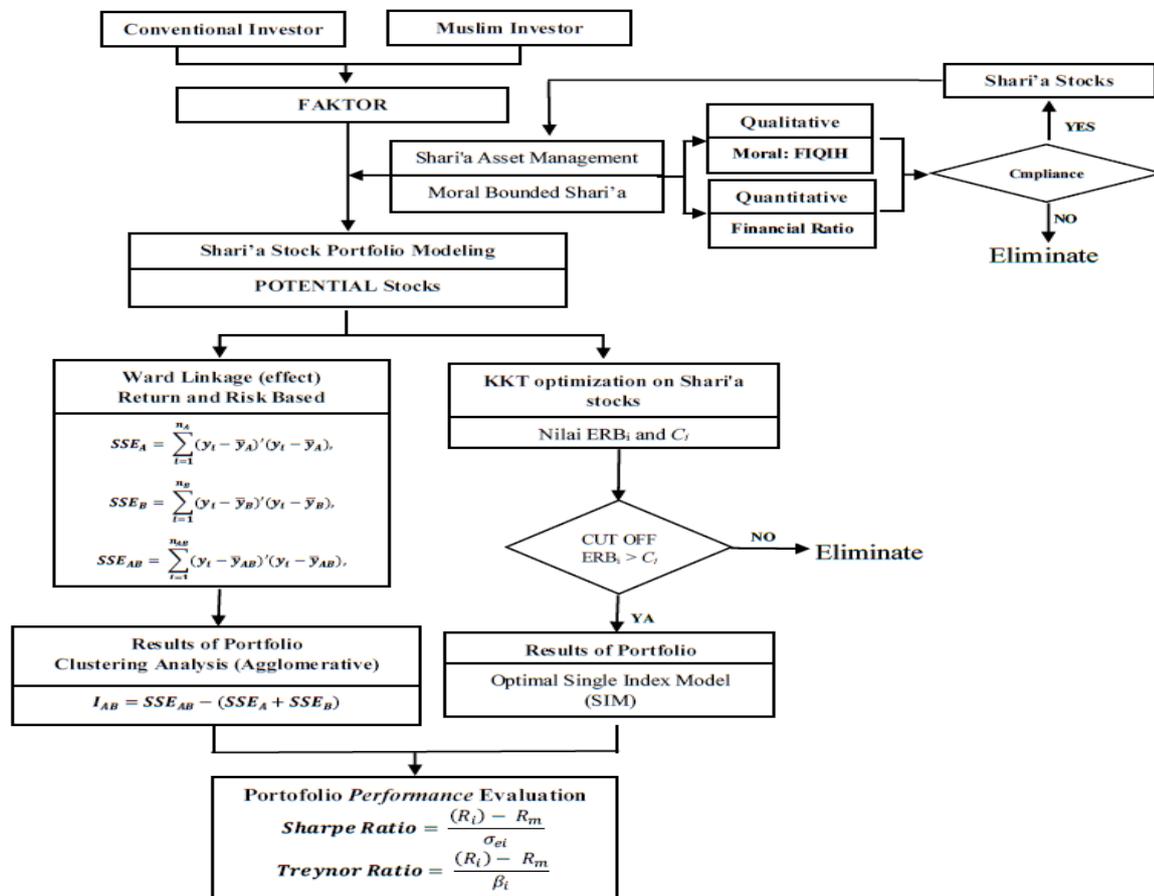


Compliant Shari'a stocks are expected to be more stable assets than conventional stocks. Ibragimov et al. (2011) reviewed the formation of an optimum portfolio for risk diversification. Every company has a certain risk class (idiosyncratic risk) which is then combined in one market portfolio together with other financial companies. The linkage between the risk of portfolio-forming instruments can increase the risk of systemic failure, although it does not rule out the possibility that each company can eliminate idiosyncratic risk in new portfolios (Shaffer 1994).

Data and Methodology

The research data used is secondary data, closed price of all issuers listed on the IDX. Non probability sampling was used to sort data. This was achieved by using purposive sampling on all issuers on the exchange. The sorting criteria for the main sample group are compliant Shari'ah stocks, the benchmark sample group is potential stocks on the exchange. The first criterion regarding compliance will be evaluated based on the MUI DSN fatwa number: 40 / DSN-MUI / X / 2003. This is also contained in the Financial Services Authority Regulation Number 35 /POJK.04/2017 concerning Criteria and Issuance of List of Sharia Securities based on financial ratio limits. The data used is secondary data, evaluated from the Annual Financial Report of all listed companies listed on the IDX in the last quarter of 2018.

Flow Chart Research



Methodology

Profiling of Compliance with Sharia Shares.

Financial Report data of all listed companies in the ISSI group in the last quarter of 2018 will first be converted into a percentage of the level of compliance using the fatwa foundation number: 40 / DSN-MUI / X / 2003. This is also contained in the Financial Services Authority Regulation Number 35 / POJK. 04/2017 concerning Criteria and Issuance of List of Sharia Securities. Quantitative financial ratio limits must be in accordance with the following formulation :

- a) $\frac{\text{Interest-based total debt}}{\text{total asset}} \leq 45\%$ b) $\frac{\text{Total interest income + unlawful income}}{\text{total business income + other income}} \leq 10\%$

Calculates Return, Risk and Portfolio Beta.

Holding Period Return (HPR) is the level of profit obtained from an investment in a certain period. Bodie et al. (2011) determine the formula to be as follows:

$$R_{it} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

R_{it} : return of stock i for a period of time t

P_t : stock price in period t

P_{t-1} : stock price in period $t-1$

Bodie et al. (2011) also formulate the expected return, or the weighted average return (return rate) at each observation. If the data is historical data with no observations, then the probability for each observation is n^{-1} . The expected average value can be calculated by the formula as follows:

$$E(R_i) = \sum_{t=1}^n p_{it} R_{it} = \frac{\sum_{t=1}^n R_{it}}{n}$$

$E(R_i)$: expected return of stock i

p_{it} : probability of stock i in the period t

R_{it} : return of stock i for a period of time t

n : amount of sample

Risk is a measure that is equivalent to the standard deviation from the level of yield. In a series of various historical data, standard deviations can be used to measure the uncertainty of results. Variant formulations and standard deviations for calculating historical data are as follows:

$$\sigma_i^2 = \frac{\sum_{t=1}^n (R_{it} - E(R_i))^2}{n - 1} \text{ dan } \sigma_i = \sqrt{\sigma_i^2}$$

σ_i^2 : variety of stocks i

R_{it} : return of stock i for a period of time t

$E(R_i)$: expected return of stock i

σ_i : standard deviation of stock i

n : amount of sample

In the context of portfolio management, there needs to be a measure that states the variable tendency to move together. The variables that are intended are returns and securities. This value can be obtained by using covariance:

$$Cov(R_A, R_B) = \frac{\sum_{t=1}^n (R_{At} - E(R_A))(R_{Bt} - E(R_B))}{n}$$

R_{At} : return of stock A for a period of time t

- $E(R_A)$: expected return of stock A
 R_{Bt} : return of stock B for a period of time t
 $E(R_B)$: expected return of stock B
 n : amount of sample

Beta coefficients are defined by the covariance of stock returns with market returns as part of a market portfolio variant. Beta can be calculated using the formula as follows:

$$\beta_i = \frac{Cov(R_i, R_M)}{\sigma_M^2} = \frac{\sum_{t=1}^n (R_{it} - E(R_i))(R_{Mt} - E(R_M))}{\sum_{t=1}^n (R_{Mt} - E(R_M))^2}$$

- β_i : beta of stock i
 $Cov(R_i, R_M)$: covariance between stock returns i and market returns
 σ_M^2 : variety of market return
 R_{it} : stock return i for the period t
 $E(R_i)$: expected return of stock i
 R_{Mt} : return market
 $E(R_M)$: expected of market return

Karush Kuhn Tucker's Condition (KKT) for Single Index Model

Modern Portfolio Theory (MPT) was developed and first formalized by Markowitz (1952) and later became an important foundation of financial economics. This theory explains how investors behave to optimize wealth (their assets) when investing in an efficient market. Portfolios are more specifically a set of assets invested by buying shares from companies operating in various types of industries (Jones 2000). The development of MPT can be divided into two parts. The first part is about the attitude of investors in terms of avoiding rational risk in order to optimize asset returns. The second part is the pioneering direction of Sharpe's work (1964), Treynor (1962), Lintner (1965), Mossin (1966), and Black (1972) which ultimately leads to the CAPM theory, assuming that investors are assumed to act homogeneously according to the pattern of analysis means-variance (Markowitz, 1952). Rielly (1992) recommends the minimum number of shares in an optimum portfolio of 12 to 18 shares. Specifically, if observed, most stocks will experience a tendency to increase in price if the stock price index in the market goes up, so should we. Elton et al. (2014) formulates this model mathematically, namely:

$$R_i = \alpha_i + \beta_i R_m$$

- R_i : return stocks i
 R_m : the rate of return from the market index.
 α_i : a random variable that indicates the component of the return on security of securities which is independent of market performance

β_i : coefficient that measures changes in R_i as a result of changes in R_m .

Assumption: $cov(e_i, e_j) = 0$

$cov(e_i, R_m) = 0$

The unique risk conditions modeled by incorporating KKT conditions into a single index model will produce a cut-off path for stocks whose value of excess return to beta i is more than C_j as an

indicator of the cut off point. The formulation is as follows:

$$w_i = \frac{Z_i}{\sum_{i=1}^n Z'_i}$$

with : $Z_i = \frac{\beta_i}{\sigma_{ei}^2} [ERB_i - C_j]$;

$$ERB_i = \frac{E(R_i) - R_{br}}{\beta_i} ;$$

$$C_j = \sigma_m^2 \frac{\sum_{j \in k} A_j}{1 + \sigma_m^2 \sum_{j \in k} B_j} ;$$

$$A_j = \frac{[E(R_i) - R_{br}] \beta_j}{\sigma_{ej}^2} ; \text{ and}$$

$$B_j = \frac{\beta_j}{\sigma_{ej}^2}$$

Agglomerative Clustering (Ward Linkage)

Cluster analysis is one technique in multiple variable analysis based on grouping objects that have similar characters. In the analysis of cluster variables, or the object of observation to be clustered, does not have to fulfill any assumptions (Johnsons 2002). The main objective of cluster analysis is to find a natural cluster of units of observation in the hope that the diversity between units of observation in one cluster is more homogeneous than the diversity of different units of observation (Jolliffe 2002). Some measures of distance used include euclidean distance, mahalanobis distance, city-block distance (Manhattan), chebychev distance, and cosine distance. Of the total distance measurement methods, the euclidean distance method is the most commonly chosen distance method.

Alan H. Fielding (2007) simplifies the interpretation of euclidean distance as a pythagorous theorem that is adjusted to the number of dimensions. Euclidean distance puts progressively greater weight on far apart objects, defined:

$$d_{ij} = \sum_{k=1}^p [(x_{ik} - x_{jk})^2]^{1/2}$$

d_{ij} : distance between object i and object j

x_{ik} : the value of the i -object in the k -variable

x_{jk} : the value of the j -object in the k -variable

p : the number of variables observed

It should be noted that in the use of euclidean distances, the measurement unit of observation must be the same, so that the goal to minimize diversity is achieved. As explained in Jolliffe (2002), if the unit of measurement of data is not the same, it is necessary to transform it into a standard form before the calculation is carried out.

Ward's method is one system of hierarchical cluster analysis with agglomerative observations. Fielding (2007) explained that this method would consider the composition of cluster membership by calculating the sum square error (SSE) of the cluster average. If AB is a cluster obtained by combining groups A and B, then the sum of distances in a cluster is defined:

$$SSE_A = \sum_{i=1}^{n_A} (y_i - \bar{y}_A)'(y_i - \bar{y}_A),$$

$$SSE_B = \sum_{i=1}^{n_B} (y_i - \bar{y}_B)'(y_i - \bar{y}_B),$$

$$SSE_{AB} = \sum_{i=1}^{n_{AB}} (y_i - \bar{y}_{AB})'(y_i - \bar{y}_{AB}),$$

With $\bar{y}_{AB} = (n_A \bar{y}_A + n_B \bar{y}_B) / (n_A + n_B)$ and n_{AB} is the sum of the results of n_A and n_B . The number of indices is the number of points for each A, B, and AB (denoted by SSE_A , SSE_B , and SSE_{AB}). The Ward method will combine groups A and B so that the smallest increase in SSE is obtained, defined as:

$$I_{AB} = SSE_{AB} - (SSE_A + SSE_B)$$

Thus, the Ward method is often the best alternative in hordes, because it forms a cluster with a small observation distance so that the size of the cluster formed is almost equal.

Result and Discussion

Indonesian Sharia Capital Market

The foundation of compliance with moral bounded Islam forms a Shari'a principle and implicitly will form a stock with a limited classification. In Indonesia, the development of the Islamic capital market began with the issuance of Shari'a mutual funds in 1997. Indonesia's Islamic capital market publishes Shari'a Effect List (SEL) twice a year in developing roadmap efforts. Since the beginning of SEL, investors have been able to move freely form a portfolio of future asset allocations that are in accordance with Islamic teachings. For issuers, SEL provides a broader investor base than conventional shares. Shari'a shares are legitimately owned by investors who adhere to the principle of compliance with Shari'a and conventional investors. In terms of supply, the market share reached by Shari'a capital market products is still very far from expectations. This provides a large space for the world of capital to develop the Islamic capital market as a capital solution with various combinations of preferences offered, as long as they do not conflict with Shari'a principles. In terms of demand, Indonesia's large population has the potential to become a Shari'a capital market investor. This potential is also supported by increasing the economic capacity of the Indonesian people. This becomes evident due to the increase in national per capita income growth reaching 51.8 million per capita at the end of 2017.

The 402 Shari'a stocks that the ISSI group tested were compliant based on fatwa number: 40 / DSN-MUI / X / 2003 which is also contained in the Financial Services Authority Regulation Number 35 / POJK.04/2017. There are 24 issuers that are assumed to be obedient to moral boundary Shari'a. They will be candidates for portfolio formation. Table 2. describes in detail the list and percentage values of compliance of each issuer. First is the limitation on the value of interest debt and other income that is not halal divided by total assets not more than 45% (we call AP1). Second is the limitation on the value of interest income and other income that is not halal, divided by total income. This should not be more than 10% (we call AP2). If we make a weighted average of AP1 & AP2 value it will make it easier to interpret the relationship between compliance and other measurable variables in the portfolio. The Distance to Default point of each AP1 and AP2 we called DDAP1 and DDAP2 will be an indicator of compliance value. The weighted average of AP1 & AP2 19.32% (will be a margin and default point). The bigger distance spare from weighted average point value of the portfolio shows the better the compliance as we called Distance of Shari'a Compliance to Default (DSCD).

Based on Table 2, the average frequency distribution of the value of AP1 (compliance aspect to interest-based liabilities) with the provisions of standardization should not exceed 45% at a fairly safe point of 29.921% with a standard deviation of 14.6%. PT PP Persero Indonesia (PTPP) has the highest AP1 point, which is 60,878% with a distance of 15,877 points outside the stated compliance margin. While PT Vale Indonesia Tbk (INCO) point AP1 compliance is

the best, which is 6,585% with a distance of 38,415 points below the set compliance margin. We can say that INCO has compliance with compliance of 85,366% while PTPP has a percentage of compliance violations of 35,284%. The next frequency distribution average is the fulfillment of AP2 (compliance aspects of interest-based income) with the standard provisions must not exceed 10% at 2,415%, with a standard deviation of 2.7%. PT Bumi Serpong Damai Tbk (BSDE) has the highest AP2 point, which is 12,427% with a distance of 2,427 points outside the specified compliance margin. While PT Waskita Beton Precast (WSBP) has the best AP2 compliance point which is 0.003% with a distance of 9,997 points below the predetermined compliance margin. We can say that WSBP has compliance obedience of 99,970% while BSDE has a percentage of compliance violations of 24,271%. This section provides proof of the first hypothesis that not all shares labeled Shari'a are, in principle, compliant with the rules set.

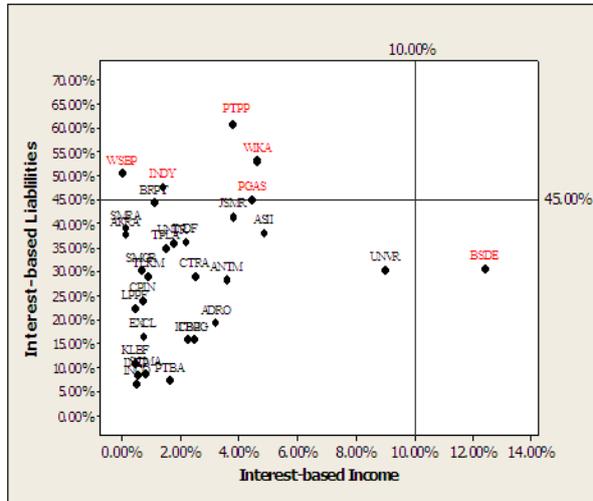
Table 2: List and Compliance Presentations of each Shari'a Potential Issuer

CO DE	AP1	AP2	Risk	Comp liance of AP1	Compli ance of AP2	CO DE	AP1	AP 2	Risk	Comp liance of AP1	Comp liance of AP2
AD RO	19.2 70%	3.20 0%	6.53 7%	57.170 %	67.971 %	JSM R	41.4 70%	3.8 00 %	3.83 5%	7.855 %	62.028 %
AK RA	37.8 40%	0.11 0%	4.44 5%	15.917 %	98.896 %	KL BF	10.9 40%	0.4 70 %	3.67 6%	75.679 %	95.333 %
AN TM	28.2 00%	3.58 0%	6.11 5%	37.344 %	64.172 %	LPP F	22.3 50%	0.4 40 %	5.92 4%	50.324 %	95.551 %
AS II	38.1 60%	4.84 0%	4.15 0%	15.211 %	51.601 %	PG AS	45.0 70%	4.4 60 %	5.66 2%	- 0.147 %	55.400 %
BR PT	44.3 60%	1.10 0%	8.19 5%	1.429 %	88.992 %	PTB A	7.31 0%	1.6 50 %	5.91 3%	83.748 %	83.470 %
BS DE	30.5 80%	12.4 30%	4.56 7%	32.047 %	- 24.271 %	PTP P	60.8 80%	3.7 70 %	5.16 0%	- 35.284 %	62.288 %
CP IN	24.0 00%	0.71 0%	5.62 8%	46.677 %	92.903 %	SC MA	8.58 0%	0.8 10 %	4.72 0%	80.930 %	91.936 %

CT RA	28.9 10%	2.50 0%	5.99 5%	35.750 %	75.029 %	SM GR	30.1 60%	0.6 50 %	4.66 9%	32.973 %	93.460 %		
EX CL	16.3 70%	0.74 0%	5.90 3%	63.631 %	92.628 %	SM RA	39.2 00%	0.1 30 %	6.01 8%	12.899 %	98.715 %		
IC BP	15.6 80%	2.25 0%	3.51 8%	65.152 %	77.497 %	TL KM	28.9 10%	0.9 00 %	2.99 3%	35.758 %	90.998 %		
IN CO	6.59 0%	0.50 0%	7.10 9%	85.366 %	95.041 %	TPL A	34.9 10%	1.4 90 %	4.39 2%	22.411 %	85.112 %		
IN DF	36.3 00%	2.18 0%	3.65 5%	19.328 %	78.180 %	UN TR	36.0 00%	1.7 40 %	4.73 7%	20.000 %	82.602 %		
IN DY	47.6 80%	1.40 0%	9.96 5%	- 5.962 %	85.964 %	UN VR	30.2 80%	9.0 20 %	3.09 4%	32.720 %	9.788 %		
IN TP	8.39 0%	0.51 0%	5.02 3%	81.361 %	94.872 %	WI KA	53.0 40%	4.6 20 %	5.01 5%	- 17.863 %	53.784 %		
IT M G	15.6 30%	2.46 0%	6.53 9%	65.256 %	75.449 %	WS BP	50.5 90%	0.0 00 %	3.12 5%	- 12.416 %	99.970 %		
AP1				Average		29.921%		AP2				Average	2.415 %
				Deviation		0.1469						Deviation	0.027
				Max		60.878%						Max	12.427 %
				Min		6.585%						Min	0.003 %

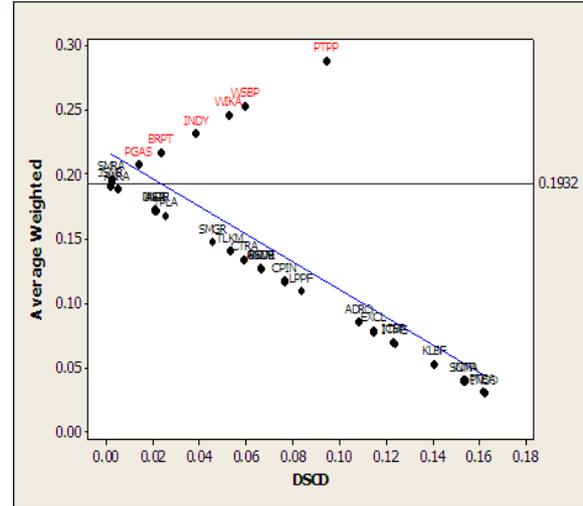
Source: Shari'a Capital Market Statistics (2018); Financial Services Authority (OJK) 2018; Data processed (2019).

Figure 2. Proxy Compliance Shari'a Stocks (JII30)



Source: Financial Report 3rd kuartal (2018); data processed

Figure 3. Proxy DSCD Shari'a stock (JII30)



Source: Financial Report 3rd kuartal (2018); data processed (2019).

Figure 2. reflects the compliance proxy (moral bounded) of the Shari'a shares of the JII group. As a result, only 24 of the highest liquid stocks obeyed the true moral boundary of Shari'a. The entire compliant Shari'a share is a member of group JII 30 with a value of interest debt compliance of no more than 45% and interest income of no more than 10%. Some potential shares of Shari'a have not yet passed the compliance rate margin are WSBP, INDY, PTPP, WIKA, PGAS and BSDE. Three Shari'a shares with the best value of moral bounded are PT Vale Indonesia Tbk.(INCO), Bukit Asam Coal Mine(Persero)Tbk. (PTBA) and Indocement Tunggul Prakarsa Tbk. (INTP). The interest rate ratio and interest income ratio of each of the three Shari'a shares are 6.59% and 0.5% (INCO), 7.31% and 1.65% (PTBA) and 8.39% and 0.51% (INTP).

Figure 5 is an Average Weighted point of each stock to DSCD plot of point of each stock. This mapping proxy is an additional adjustment to each share that is considered compliant, which is weighted from the AP1 and AP2 points that are owned may not exceed the default point, which is 19.32. From this proxy, the shares that do not fit the criteria are PGAS, Summarecon Agung Tbk (SMRA), PT Barito Pacific Tbk (BRPT), INDY, WSBP, WIKA, PTPP. There are an additional 2 names of new shares included in the disqualification, this is because the fulfillment of the value of compliance with AP1 points is very low, thus affecting the weight formed. Considering the issues that must be addressed follow each point AP1 and AP2, rather than the average weighted of both meals, the researcher uses the results of the proxy in Figure 2 as a reference for sorting shares.

Portfolio Allocation ***Single Index Model Portfolio***

The Single Index model is a conditional derivative method from Markowitz. This model is based on the observation that the price of a stock or security fluctuates according to the market price index. Potential stocks which are outputs from the previous stage are potential stocks that will be submitted in the formation of the portfolio. The time of observing returns was March 2014 to March 2019 with a stable return period for the weekly period. The next pre-processing is to ensure that the potential stocks have an expected return value that is above the risk-return asset. The formation of an optimal portfolio of potential Shari'a stocks based on a single index model is continued by calculating the expected return, alpha, beta and sigma_{ei} of each candidate. This stage is completed by transforming the manual formulation into MATLAB and R scripts. Both of the software are used to consider the precision values in the next output results. Table 3 shows the alpha, beta and sigma_{ei} results of each potential Shari'a stock. Table 4 shows that there is no negative beta of all potential shares modeled. ERB (i) is a value that measures the excess return relative to one unit of risk that beta cannot diversify.

This ERB ratio (i) also shows the relationship between two investment determinants, namely return and risk. A Shari'a portfolio will be optimal based on the Single Index Model theorem if the overall potential stock has an ERB value (i) more than C_j. Implicitly, the value of C_j will function as the cut off for the lower ERB value (i). Table 4 presents the results of calculations from ERB (i), A (i), B (i) and C_j and the risk value of each issuer proposed in modeling.

It is seen that 2 stocks namely SCMA and LPPF have ERB values (i) < C_j, each of which is -0,00082 < -0.00004 and -0.00253 < -0.00006. Another 22 potential Shari'a stocks have ERB (i) > C_j values, so they are part of the optimal Single Index Model portfolio with a return rate of 0.6% and a risk level of 0.07% per week. If an investor adheres to this portfolio model, for each investment of 1 billion rupiah they will receive a return value of Rp. 11,107,462.81 and the risk of failure are Rp. 1,264,614.78 per week with a model confidence interval of 5%.

Table 3: Alpha, beta and sigma results of each Shari'a Potential Issuer

CODE	alpha	beta	sigmaei
ADRO	0.00131	1.52082	0.05953
AKRA	0.00002	0.67300	0.04286
ANTM	0.00036	0.98029	0.05868
ASII	-0.00149	1.56681	0.03060
BRPT	0.01341	0.67766	0.08120
CPIN	0.00180	1.45296	0.04999
CTRA	-0.00150	1.83358	0.05023
EXCL	-0.00151	1.07817	0.05588
ICBP	0.00160	0.98013	0.03054
INCO	0.00181	1.13640	0.06824
INDF	-0.00103	1.14695	0.03028
INTP	-0.00202	1.77258	0.03898
ITMG	0.00049	0.99786	0.06302
JSMR	-0.00106	0.98762	0.03409
KLBF	-0.00079	1.23793	0.02936
LPPF	-0.00409	1.02685	0.05642
PTBA	0.00280	1.30585	0.05440
SCMA	-0.00275	1.21011	0.04200
SMGR	-0.00169	1.50102	0.03823
SMRA	-0.00141	1.88174	0.04994
TLKM	0.00132	0.87834	0.02550
TPLA	0.01008	0.28716	0.04370
UNTR	0.00070	1.14553	0.04277
UNVR	0.00117	0.99853	0.02528

Source: Shari'a Capital Market Statistics (2018); Financial Services Authority (OJK) 2018; data processed (2019).

Table 4: ERB values (i), A (i), B (i) and Cj for each listed issuer in modeling

CODE	ERB(i)	A(i)	B(i)	C*
TPLA	0.03655	0.06897	6.57121	0.00009
BRPT	0.02124	0.12014	8.34559	0.00016
PTBA	0.00360	0.11272	24.00456	0.00015
ICBP	0.00309	0.09709	32.09342	0.00012
INCO	0.00304	0.05759	16.65293	0.00008
TLKM	0.00295	0.08932	34.44467	0.00011
CPIN	0.00269	0.11368	29.06495	0.00015
UNVR	0.00263	0.10358	39.49893	0.00013
ADRO	0.00231	0.08977	25.54715	0.00012
UNTR	0.00206	0.06318	26.78340	0.00008
ITMG	0.00194	0.03064	15.83395	0.00004
ANTM	0.00182	0.02986	16.70562	0.00004
AKRA	0.00149	0.01572	15.70229	0.00002
KLBF	0.00081	0.04242	42.16377	0.00005
SMRA	0.00070	0.04991	37.67996	0.00006
CTRA	0.00063	0.04240	36.50368	0.00005
INDF	0.00055	0.02399	37.87814	0.00003
ASII	0.00050	0.04014	51.20278	0.00005
JSMR	0.00038	0.01082	28.97102	0.00001
SMGR	0.00033	0.01933	39.26283	0.00002
INTP	0.00031	0.02521	45.47414	0.00003
EXCL	0.00005	0.00112	19.29440	0.00000
SCMA	-0.00082	-0.02862	28.81221	-0.00004
LPPF	-0.00253	-0.04722	18.20009	-0.00006

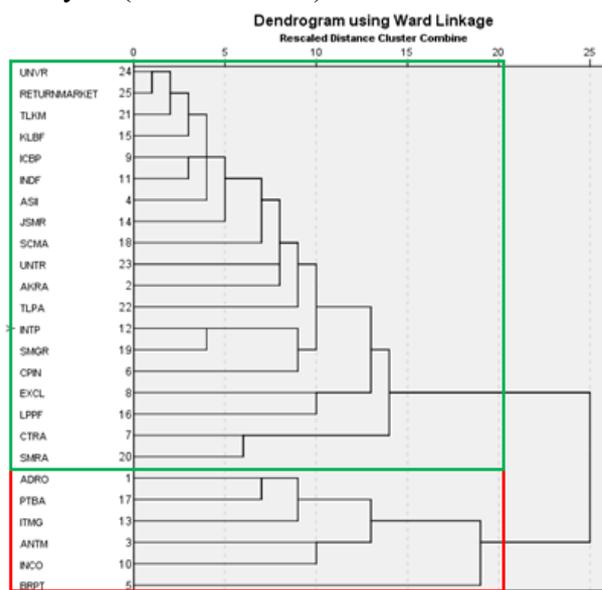
Source: Shari'a Capital Market Statistics (2018); Financial Services Authority (OJK) 2018; data processed (2019).

Ward's Linkage

Decision making, in terms of asset allocation and the selection of portfolio instruments, is a challenge for investors. Investors have their preferences and considerations in making investment decisions. Awareness of the importance of asset classes has substantially driven innovation in the financial industry from traditional investments (i.e. equity and fixed income) to broader alternative asset investments and alternative asset investments. The grouping of 24 Shari'a stocks that obeyed Ward's linkage method of clustering is one of the researchers' efforts in presenting a variety of portfolios to suit the needs of investors. The cluster analysis method will, in principle, build a data group with characteristic similarities. In this study, cluster analysis was built to meet the needs of investors both risk-averse investors and risk seekers investors.

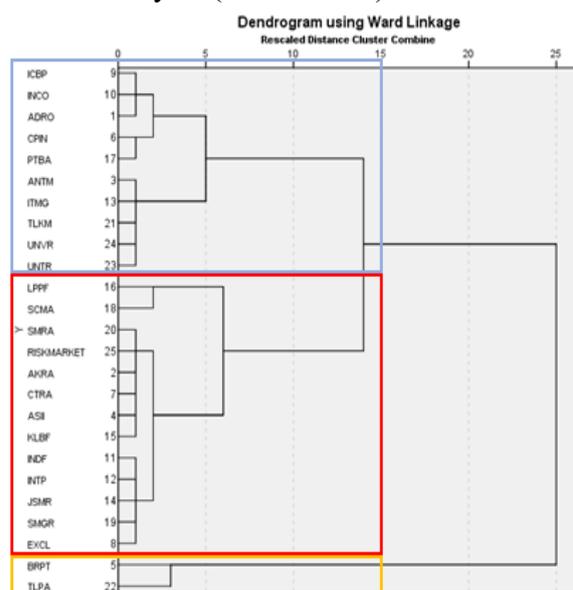
Potential Shari'a stocks that are compliant will be modeled in a portfolio group based on the proximity of the character of the return and risk. Figures 4 and 5 are dendograms of cluster analysis results on 24 potential Shari'a stocks with fulfillment of return-based characteristics (Figure 4) and risk-based (Figure 5). The cut of the dendogram is done by cutting the longest connecting line and considering the equal number of members of each group. Figure 4 shows the dendogram based on return based characters can be divided into two groups. Group 1 consists of 5 shari'a shares, namely ADRO, ANTM, BRPT, INCO, ITMG, and PTBA. Figure 4 shows a dendogram based on risk-based characters can be divided into three groups. Group 1 consists of 2 Shari'a shares with the highest risk, namely BRPT and TPLA. Group 2 consists of 12 Shari'a stocks with medium risk level, namely AKRA, ADII, CTRA, EXCL, INDF, INTP, JSMR, KLBF, LPPF, SCMA, SMGR, and SMRA.

Figure 4. Dendogram Agglomerative Cluster Analysis (Return Based)



Source: Data on return value of issuers (2014-2019); Data processed (2019).

Figure 5. Dendogram Agglomerative Cluster Analysis (Risk Based)



Source: Data on return value of issuers (2014-2019); Data processed (2019).

Table 5: Weighted average of AP1 & AP2, Return and Risk for each portfolio resulting from the ward's linkage

Mean of Compliance, Return and St. dev Syari'ah stock return									
Base d	Aspek	Cluster = Portfolio			Based	Aspek	Cluster = Portfolio		
		1	2	3			1	2	3
Retu rn	Complia nce	31.25%	34.64 %	-	Risk Base d	Complian ce	10.08 %	35.56 %	32.60 %
	Return	0.58%	0.87%	-		Return	1.28%	0.38%	0.32%

Base d	Risk	0.08%	0.27%	-		Risk	0.28%	0.05%	0.01%
	Σ member	18 emiten	6 emiten	-		Σ member	2 emite n	12 emite n	10 emite n

Source: data processed (2019).

Table 5 is an attempt to expose investor preference constraints to Portfolio 1 risk and return from Ward's linkage (return based) results that have compliance values of 31.25%, smaller than Portfolio 2 with compliance values of 34.64%. It can be determined that the Shari'a stock group forms Portfolio 1 are more compliant than the stock groups forming Portfolio 2. However, the risk value of Portfolio 2 is still higher than Portfolio 1, which is $0.27% > 0.08%$. Portfolio 2 of Ward's linkage (risk-based) results have compliance values of 10.08%, smaller than Portfolios 2 and 3 with respective compliance values of 35.56% and 32.60%. It is therefore apparent that Shari'a stock groups form Portfolios 2 and 3 are more compliant from Portfolio groups forming Portfolio 1. The risk values of Portfolios 3 and 2 look much smaller than Portfolio 1 which is $0.01% < 0.05% < 0.28%$.

Conclusions

If we pay close attention to the relationship between compliance and risk contained in Portfolios 1 and 2 or Portfolios 1 and 3, the results of Ward's linkage with risk-based are sufficient to prove a third hypothesis. The better the quality of moral values is bounded, the better value at risk portfolio. Even though there are still customary compliance value models in Portfolios 2 and 3 that cause confusion in decision making. This result is caused by the proximity of the distance to portfolio compliance values 2 and 3 so that the characters built will tend to be the same or similar. This finding is also not enough to break the theory of the relationship between risk and return that already exists that the higher the return, the higher the risk. The risk reduction efforts carried out by morally bounded Shari'a will, in fact, still affect the level of returns obtained by investors. For this reason, it is necessary to have a further study of moral bounded which is related to the theory of bounded rationality whether to be able to create a new paradigm on the board which is based on other financial technical theories.



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