CHAPTER II

LITERATURE REVIEW

2.1. Theoretical Background

2.1.1. Investment

Traditional investment theory concerns about a use of large amount of varied assets. It is based on the context of financial statement analysis. We can distinguish traditional investment in two types: fixed investment / fixed capital formation and investment in stocks. Each of it may be elaborated into further three types. The fixed investment includes plant, machinery, vehicle, and buildings, and other forms of fixed assets; and the investment in stocks contains of raw material, work in progress, and finished goods (Backhouse, 1991). This might be true in essence of financial report. However, investment on the context of this research is defined as "a set of program that aims desired future financial goals to be met through interest in bank products (certificate/deposits) and market returns on stocks/bonds/mutual funds." (Baker et al., 2008)

Investing is closely related to both retail or corporate objectives in the future and in investment programs, specifying them is essential, along with personal capability / condition (such as age, income, time horizon, and so on) and personal financial instrument desires (such as liquidity, tolerance of risk, and others) (Educated Investor, 2000). Company pensions, property, gold and social security are several of many traditional examples of investment plans that are self explanatory for many people in Indonesia. In a

current global era, investing through financial market is still a challenge and worthy to be done massively since its ease for being liquid and reachable for middle income people (Baker et al., 2008). Thus, selecting suitable financial instruments is a critical point. Investing is also different from saving:

Table 2.1
Savings and Investments

	Savings	Investments
Objective	Short-term needs or emergencies	Long-term Growth
Products	Savings account, money market account	Stocks, bonds, mutual funds
Risks	None on capital if FDIC insured, inflation risk	Varies, depending on investment products
Source of Return	Interest paid on money deposited	Interest, dividends, capital gains, coupons
Key Benefit	Money is safe and accessible	Returns have outpaced inflation over the long term
Key Drawback	Returns historically have not outpaced inflation over the long term	Risk of losing money if securities decline in value

(Source: Baker et al., 2008)

In investing, one of main issues that investors face is about to allocate assets through financial instruments and thus knowing potential return and risks associated with it is important as having always been discussed in the topic of portfolio theory (Elton & Gruber, 1997). Markowitz is a founding father of modern portfolio theory (Markowitz, 1952), where it basically discusses return as combined expected degree average gain investors may get per certain period of time against the risk as

described by collection of variance / standard deviation of returns which explain probability of returns to deviate from its expected rate. Understanding basic risk-return analysis will give us awareness concerning our risk profile against many financial instruments in capital market among the globe. In more extended discussions, how risk-return analysis may contradict with investors' personal profile is discussed in the topic of behavioral portfolio theory (Shefrin & Statman, 2000). Hence, both being given financial instrument information and being able to select investment portfolio are always challenging to investors, professionals, and researchers since it is either asset allocation or investors themselves is diverse.

2.1.2. Mutual Funds

We may define mutual funds as "a type of investment fund that is a bundle of collection of investments, such as stocks, bonds, or other funds (Canadian Securities Administrators, 2012)." Mutual funds are generally open-ended that gather money from people in order to issue more funds. A mutual fund usually focuses on certain investment, like government bonds, stocks from large companies, foreign stocks, mutual funds in mutual funds, balanced mix of domestic financial markets, and so on. Another definition of mutual funds starts from its institutional concept where "mutual funds are intermediary financial institution that sell shares to the public and use the proceeds to buy a selection (or portfolio) of various types of stocks, bonds, or both stocks and bonds (Mankiw, 2009)." In further discussions, Mankiw (2009) also shares that the investors of mutual funds accept all the risk and

return associated with the portfolio. Because the professional fund managers allocate the money, investors of these funds can just experience both rising and falling of the portfolio.

Table 2.2
Advantages and Disadvantages of Having Mutual Funds

	Advantages	Disadvantages
1	Allowing people with small amount of money to diversify	Arguably "hard to beat the market"
2	Giving mass investors access to the skills of professional money managers	High entry costs index funds are more profitable

(Source: Mankiw, 2009)

The below table shows some common types of mutual funds and what investments they typically invest in:

Table 2.3
Common Mutual Funds Types

	Type of Fund	What it mainly invests in
1	Money Market	Short-term fixed income securities like treasury bills (USA), saving deposits, bank certificates
2	Fixed Income	Fixed income securities like government bonds and corporate bonds
3	Growth / Equity	Equities like stocks or income trust units
4	Balanced / Managed / Mixed	A mix of equity and fixed income securities
5	Global	Foreign equities or fixed income securities
6	Specialty	Equities or fixed income securities in a specific region (Asia-pacific, Africa, South America, and so on) or in a specific industry (manufacturing, technology, government owned corporations, and so on)
7	Index	Chosen equities or fixed income securities to mimic a specific index, such as S&P/TSX Composite Index
8	Fund of Funds	Other mutual funds

(Source: Canadian Securities Administrators, 2012)

In the context of this research, Indonesian mutual funds typically use the term mixed funds to express the balanced / managed funds. From the research point of view, the fund is interesting for its coverage between fixed income funds (both short-term or long-term fixed income) and equities so by comprehending the performance of the managed funds, comparative study to capital market is conducted at the same time, while the author may leave other funds to be studied for further researches.

Since the permission of Capital Market Law in 1995, open-ended fund began to be promoted and the history of the rising of Indonesian mutual fund started from general economic recovery from 1999 to 2002 that made Indonesian mutual fund industry rebounded (Srinivas, 2006). After going through numerous economic fluctuation in 2005 and the subprime mortgage crisis up to the end of 2008, Indonesian mutual funds got stronger by 2010 with Rp152 trilions NAV with more than 20,000 licensed fund sales forces (Kadomae, 2012) and now the national NAV has become Rp157 trilions (BAPEPAMLK, 2015). With more than 80% of total populations are Moslems, Indonesia is the biggest Moslem nation in the world and its Islamic finance also grew in the country and by the end of 2010, BAPEPAMLK has issued permission of 48 Islamic funds with total NAV of Rp5.3 trilions (Kadomae, 2012) that now has grown into almost Rp6.2 trilions (BAPEPAMLK, 2015).

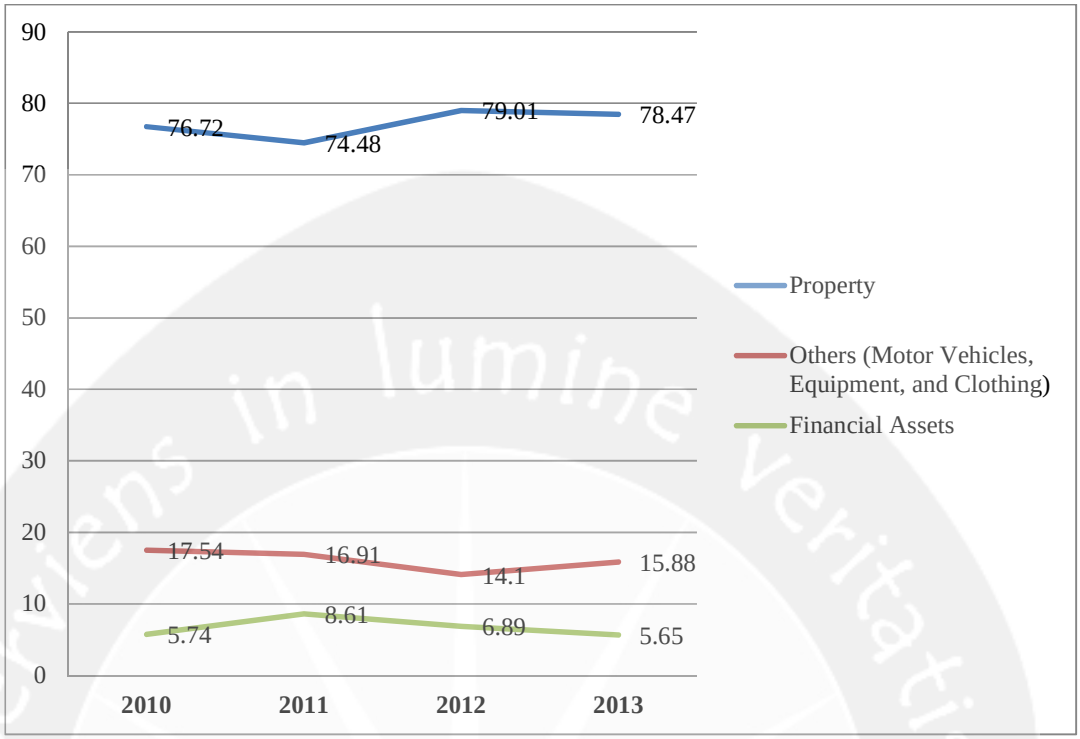

Figure 2.1
Indonesian Household Assets (%)
(Source: Bank Indonesia, 2014)

Indonesia is populated by 237.64 million people and consists of 61.6 million of households with challenging condition for more penetration in financial market for retail investors, with 49% of the populations are in working age. Figure 2.1 shows that Indonesian households have favored property assets more from years. Thus, it is still challenging for Indonesian government to increase financial literacy, especially to increase investing education (as shown in Figure 2.2). Such a condition is actually worse than 2008 when the average household financial asset was still around 9% and now it became less than 6% in 2013 (Kadomae, 2012). However, the government still expects the people to be more considerate financially for

the future, rather than only booming in their consumption (Bank Indonesia, 2014).

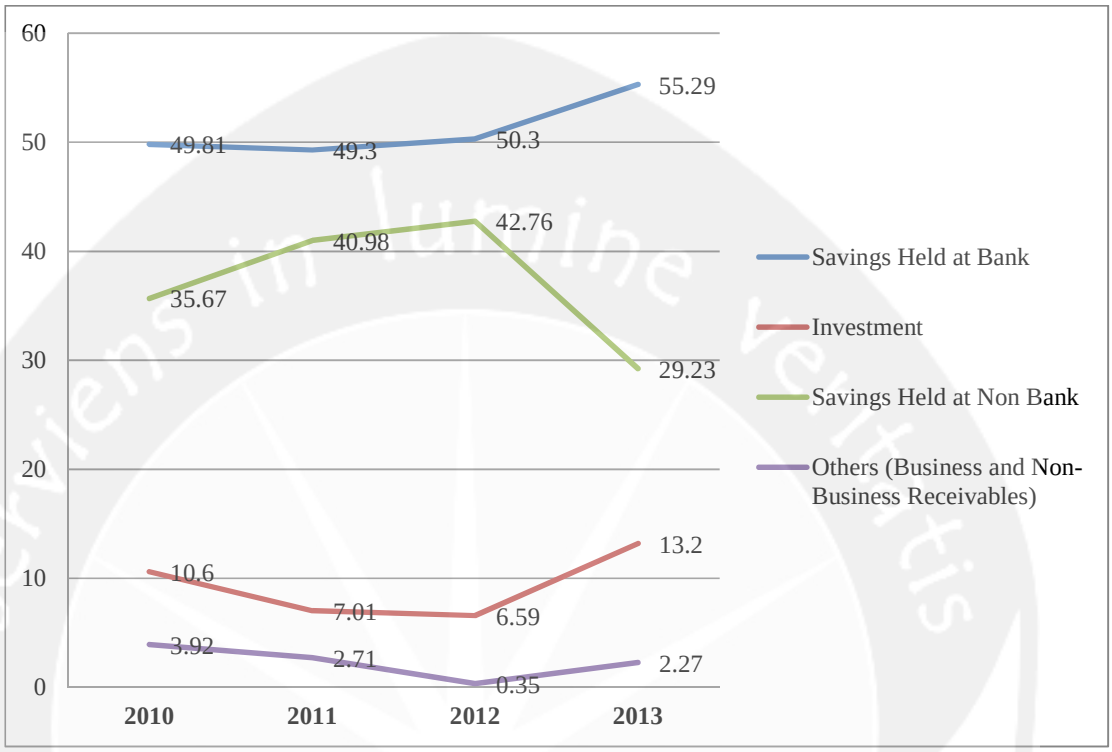

Figure 2.2
Indonesian Household Financial Assets (%)
(Source: Bank Indonesia, 2014)

2.1.3. Net Asset Value

Evaluating the mutual funds requires an understanding about how investors might get gains or returns from them. Thus, the term net asset value is important and can be defined as "the amount by which total assets exceeds total liabilities (du Toit, 1979)." Thus, the net asset value represents profitability in business and should the amount of total liabilities exceed the total assets, negative returns might be experienced. In common, the net asset value is generated after deducting all the debts, the loan capital, and the preference capital, also after fulfilling the rights of preferred and common

stockholders. In a specific measure, the NAV also include the listed investments and unlisted investment (Green Street Advisors, 2014). In mutual funds, the net asset value is usually reported daily even though they may not vary too much on daily basis (Weliandra, 2010).

2.1.4. Traditional performance measurement

In early developing theories, the mentioned mutual funds are evaluated as portfolio of assets by utilizing traditional investment meaurements unto the returns from dynamic NAVs. Traditional performance measurement in the research context lies on risk-return analysis developed by Markowitz (1952) in order to assess gains by deducting periodical return with the previous returns per base return and standard deviations in order to analyze the number of how the returns might deviate from its central tendency. It also discusses further risk analysis concerning total risk and systematic risk by Treynor (1965) and Sharpe (1966), along with the Jensen α (1968). Overall, traditional performance measurement is in the topic of Capital Asset Pricing Model, where the two-dimension measure of risk and return is thoroughly discussed and is still a debate for its weakness of relying on assumptions validity. Table 2.1.5.1 explains briefly how we may understand the three traditional performance measurements:

Table 2.4
Concepts of Traditional Performance Measurements

Risk Measure	Definition and Concepts
Treynor (1965)	Return/risk indicator given by the annualized return of the security, deducted the yield of an investment without risk, divided by the fund's beta during the same period, and the specific risk measures in Treynor (1965) assesses Beta that may analyze return by systematic risk.
Sharpe (1966)	A further but close risk indicator from Treynor (1965) with assessment of return for more than per systematic risk, the Sharpe (1966) indicator measures expected return investors may get per total risk.
Jensen (1968)	Risk measure that takes into account a comparative difference analysis between the expected risk-return of actual portfolio and the expected risk-return of the benchmark, which are usually related to capital market, government bonds indices, composite index, and so on.

[Source: Treynor (1965), Sharpe (1966), and Jensen (1968)]

2.1.5. Data Envelopment Analysis

A brief definition concerning data envelopment analysis might be defined as "data-oriented approach for evaluating the performance of a set of peer entities called decision making units (DMUs) which convert multiple inputs into multiple outputs (Cooper et al., 2011)." Perhaps, the best way of defining data envelopment analysis has to associate with methodological formula since the DEA has a basic form of a linear programming model. It breaks down the model as a non-convex programming by weighing resources (or simply called inputs) in order to create the outcomes (or simply called outputs) through simultaneous observational data (Charnes et al., 1978). The collection of these inputs and outputs are thus called decision making units (DMUs). The DMUs may vary in accordance with the characters of inputs and outputs. In other words, the

DMUs contain various perspectives of inputs and outputs. Even the DMUs might cover both parametric and non-parametric variables at the same time without a need of building a functional relationship model (Chen & Lin, 2006). For example, in an efficiency research regarding a school, the observations may define various inputs (educational programs) to maximize the outputs (can be like arithmetic scores, psychological attitude, and even students' gestures) with the linear programming.

The DEA model was originally intended to become a performance measurement tool for not-for-profit organizations and since its establishment, the use of DEA varies to profit organizations with its very first model was called CCR (Charnes, Cooper, Rhodes) model (Bowlin, 1998). The model measures performance by assessing efficiency, which means to assess how certain inputs may create certain outputs and the bigger the outputs of certain inputs, it must be more efficient among others (Sherman & Zhu, 2006). And as for the result of the calculation of the DEA, it is deemed efficient for a subset of a data if the result is 1. Hence, if an observational data gets the score of less than 1, it is less efficient. In this context, the DEA's advantage may take place by identifying a set of corresponding efficient units that can be utilized as benchmarks for improvement (Weliandra, 2010). In further discussions, Weliandra (2010) also summarized notifications of paying attention to the model's strengths and possible pitfalls. The research uses the proposed model of input-oriented BCC (Pastor, 1996) to apply a DEA model of mutual funds that emphasizes on the input where it redefines the linear programming model of

the CCR model by capturing returns to scale characteristics and dualing the model, where the input-oriented BCC model is conducted because of its investment appraisal nature of evaluating an assets' historical inputs (Chen & Lin, 2006).

On a concern of reading the final solutions of the objective function provided by the DEA model, objective function result is $0 < \text{Objective} \leq 1$. We define the linear programming's objective function as efficient by possesssing the amount of 1 (100%), DMUs with less than 1 value are deemed inefficient. The objective values can necessarily be ranked where the higher an objective result of a DMU, the more efficient those DMUs are (Cooper et al., 2000). On the other hand, slacks solutions are informative to show the degree of inefficiency of a DMU's variables. It means that the slacks state amounts of number that can be possibly reduced from the DMU's variables to reach efficiency (Banker et al., 2004).

Table 2.5
Summary of the DEA Model Strengths and Challenges

	Strengths	Challenges
1	Multiple inputs and multiple outputs are able to be handled in a single model.	Measurement error is unacceptable at all for the model is an extremely precise model.
2	Functional relationship models are excluded.	Absolute efficiency is not comprehensive.
3	Directly compare decision making units in bundles of observational data from its inputs and outputs.	Hypothesis testing is tough to be done for its nature of non-parametric measure.
4	Significantly different measures may be operated well.	

(Source: Weliandra, 2010)

2.1.6. New risk measures (New DEA model)

Chen and Lin (2006) proposed the term of "new risk measure" as a respond of real statistical circumstances through various previous researches (will be explained on the next sub chapter) and they define it as "properly reflected DEA model to overcome the pervasive skewness and leptokurtosis return distributions of a certain financial data by introducing value-at-risk (VaR) and conditional value-at-risk (CVaR) into inputs of the existing DEA models." Through DEA model, the observation is also able to cover the context of different time of observation by treating different time periods as different decision making units (DMUs). Through the combination of VaR and CVaR with the traditional performance measurements, combination of return distribution description and its financial properties are understandable. Moreover, the DEA model enables researcher evaluates the financial structure of the data.

2.1.7. Global Economic Crisis and Recovery

The global economic crisis was the time of 2007-2009 crises of recession and sheer magnitude caused by the consumer finance that is showed by housing mortgages to affect the corporate finance and finally the global economy (Kuppuswamy & Villalonga, 2010). In Asia, the global economic crisis started to recover in the end of November 2008 where Japan's Nikkei, Hong Kong's Hang Seng, and South Korean's KOSPI experienced daily return jump for more than 1% and this redemption period ended at the end of 2010 (Guillen, 2011).

2.2. Previous Researches

Table 2.6
Summary of Previous Researches

Topic		Important Facts
Traditional performance measurement	1	Markowitz (1952) founded the modern portfolio theory that comprises the two dimension analysis of risk and return.
	2	Treynor (1965) extended the research to grasp the analysis of exceeded return per systematic risk, while Sharpe (1966) continued the research to include the total risk analysis. The Jensen α (1968) provides an understanding of how analyst compare the actual portfolio to the benchmark risk and return.
	3	Chen and Lin (2006) emphasized that those analysis are altogether put into the topic of capital asset pricing model (CAPM).
CAPM Underlying Assumptions Improvement	1	Underlying assumptions that have been discussed in CAPM rose awareness from researchers to look for new solution to real financial data. Thus, variance of portfolio returns as a risk measure and non-normal distributions model was incorporated by firstly using the higher-moments like what Stephens and Proffitt (1991) did.
	2	Then, Sortino and Price (1994) also developed the concept of "downside deviation" in order to analyze deeper concerning the measurement of variance as the portfolio returns risk.
	3	In a further study concerning the variance analysis, Ang and Chua (1979) also defined the reward-to-half-variance index to develop the use of the traditional standard deviation into the square-root of the lower semi-variance to measure the excess return per unit of risk.
	4	In order to capture the nonlinearities in β from market timing activities, conditional CAPM framework was introduced by varying the risk premiums through evaluation techniques, rather than relying on the classic CAPM model like what Ferson and Schadt (1996) found.
	5	In other research, additional influences as functions were included in multi-index models by Schneeweis and Spurgin (1998) and others by also identifying the factors that serve as proxies for the fund risk.
Current models in DEA	1	Even though these developments may define the skewness in portfolio return distributions and the time-varying risk up to a certain level, Chen and Lin (2006) underline the difficulty of the models to be combined into one model in order to describe the "fat tails" phenomenon in return distributions, which are now infamous in risk management literature, moreover the extreme losses which are more concerned by investors (rather than extreme gain) is tough to be included into a single model.

2	Thus, Murthi, et al. (1997) introduced the use of data envelopment analysis for the first time as a relative performance measure. They defined the term DEA portfolio efficiency index (DPEI) that included transaction costs without benchmark specification.
3	The use of DEA into performance measurement of mutual funds was begun by Cooper et al. (2000) due to its ability to incorporate various risk measures and does not require functional relationship. At the time, the research included traditional indexes and investment costs to create the outcome of mean return.
4	The idea of I(DEA-1) was incorporated in the DEA model by Basso and Funari (2001) in order to consider the stochastic dominance of various risk measures that are put into a single model. Basso and Funari (2002) developed the model again into I(DEA-g) to extend the DEA capacity for more risk measures considerations.
5	In certain financial data circumstances, the DEA model was also adapted for example by McMullen and Strong (1998) who developed the concept of different time lengths period in the DEA model and Morey and Morey (1999) who included the concept of multiple time horizon, and so did other researches.
6	One of the most important development in the DEA model was the establishment of the value-at-risk (VaR) concept by Morgan (1996) where quantile-based measures was included for its ability to incorporate risk of investors' concern for extreme loss than extreme gain. This measure is suitable for asymmetric return distributions with fat tails.
7	However, through proper researches considering undesirable properties such as its lack of subadditivity, Artzner et al. (1999) showed that VaR was considered not a single-handedly coherent risk measure.
8	Therefore, Rockafellar and Uryasev (2000) developed the pitfalls in VaR methods into a capable risk measure including conditional expectation of losses that exceeds VaR in a specified period at a given confidence level. The concept was introduced as conditional value-at-risk (CVaR) and it is simpler than the VaR mathematically.
9	Finally, Chen and Lin (2006) proposed a new risk model by combing the whole relevant traditional performance measurement and current DEA models of input-oriented BCC model in accordance with the financial data in order to get the complete DEA model.

[Source: Markowitz (1952), Treynor (1965), Sharpe (1966), Jensen (1968), Chen and Lin (2006)]