

CHAPTER 2 : LITERATURE REVIEW

2.1 Portfolio Theory

Return is one of the reasons that motivate investors to invest and also serves as a reward for investors' willingness to accept risks with their investments. The expected return on investment compensates investors for the opportunity cost and the risk of decreased purchasing power due to the effect of inflation. Returns might be realized returns that have occurred or unrealized returns that are predicted to occur in the future. Return is an important factor in establishing the value of a company's shares. According to Yulianto (2014), management share ownership is also positively associated to company value, thus managers would make more efforts to pick the best investment decisions to maximize shareholder value.

A portfolio is a collection of shares or other assets owned by individuals or institutions. The goal of putting together a portfolio is to lower the risk of investing by diversifying ownership of stocks or other assets. The development of a portfolio is based on the concept that capital owners would invest their assets in various types of securities in order to reduce the risk that must be faced while also looking for a greater return. Covariance can greatly enhance diversification in an asset portfolio. Putting assets with a negative covariance in a portfolio lowers total risk.

Markowitz (1952) proposed a model known as the Modern Portfolio Theory (MPT), which aims to achieve a desired level of return with the least amount of risk. To reduce risk, it is important to diversify while investing, which means establishing a portfolio or investing money in multiple assets with a particular amount of funds. Sharpe (1964) then developed the Markowitz model, also known as the capital market equilibrium theory, which states that if all investors in investing do the same thing as stated by Markowitz, then the assets traded in the capital market will be completely divided by investors, and the proportion of each security held by the investor will be identical to the capitalization of the asset in the capital market. In conclusion, an efficient and optimal portfolio is the market portfolio itself. Thus, in investing,

investors do not need to form an efficient and optimal portfolio as stated by Markowitz, but rather form a portfolio that is identical to the market portfolio.

According to Markowitz, an intelligent investor simply buys and keeps a well-diversified portfolio of index funds. He also believes that equity portfolios should be diversified with equities of all sizes, including large-cap, small-cap, value, growth, foreign, and domestic stocks.

2.2 Return of an Asset

The return of an asset is defined as the percentage change in the value of an asset over a given time period. The return of an asset, r_j , is computed mathematically according to the following formula :

$$r_j = \frac{V_{i+1} - V_i}{V_i}$$

where V_{i+1} is the value of asset j at time $i + 1$ and V_i is the value of the same asset at a previous time i . The average return of an asset, \bar{r}_j , is calculated as follows:

$$\bar{r}_j = \frac{1}{N} \sum_{i=1}^N r_j$$

where r_j is the return on asset j from time $i + 1$ to time i and N is the number of observations.

2.3 Correlation Coefficient

The correlation coefficient is a more intuitive measure of the interaction between two variables. It expresses the strength of the linear relationship between two variables as a number between 1 and -1 . A value of 1 implies that there is a perfect positive linear correlation between the two variables, which means that all of the observations fall on a straight line with a positive

slope. A value of -1 on the other hand, shows that the two variables have a perfect negative linear correlation and that all observations fall on a straight line with a negative slope. The absolute value of the correlation determines the strength of the linear relationship. A correlation coefficient of close to ± 1 indicates that the correlation is strong while values close to 0 indicates a weak correlation. A correlation value of 0 shows that the two variables have no linear relationship. There are many ways to calculate the correlation coefficient, but one of the most common is the *Pearson's product-moment coefficient*. Its mathematical formulation applied to the return of two assets, i and j , is according to:

$$\rho_{i,j} = \text{Corr}(r_i, r_j) = \frac{\text{Cov}(r_i, r_j)}{\sigma_i \cdot \sigma_j} = \frac{\sigma_{i,j}}{\sigma_i \cdot \sigma_j}$$

where $\rho_{i,j}$ is the correlation coefficient between the two assets. The standard deviation of an asset's return, σ , is defined as the square root of the variance of the return according to:

$$\sigma = \sqrt{\sigma^2} = \sqrt{\frac{1}{N} [(r_1 - \bar{r})^2 + (r_2 - \bar{r})^2 + \dots + (r_n - \bar{r})^2]}$$

When the correlations between a set of different variables are calculated and compared, a simple way to present them are by a so-called correlation matrix. If the correlation of n variables are compared, e.g. the returns r_1 to r_n , the correlation matrix has the size of $n \times n$ elements. The value of the i, j element in the matrix is the value of $\text{Corr}(r_i, r_j)$.

2.4 Index

An index is a statistical measure which describes how certain statistical properties of e.g. assets or commodities have changed over a period of time. Every index has a unique definition that explains how its value is determined. Its starting value, known as the base value, is specified

at a certain moment in time, and the index's value is subsequently assessed at continuous time intervals. This makes it possible to examine how the underlying securities included in the definition of the index has performed over time. It is usually of larger interest to know the percentage change of the index value rather than its absolute value.

A stock index is generated using a fictional portfolio comprising a certain number of stocks with predetermined weights. The value of the stock index is then obtained by evaluating the percentage change of the fictional portfolio and apply that change to the stock index value.

2.5 Commodity

A commodity is a basic good for which there is a demand on the market. There is no or only marginal differences in the good produced by different producers and the good is therefore interchangeable with commodities of the same sort. Commodities are often traded using standardized futures contracts that specify the amount and minimum quality of the product. The price of commodity futures contracts is governed by supply and demand and is traded at particular commodity marketplaces known as commodity exchanges.

2.6 Commodity prices and its effect on stock prices worldwide

The stock market index is influenced by a wide range of factors. In addition to the movement of macro variables, the level of world commodity prices can affect the world's economic conditions and investment climate, where the influence of fluctuations in world commodity prices is also deeply intertwined to the capital market as an investment venue that helps connect those with excess funds with those in need of funds. Changes in commodity prices have a significant impact on the movement of the stock market index. This is especially true for stock market indices in commodity-producing countries across the world. Furthermore, commodity-related firms have a very big market capitalization value on the stock price index.

Commodity price changes impact the share price of the firm in question, which in turn affects the stock market index. As a result, it's worth investigating how much impact fluctuations in commodity prices have on the stock market index.

Gold has been a valuable precious metal for millennia, and it is particularly useful as a hedge against political and economic instability. Gold is a valuable asset that may be used as a substitute for equities. As a result, an increase in gold returns will motivate investors to sell their stocks and acquire gold in order to maximize their earnings. As a result, gold investment and stock investment can be considered to be alternatives for one another (Hazandeh and Kiavand, 2012). In general, gold prices and the stock market move in opposite ways. Therefore, as the price of gold falls, individuals withdraw their investment from gold and put all of their funds in the stock market, which ultimately boosts the market value of the stock since the investment grows (Ray, 2013). This is supported by study by Baur and Lucey (2010) and Ciner et al (2013).

In general, the price of gold will constantly rise over time due to the fact that it's become increasingly scarce. Furthermore, gold prices always adjust to inflation, so investors who have the traits of avoiding risk as a method to secure the value of their investment generally choose gold.

Wang, Lin, and Li (2013) examined the safe haven effect of foreign commodities (Rogers International Commodity Indexes) on stock prices in a variety of markets. The empirical findings revealed that some commodities and stock markets have stable long-term correlations, and that commodity indices usually lead stock market indexes. There are no hedging impacts between commodities market indexes and stock markets under regular stock market conditions. As a result, commodities indexes cannot be used as hedging tools by investors.

After adjusting for changes in exchange rates, interest rates, and North American stock market movements, Johnson and Soenen (2009) discovered that fluctuations in commodity prices had a large impact on the stock markets of South American nations. According to the findings of the study, the stock markets of South American nations react to commodity price indices on the same day, with no lead-lag effects.

Agricultural commodities, according to Detre, Hanabuchi and Zapata (2012), play a significant role in the portfolio of a risk-averse investor since they are less volatile during market crises. They performed their analysis by checking for relationship between several

commodities and the US stock market using monthly data from the S&P 500 index. The research concluded that investment in agribusiness and/or agricultural commodities indices was prudent investing for a risk-averse investor, regardless of the time period studied.

Creti et al. (2013) analyzed the connection between commodities and the S&P 500 index using data from 2001 to 2011 and discovered that the correlation has risen in several cases since 2007. The findings indicate that correlations between commodity and stock markets change over time and are very volatile. The study also demonstrate a speculative phenomena for oil, coffee, and cocoa, while gold's role as a safe-haven is proven.

According to some academics, agricultural commodity prices exhibited limited co-movement and association with financial markets prior to the year 2000 (Gorton & Rouwenhorst, 2006). Buyukshain and Robe (2011, 2012) show that the level of commodity-equity links has shifted dramatically over the last two decades. They also suggest that correlations between commodities futures and financial price returns have strengthened significantly since the last financial crisis and the collapse of Lehman Brothers in September 2008. Lehecka (2014) discovered that from the beginning of financialization in agricultural commodities markets in 2004, food and financial markets have exhibited increasing co-movements and may sometimes be linked. The findings are much more significant for the time period following 2008.

Rossi (2012) explores the link between commodity prices and stock markets, attempting to anticipate commodities future prices in commodity-exporting nations using equity prices. She discovers that global commodities price indexes are positively correlated with lags in equity prices. According to the research, exchange rates are a stronger predictor of commodity prices than stock markets, especially over relatively short time periods.

Crude oil is the most influential commodity today. Because oil has become an important commodity for many parties, fluctuations in global crude oil prices have gotten the most attention. As a result, it has become a significant concern for the community, government, and market players. The recent oil crisis has been a source of concern in many countries throughout the world. The rise in the price of crude oil has led to the rise in the price of fuel globally. A

lot of countries have raised gasoline costs, which are critical to life and the economy. This scenario is critical because the high price of oil will generate an increase in the price of other goods, causing inflationary pressures all across the world.

The rise in oil prices was driven by a number of causes, including a lack of reserves for oil procurement infrastructure, production capacity, transportation, and, most notably, refinery capacity. Indeed, a variety of geopolitical and technological reasons have contributed to rising or falling prices, in addition to rising demand for oil. Even as economic expansion continues, demand for oil in developed countries is slowing. It should be mentioned that growing population has mostly resulted in increased demand for energy, notably oil. Population growth in developed countries is often slower than in developing countries. As a result, the rapid increase in demand for oil came from Asia, mainly China and India.

Rising global crude oil prices can have an impact on stock prices in a variety of industries. The effect generated might be both beneficial and detrimental. Furthermore, the influence of rising global crude oil prices on stock prices can be direct, as in the mining sector with rising global crude oil prices, changes in stock prices in the mining sector for the coal mining, oil and gas mining sectors, or other other mineral metal mining. This relates to the operations carried out by each mining firm as well as the company's distinctive characteristics.

Crude oil is a critical source of energy. This is due to the fact that refined crude oil is the world's primary commodity and energy source today. The mining industry's high index growth demonstrates considerable investor interest in mining sector companies, which are viewed as beneficial investment possibilities. Furthermore, capital market investors believe that increased worldwide demand for oil is an indication of a better global economic recovery following the crisis. On the other side, the drop in global oil consumption shows the deterioration of the global economic recovery. As a result, if the global oil price rises, so will the anticipation that firms' performance would improve, and hence the share price will rise as well. According to Kilian and Park (2009), global oil prices have a positive and considerable impact on the US capital market.

Oil price increases have a relatively varying impact on the economy in general, and particularly on the capital market. Rising oil prices have a good influence in oil-exporting countries, but have a negative impact for oil importers and consumers. Meanwhile, several researchers have conducted empirical studies to analyze the impact of fluctuations in global oil prices on the capital market. Among them, Le and Chang (2011) discovered that fluctuations in oil prices had little effect on the Japanese stock market. According to Papież dan Śmiech (2012)'s study, fluctuations in global oil prices had no effect on the S&P 500 index. Basit (2013) discovered similar results when examining the impact of fluctuations in global oil prices on the Pakistani stock market.

Many studies, on the other hand, have discovered a significant correlation between fluctuations in global oil prices and the stock market. Patel (2012), Jubinski and Lipton (2013), Hussin et al (2013a), and Hussin et al (2013b) discovered the opposite results. Patel's (2012) research employs the Indian capital market as the object of study, which is congruent with these findings. Using the S&P 500 index, Jubinski and Lipton (2013) discovered that fluctuations in global oil prices had a considerable impact on stock market returns reflected by the S&P 500 index. Hussin et al (2013a) and Hussin et al (2013b) research also supports the findings, indicating that fluctuations in oil prices have a short and long term influence on the FTSE Bursa Malaysia Emas Syariah Index (FBMES). Ghorbel et al. (2014) attempt to explain the influence of oil prices, investor sentiment, and conventional indices on 11 shariah indices, particularly during the financial and oil crises, in their research. According to empirical research, the Malaysian and Indonesian shariah indexes are largely influenced by oil volatility. The BEKK-GARCH model estimate findings show that investor pessimism during the subprime crisis is transmitted to the shariah index.

There are several implications that can be derived based on numerous findings of commodity prices and its effect on stock prices worldwide. Each commodity has its own characteristics and traits of how it influences price of particular stock or index. Oil are typically more volatile and can affect global supply chain and business risk significantly, while food or agriculture and precious metals such as gold are relatively less volatile. Many other factors can

enhance the overall effect of commodity price movement towards stock prices. Nature of business, level of infrastructure, robustness of financial system, demographic, geographic, and political landscape of region and countries can also significantly affects the sensitivity of stock prices on commodity price movement.

