Total Risk Stock Investment: Does International Portfolio Diversification give more Impact to Investors?

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Abstrak

Stock investment has become to be one of the most interesting and promising ways to provide a faster rate of return compared to other investments. Markowitz has set foundations about how to take a good investment decision by considering its expected return and standard deviation. The purpose of this research is two-fold. First, is to compare the total portfolio risk between international and domestic portfolio diversification. Second, is to find the relationship between portfolio size and portfolio risk. This research applies mean-standard deviations, paired t-test, and simple regression analysis on the American, German, and Indonesian stock markets. The results show that international diversification gives more significant total risk reduction compared to domestic one. Another results show a significant relationship between portfolio size and risk reduction. It means that the more number of stock in portfolio, the lesser risk that will be taken. The least risk can be achieved by holding 15 stocks whether in domestic or international portfolio diversification. The results have revealed that diversification has a positive impact through stock investment. This study strongly recommends to diversify the investment internationally and to increase the portfolio size to gain the lower risk.

1. INTRODUCTION

People around this world have been done many activities to obtain the better future with or without sacrificing their present. Investment help people to gain benefit in future by considering the present and future value of a certain instrument. In other words, investment means the purchase of a financial product with an expectation of future returns. It is the employment of funds with the aim of earning additional income [1].

Investment can be done in many sectors, starts from the conventional investment such as property, luxury goods, and jewels. Investment also can be done by investing in modern investment sector like securities, warrants, options, and futures. The later types bring more values that attract the investor to invest their capital in modern investment especially stock investment. Stock investment offers the certain return because it relates with the company which we investing to. We can collect all required information easily such as operational and financial report from many source, not only the company but also media like online media. Despite greater integration of international capital markets, investors continue to hold portfolioslargely dominated by domestic assets. International investors' preference for domestic stocks remainsa subject of controversy, since many studies indicate that greater profits can be made by diversifying internationally [2]. Investment has the certain characteristic that is always followed by the risk. Risk can be described as a combination between the probability of risk and the consequences in terms of loss or gain because of risk[3]. The investment risk can be divided into three types of risk, systematic risk, unsystematic risk, and total risk. Total risk is the accumulation from systematic and unsystematic risk. The risk can be decreased in terms of unsystematic risk. The way to decrease the risk can be done by diversification. Selecting a portfolio aims to diversification of investments and different assets in an investment portfolio, so that portfolio returns or value and its risk will be maximized and minimized respectively [4]. Bogdan et al [5] also conducted research on the comparison of domestic and international portfolio risk by using shares from Southeastern European countries and twenty shares from the Zagreb capital market (Zagreb stock exchange).

This study will examine the total risk comparison that occurs after portfolio is diversified domestically and internationally. This study using data from three different stock indices so that the research results can reflect the level of portfolio risk in different countries. One of the thing that become major problem for investors is how to form an optimal portfolio so that the return on investment will be in line with the expected return of investors. This happens because investors do not understand how to determine and form an optimal stock portfolio, so that investments only make investors lose their money in the future, an investor can form an optimal portfolio if they know the risk level of each stock and then the risks can be minimized by diversifying the portfolio. A common investor is not informed and competent enough to understand the intricacies of stock market [6]. With careful preparation and analysis, investors don't need to worry about the investment that will be happen, because various information has been collected and various scenarios have been prepared to anticipate the possibility that will occur in the future. Referring to the research results of Bogdan et al [5], which conducted a study on the total risk comparison of the domestic and international stock portfolios, the result shown that international portfolios were able to reduce total risk more significantly compared to the domestic portfolio. Meriç et al [7], conducted a study of global portfolio diversification in emerging stock markets also shown that international portfolio diversification was able to provide greater benefits by combining developed country portfolios with developing countries with the category of emerging stock markets. In this study there are several objectives so that later can be used as guidelines and benchmarks in carrying out another research.
The objectives on this research are: First, Knowing the optimal way in diversifying portfolio; Second, Understanding the method of optimizing the risk in investments; Third, Knowing the effect of the number of shares on the total risk in forming a portfolio.

2. LITERATURE REVIEW

Each investor has its preferences in selecting investment regarding to its capital and what kind of information owned. A good investor makes the decision precisely by considering the risk and return of the investment. Investors should make decisions about their portfolios solely based on the expected return and standard deviation [8]. A higher standard deviation translates into a greater risk and requisite higher potential return. Expected return can be defined as the average ofa probability distribution of possible returns [9].That's why before starting to invest, investor have to know well each component of the investment itself. The main component that should be considered carefully is the investment risk.Risk can be described as a combination between the probability of risk and theconsequences in terms of loss or gain because of risk[3]. There are two academic definitions for risk. The first is related to chances of anevent happening that will have negative consequences. The second is related to chances of an event happening, which will have both negative and positive consequences[10].

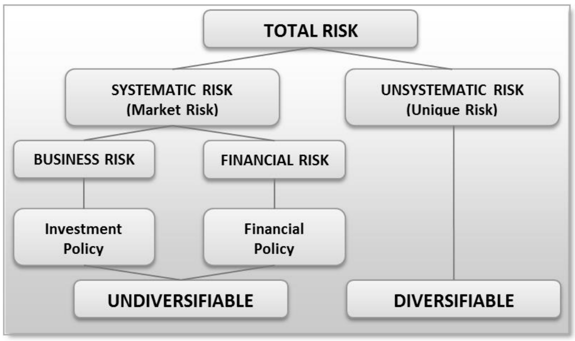

Figure 1: The Inter-relationship of Risk Concepts[11]

If the risk management is well enough, the certainty of return in future will be brighter because the portfolio investment has done in efficient way. Efficient here means thatan investment portfolio has a maximum expected return given a certain level ofexpected risk, or a minimum expected risk given a certain expected level of return[12]. Every stock or portfolio comprises of two types ofrisks, systematic and unsystematic. The systematic risk,denoted by beta in the domain of finance, is the riskwhich is inherent in a stock and cannot be diversifiedaway. Systematic risk, also known as market risk, cannot be reduced through diversification of stocks' portfolio[13].

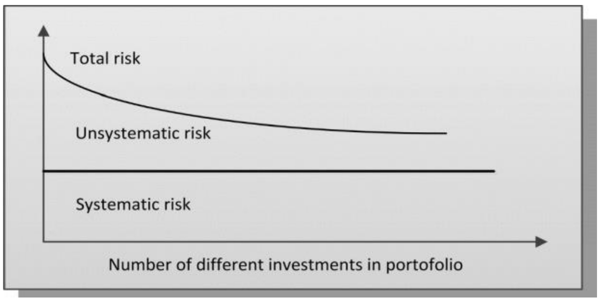

Figure 2: Risk and diversification[14]

The total risk will be lesser when the unsystematic risk is reduced and it can be done by holding the more different investments in portfolio or we usually call it diversification. Diversification has been proven its capability to reduce the total risk of an investment and increase the return. Diversification can be done domestically or internationally, it depends on the investor's preferences. Diversifying domestically is easier because it doesn't give more struggle to investor in collecting the information compared to international diversification. But in terms of risk reduction and higher return, international diversification offers more benefit because it reduces risk more significant and gives higher return compared to domestic diversification.

Several empirical study has emphasized the investors to internationalize their investment. Solnik[15] concluded that internationally diversified portfolio is likely to carry a much smaller risk than a typical domestic portfolio. Gilmore et al [16] in their research have presented results which indicate that for US investors optimally diversifying into Central European stocks will outperform investing solely in the domestic stock market. Abid et al [2] applied mean-variance portfolio optimization approach and stochastic dominance test to examine preferences for international diversification versus domestic diversification. Meriç et al [7] concluded that international diversification help investor obtains the maximum benefit by combining developed and developing countries stocks.

Setting realistic goals allocating and diversifying your assets appropriately and taking a longtermview can help offset many of the risks of investing in stocks[17]. That's why portfolio diversification will help investors to secure more their investment assets by considering the risk and return.

3. DATA AND METHODOLOGY

This research applies a comparative and associative descriptive approach. Descriptive research will explain the total risk when the portfolio is diversified domestically and also internationally. The comparative research is used to find the comparison between domestic portfolio diversification and international portfolio diversification, which one of diversification that has more significant reduction in total risk. In the second study conducted associative research, the aims to determine the effect or relationship between two or more variables, which used to find the relationship between portfolio size and portfolio risk. The population in this study are 30 leading companies which listed in the stock index in three different countries, LQ45 (Indonesia), NASDAQ (Germany), and DOWJONES (USA). This study using purposive sampling, with criteria that the shares have weekly closing prices consistently from the beginning of January 2017 to the end of December 2017. The data collection technique in this study obtained through browsing and downloading on the related website. Beside that for the purpose of depth study there are some contents gathered from interview, relevant books and articles from journals and websites. The data analysis technique applies mean-standard deviation, paired t test, and simple regression analysis.

The data which has analyzed in this study were selected using stratified random sampling, which from each stock index 15 different stocks were chosen, by dividing 30 existing stocks into three groups of shares divided by the level of individual risk in each company. Then after being grouped into three categories, 15 different stocks were chosen, which each of the 5 shares originating from the three categories of stocks that had been grouped before. Calculation of risk and return in this study using the weekly closing price stocks in 2017.
Mean-standard deviation applied to identify the total risk of each diversification whether domestic or international. Assuming equally proportion of each stock, portfolio risks are calculated as:

$$\sigma_{port} = \sqrt{w_a^2\sigma_a^2 + w_b^2\sigma_b^2 + w_c^2\sigma_c^2 \ldots + w_n^2\sigma_n^2} \quad (1)$$

Where:
σ_{port} = total portfolio risk
$w_a^2, w_b^2, w_c^2, \ldots w_n^2$ = proportion of stock a,b,c to n-stock
$\sigma_a^2, \sigma_b^2, \sigma_c^2, \ldots \sigma_n^2$ = variance of stock a,b,c to n-stock[18].
After found the portfolio risk by calculating the mean-standard deviation, then comparative analysis applied to know which diversification reduce risk more significant. Paired t test take place to do the comparative analysis by using the proper tools or software. Then to analyze the correlation between portfolio size and portfolio risk, simple regression applied to examine the associative analysis.

4. RESULTS AND FINDING

Based on the mean standard deviation analysis, the decrease in the total risk that occurs in international diversification from 0.02190 on 2 shares to 0.0105 on 15 shares or the total risk level of the portfolio falls by 51.85%. While total risk through DOWJONES domestic diversification, from 0.01414 on 2 shares to 0.0099 on 15 shares or the risk level of the total portfolio falls by 30.25%. On NASDAQ domestic diversification, from 0.0227294 on 2 stocks to 0.015070 on 15 stocks or the risk level the total portfolio falls by 33.70%. In domestic LQ45 diversification, from 0.0244052 on 2 shares to 0.012284 on 15 shares or the risk level of the total portfolio falls by 49.67%.

Table 1. Total portfolio risk of international and domestic diversification

N SHARES	INTL	DOWJONES	NASDAQ	LQ45
2	0.02190	0.01414	0.0227294	0.0244052
3	0.0197	0.0141	0.022103	0.021817
4	0.0174	0.0119	0.020709	0.017833
5	0.0154	0.0111	0.019597	0.016186
6	0.01517	0.01076	0.0185880	0.0158509
7	0.0139	0.0101	0.017429	0.015331
8	0.0131	0.0099	0.016641	0.014693
9	0.0124	0.0102	0.016991	0.014591
10	0.01155	0.01004	0.0165287	0.0142966
11	0.0111	0.0102	0.015957	0.013719
12	0.0117	0.0102	0.015693	0.012942
13	0.0114	0.0101	0.015674	0.012556
14	0.01087	0.00991	0.0154501	0.0122856
15	0.0105	0.0099	0.015070	0.012284

This shows that the international diversification has the more significant total risk reduction compared to the domestic diversification. Although the total risk of the domestic portfolio in DOWJONES index has the smallest risk, this can be occured because the average risk of individual stocks in the DOWJONES index is smaller than the other indices. The results of this study are in line with previous research that conducted by Bogdan et al [5] which stated that international diversification was able to reduce the level of total risk more significant than domestic diversification.

Table 2. Paired Samples t Test

Diversification		Mean	t Statistic	Df	Sig. (2-tailed)
Pair 1	INTL-NASDAQ	-0.00379365	-12.867	13	0.000
Pair 2	INTL-DOWJONES	0.00310526	5.357	13	0.000
Pair 3	INTL-LQ45	-0.00162437	-8.293	13	0.000

Based on the t test results, the average difference in total portfolio risk shows that international diversification has a smaller total risk portfolio compared to domestic NASDAQ and LQ45 diversification as indicated by the negative t value calculated. However, international diversification has a greater total portfolio risk compared to domestic DOWJONES diversification, because the average stock on the DOWJONES index has a very small individual risk of 2%. Based on the results of the t test, there is a significant difference between the risk of the portfolio formed through international diversification compared to the risk of the portfolio formed through domestic diversification at α = 1%.

Table 3. Result of simple regression

Model	Standardized Coefficients Beta	Unstandardized Coefficients Beta	Lvl of significant 1%	R^2
INTL	-0.921	-0.001	0.000	0.848
DOWJONES	-0.79	0.000	0.001	0.624
NASDAQ	-0.942	-0.001	0.000	0.888
LQ45	-0.889	-0.001	0.000	0.79

Based on the regression analysis, the effect of the number of shares on the total portfolio risk shows that the number of shares in the portfolio negatively affects the risk of the portfolio on all indices indicated by the beta coefficient. The results of the t-test statistics indicate that the number of shares in the portfolio has a significant negative effect on the total portfolio risk, both for the international and domestic portfolio at the level of 1%. In other words, the more shares added to the portfolio, the smaller total risk of a portfolio. The coefficient of determination (R^2) from overall portfolio of both portfolio diversifications are ranged from 0.624 to 0.888. This shows that the total portfolio risk from international diversification and domestic diversification in all stock indices is influenced by the number of shares ranging from 62.4% to 88.8% and the rest ranging from 37.6% to 11.2% influenced by other factors besides the number of shares. This also confirmed by Suqaier et al [19]which stated that the more number of shares in a portfolio will reduce the level of portfolio risk.

5. CONCLUSION

This study concluding several things: First, based on the mean standard deviation (total portfolio risk) of each stock combination, international portfolio diversification has the more significant risk reduction compared to domestic portfolio diversification. The risk reduction in international diversification is the highest because portfolios are formed from various countries, which means that the existing stock market conditions are becoming more diverse, so the potential to reduce the level of risk becomes higher when compared to domestic diversification which only diversifies the portfolio between shares on one exchange only; Second, based on the paired t-test, domestic diversification of DOWJONES has the lowest risk level compared to domestic diversification of the NASDAQ and LQ45 indices. This can be occurred because the level of individual risk in the DOWJONES index has the lowest average; Third, based on simple regression analysis shows that the number of shares has a negative and significant effect on the reduction of risk, which means that the more the number of shares will reduce the level of total portfolio risk.

This results prove that international diversification brings more significant risk reduction rather than domestic one. Risk averse investors strongly recommended to internationally diversify their stocks investment according to the empirical result on this research.

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