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عنوان المقال:

Portfolio construction choice: comparative based behavioral finance and efficient market

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Abstract:

The investor aims, when constructing their efficient portfolio, to choose securities, which provide the maximum expected return in exchange for supporting the lowest possible risk, taking into account the diversification of these securities. Because of the abnormalities observed in the financial market, the behavioral trend emerged since the eighties of the last century. It is based on proving the irrationality of individuals. Research on this trend included many fields, among which financial portfolio construction.

Therefore, this study aims to find out how to choose the best portfolio among the classical trend and the behavioral trend, and to what extent the behavioral finance is able to develop these models and increase efficiency.

To search all aspects of the study, we have addressed the theory of efficient financial markets and the Capital Asset Pricing Model (CAPM) and how to constitute optimal portfolios. We have compared this theory to that of behavioral finance by identifying the most significant anomalies observed in the financial markets that led to the emergence of the modern behavioral trend, and the methodology used in selecting securities for the construction of the behavioral portfolio

Key words: efficiency of financial markets, behavioral finance, optimal portfolios, behavioral theory of portfolio.

الملخص:

يهدف المستثمر عند بناء محفظته الكفؤة الى اختيار الأوراق المالية، التي توفر اقصى عائد متوقع مقابل تحمل ادنى قدر ممكن من المخاطر مع الاخذ بعين الاعتبار تنويع هذه الأوراق، ونظرا للتشوهات الملاحظة في السوق المالي ظهر الاتجاه السلوكي منذ الثمانينات من القرن الماضي الذي يقوم على اثبات عدم رشادة الأفراد، وقد شملت الابحاث فيها عدة مجالات منها بناء المحافظ المالية.

ولذلك تهدف هذه الدراسة الى معرفة كيفية اختيار المحافظ المثلى ضمن الاتجاه الكلاسيكي والاتجاه السلوكي ومدى قدرة المالية السلوكية على تطوير هذه النماذج والرفع من كفاءتها.

وللإحاطة بجوانب الدراسة فقد تم التطرق الى نظرية كفاءة الاسواق المالية ونموذج تسعير الاصول الرأسمالية CAPM وكيفية تكوين المحافظ المثلى وتمت مقارنتها بالمالية السلوكية من خلال التعرف على اهم التشوهات الملاحظة في الاسواق المالية التي ادت لظهور الاتجاه السلوكي الحديث والمنهجية المتبعة في اختيار الاوراق المالية لبناء المحفظة السلوكية .

الكلمات المفتاحية: كفاءة الاسواق المالية، المالية السلوكية ، المحافظ المثلى ، النظرية السلوكية للمحفظة.

Introduction :

Portfolio construction has developed significantly over the last decades, utilising the enormous advancements in computing power, and applying many of the lessons from portfolio theory.

Portfolio construction is ultimately based on the risk can be diversified by adding in assets that are less than perfectly correlated; allowing the portfolio to achieve a better return per unit risk undertaken. From an investor's perspective, portfolio is to be constructed taking into account each investor's risk return preferences, with the **optimal portfolio** resting on the **efficient frontier**. With these two, sometimes competing objectives, and with the extensive assumptions in each, it's no wonder then that portfolio construction is sometimes as a black art.

More recently advances in **behavioral finance** have developed a better understanding of investor preferences and provided insight into the way investors make their decisions. for example, investor preferences on risk are asymmetric with preferences dependant whether the risk results in a loss or a gain ."losses loom larger than gains" implying that volatility on the downside has greater impact on investors; than volatility on the upside.

Furthermore, investors are seemingly unable to contemplate accurately differences in portfolio time horizons where they are greater than a year. So as an example, an investor's finds it difficult to discriminate accurately between a portfolio that has a 5 year time horizon, and a portfolio that has a 7 year time horizon.

In contrast to the **behavioral finance** theory, the efficient market theory indicates the market price of a share of a company's stock reflects the expectations and the knowledge of investors. Supporters of this theory argue that searching for undervalued stocks or attempting to forecast market movements is ineffectual because all developments and projections are do as well or better with a buy-and-hold strategy of arbitrary stocks, the efficient market theory is popular in the financial industry because of the long term capital gains tax advantages it confers and because portfolio, based on this theory, require less attention as they are often based on buy-and-hold strategies. The efficient market theory is still at all the center of market analysis for researchers in the financial comity and investment strategy for individual investors.

-Statement of problem:

portfolio selection has always been one of the subjects of financial theories. Before the 50 th decade of 21st cen-tury, most of financial theories were in form of case study and nonsystematic. harry markowitz (1952) formulated the first portfolio theory, in title of "Modern portfolio theory" hich as the first systematic financial theory. Modern portfolio theory evaluates return and risk of risky assets; using mean-variance pattern, and represents a normative pattern for portfolio choice . this theory assumes economic equilibrium, as the basis for other financial theories like capital assets

pricing model (CAPM) developed by sharp, and efficient market hypothesis by Fama. Fallow up studies such as survey of behavior of stock price showed some anomalies in reality and efficient financial market hypothesis

So, researchers who are always looking for behaviors and reasons of financial markets events,

attempted to explain behavior of decision makers in financial markets, using behavioral science. They explained the limits of rational financial theories such as limits of arbitrage and human cognitive limits. So, irregular behavior was known as an effective factor of economic behavior as well as other economic variables.

Therefore, behavioral economics and behavioral finance attempt to explain economic variables in the framework of and normative theories, better and more accurate, The most important question in this field is:

-What are the factors influencing the choice of portfolio under the traditional financial and behavioral theory?

1-Efficient Market Hypothesis:

An efficient market is defined as a market where there are large numbers of rational, profit maximizes, actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants. In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value." (Fama, 1965) The **Efficient Market Hypothesis** (EMH) has been a central finance paradigm for over 40 years, probably the most criticized too. Fama (1970) defined an efficient market as one in which security prices fully reflect all available information, and hypothesis states that real world financial markets are efficient. Fama goes on to say that it would be impossible for a trading system based on currently available information to have excess returns consistently. The EMH became sensational in the 1970s and a lot of research work-centered on why the hypothesis should hold- developed supported by immense theoretical and empirical success. The University of Chicago, home to the EMH, became the world's center of academic finance. The theoretical foundation of EMH is based on three key arguments (Andersen, Jorgen Vetting, 2010) investors are rational and value securities rationally(Anonymous, 2012) in case some investors are irrational, their trades are random and cancel each other out without affecting prices(Banerjee Arindam, 2010) rational arbitrageurs eliminate the influence of irrational investors on market. The fact that Efficient Market Hypothesis was not purely based on rationality alone but also predicted

efficient markets in cases where rationality did not exist, gave the theory a lot of credibility. The empirical evidence from the 1970s, which only strengthened the cause, fell into two main categories any fresh news about a security should be reflected in its price promptly and completely and (Rahul Subash, 2012) prices should not move as long as there is no new information about the company, since it must be exactly equal to the value of the security. In other words, non-reaction to non-information (Shleifer, 2000).

1-1-Support and Criticism:

Fama (1965) distinguishes between three forms of the EMH the "weak" form efficiency where all past market prices, returns and other information are fully incorporated in prices, which makes it impossible to earn credible risk-adjusted profits based on historical data. This renders technical analysis useless the "semi-strong" form states that it is impossible for investors to earn superior returns using publicly available information since they would already be incorporated in the prices. This renders fundamental analysis useless the "Strong" form of EMH states that all information, public and private, are fully reflected in securities prices. This would mean that even insider information would not help an investor land superior returns. Much of the evaluations have been based on the weak and semi-strong form efficiency since it was difficult to accept the strong form, and there was also evidence that insiders did in fact earn abnormal returns even while trading legally. In support of weak form efficiency Fama (1965) found that stock prices followed a random walk pattern. The semi strong efficiency was tested by event studies – studies where effect of various news 'events' on share prices were studied – pioneered by Fama et al (1969).

The EMH peaked when it was declared by Michael Jensen – one of the inventors of EMH – that there is no other proposition in economics which has more solid empirical evidence supporting it than the Efficient Markets Hypothesis". Shortly after this the EMH was challenged both on both the empirical and theoretical front. Grossman and Stiglitz (1980) argued that it was impossible for efficient markets to exist since information has a cost associated with it, and prices will not perfectly reflect available information, since if it did, there would be no incentive for investors to spend resources to obtain it. Investors are likely to act based on what they perceive to be relevant information, while this may actually be irrelevant, thus deviating actual prices from its fair value. Kahneman and Riepe (1998) showed that people deviated from the standard decision making model in key fundamental areas for e.g. based on varying risk appetite levels. Kahneman and Tversky with their theories – to be discussed later - provided psychological evidence that people did not deviate from rationality in a random manner. They showed that investors were unlikely to randomly trade between each other, and more likely to buy or sell at the same time. Shiller (1984) and Summers (1986) provided empirical evidence to

show that returns were predictable to some extent which contradicted the existing market model assumption of constant expected returns. This raised eyebrows about the credibility of the testing of EMH done until the 1980s based on this model (Rahul Subash, 2012) .

1-2-Capital Asset Pricing Model (CAPM):

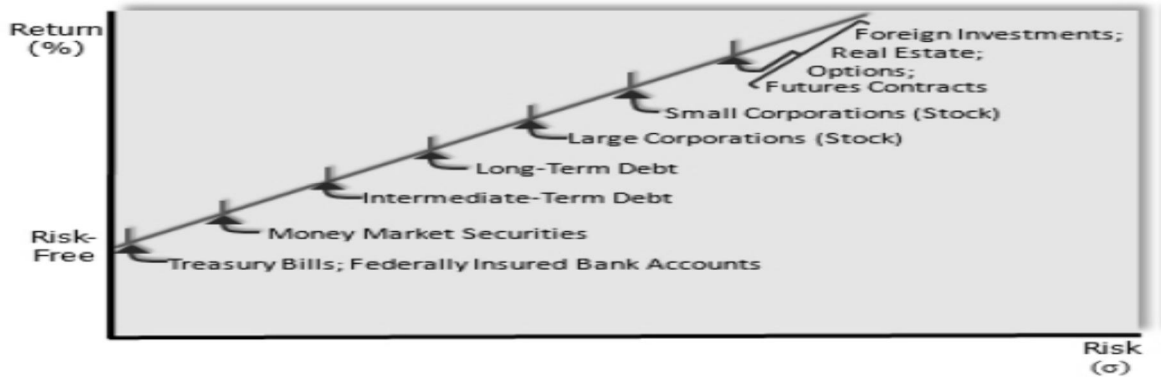
The Markowitz portfolio theory developed the **efficient frontier** and provided the investor with a way to choose **efficient portfolios**. Capital market theory, which was further advanced by William F. Sharpe and others, extends the Markowitz portfolio theory by developing a mathematical model for pricing risky assets. This model, the capital asset pricing model (CAPM), provides a required rate of return for any risky asset.

The **Capital Asset Pricing Model** is among the most important concepts found in finance, and has two forms: micro and macro. The first form, the "macro" version, is called the capital market line (CML). The capital market line looks at risk and return as applied to a portfolio of assets and the risk used to calculate the CML is standard deviation. The second form of the CAPM, the "micro" version, is called the security market line (SML). The security market line looks at risk and return as applied to a specific asset. The risk used to calculate the SML is beta, and the SML is the one widely used by analysts since it is applicable with both individual stocks and funds. When the CFP Board refers to the CAPM and does not specify which form is being addressed, it is the security market line (SML) that is being referred to, not the capital market line (CML), since the SML can be used for individual assets(Craig Kinnunen, 2012).

1-2-1-Capital Market Line (CML):

Here is what the capital market line, the macro version of the CAPM, looks like, showing what happens as you add riskier assets to the portfolio—both risk and return go up:

Figure 1: A Pragmatic Capital Market Line



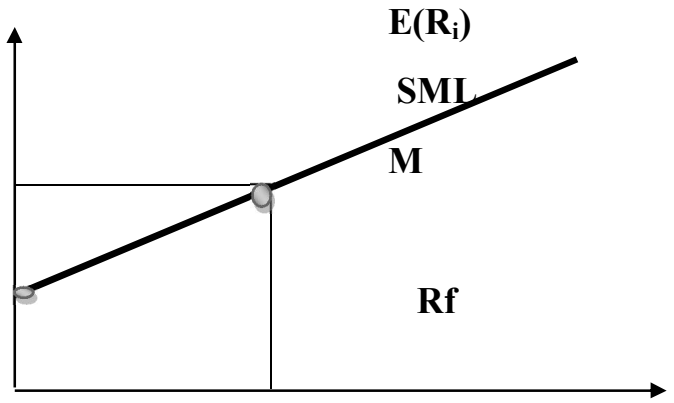
Source: Craig Kinnunen, **Modern portfolio theory & behavioral finance**, college for financial planning, 2012, p.13

The formula to calculate the CML looks like this: $r_p = r_f + \sigma'_p \{\frac{r_m - r_f}{\sigma_m}\}$

1-2-2- Security Market Line (SML): Recall that beta is defined mathematically as follows: $\beta = \frac{S_i}{S_m} . R_m$

Recall that all portfolios (including the market portfolio) that are located on the capital market line have a correlation coefficient of +1.0 with one another and are fully diversified. When a correlation coefficient of +1.0 is plugged into the formula, beta becomes the standard deviation of the portfolio divided by the standard deviation of the market. Thus, when we are looking at a fully diversified portfolio, all the unique (unsystematic) risk has been eliminated, and beta is the only necessary risk measure we need(Craig Kinnunen, 2012).

Figure 1: Security Market Line



Source: Craig Kinnunen, **Modern portfolio theory & behavioral finance**, college for financial planning, 2012, p.13

1-2-3-Diversification:

Many investors are **over-diversified**. As discussed earlier, not many individual securities are required to eliminate unsystematic risk. Many studies suggest that 10 to 15 large cap U.S. stocks in different industries are sufficient. Some studies suggest that 20 to 40 individual securities, or more, are required. An investor should be careful to differentiate between large-cap and small- to mid-cap stocks when determining the proper number of stocks to diversify away unsystematic risk. A rule of thumb is that it takes about twice as many small- to mid-cap stocks, as compared to large-cap stocks, to achieve the same diversification effect. In any event, the number is not large. Yet, many investors own hundreds of stocks through investments in mutual funds. A study by Kobren Insight Group reported that more than 75% of investors own more than 10 mutual funds in their **portfolios.** Many mutual funds own more than 100 individual issues. Therefore, many mutual fund investors own thousands of individual issues indirectly(Craig Kinnunen, 2012).

1- 2-4-Overlap:

What is also a concern is the overlap from one fund to another. If an

investor owns too many large-cap funds, he may find that the top 10 holdings of each fund have many of the same stocks. This is known as an overlap effect. How many times does an investor have to own Microsoft or General Electric, for example: With so many individual issues owned, there is little wonder that many investors have trouble beating the indexes. In effect, these investors have created their own huge index fund.

1-2-5-Correlation:

A second major element in the construction of investment portfolios is deciding which types of securities to assemble into a portfolio. The key to this decision is using covariance and correlation coefficient. The ideal portfolio is one in which the correlation coefficients of the assets added to the portfolio are low. Long term correlation coefficients are available through resources such as Ibbotson Associates' annual publication, Stocks, Bonds, Bills, and Inflation.

Table 1: Correlation of Returns Among Asset Classes (1970–2013)

	Intl-stock	Large-cape	Smail – cap	Long Term corp Bond	Long Term cov't Bond	Inter-mediate cov't Bond	T-Bill	inflation
Intl-stock	**1.00**							
Large-cape	**0.66**	**1.00**						
Smail – cap	**0.50**	**0.73**	**1.00**					
Long Term corp Bond	**0.02**	**0.22**	**0.06**	**1.00**				
Long Term cov't Bond	**-0.13**	**0.00**	**-0.15**	**0.89**	**1.00**			
T-Bill	**-0.03**	**0.04**	**-0.02**	**0.05**	**0.09**	**0.36**	**1.00**	
inflation	**-0.01**	**0.12**	**-0.01**	**-0.35**	**-0.28**	**-0.1**	**0.66**	**1.00**

Source: Craig Kinnunen, **Modern portfolio theory & behavioral finance**, college for financial planning, 2012, p.13

Using correlation information such as this, an investor might construct a portfolio that includes large company stocks, small company stocks, stocks and bonds from developed countries, emerging market stocks, intermediate-maturity bonds, and short-term bonds. One might also include commodities or real estate. Studies have found that selecting from four to seven asset classes provides sufficient diversification

For the initial construction of a portfolio, long-term statistics on correlation coefficients may have to suffice. The trade-off is that, over the recent period, short-term correlation coefficients may be higher than the long-term average. Assuming a reversion to the mean, the short-term divergence may be corrected over time, but this may not always be the case. With the global economy we have seen an increasing correlation between the U.S. markets and the developed

International markets over time.

1-3-Efficient Portfolios:

Cost-effective computer software now exists to help advisers design investment portfolios that lie on the **efficient frontier**. Remember that this approach is also referred to as the mean-variance optimization approach. When using this approach, investors are striving to optimize their amount of return (mean) for any given level of risk (variance, and our measure of risk is standard deviation). Or, looked at the other way, investors are trying to take only as much risk as necessary to achieve a given level of return. In addition to looking at return and standard deviation, the interaction between one asset and another is also important (correlation). Mean-variance optimization requires looking at the return and standard deviation of each asset, as well as the correlation of each asset with every other asset.

Generally, programs that construct **efficient portfolios** can be helpful to advisers and investors.

However, sometimes they give asset allocations that might be difficult for advisers and investors to accept. Their outputs are very sensitive to the input factors, including expected return, the standard deviation of each asset class, and the correlation coefficients among the asset classes. The future may not always resemble the past, and estimating these factors or using historical

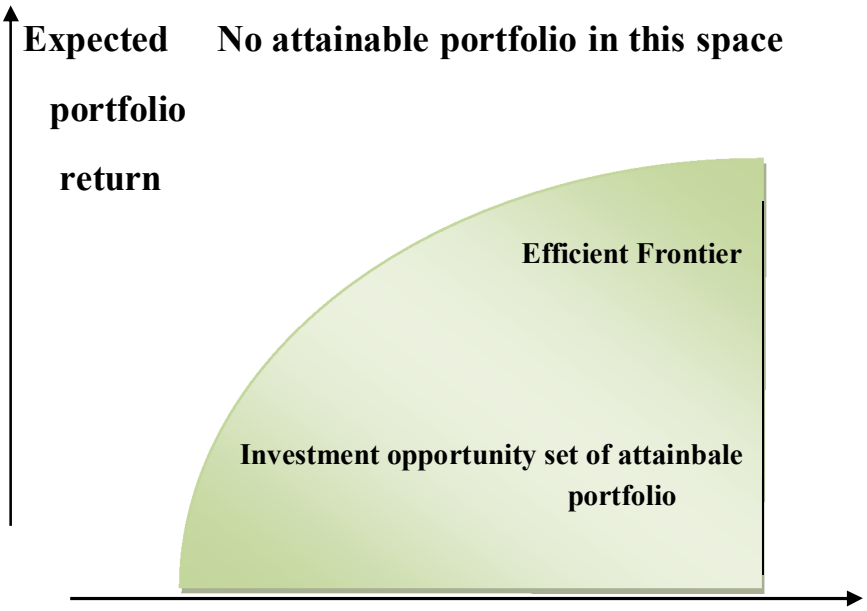
Relationships and averages may be less than accurate(Modern portfolio theory : efficient and optimal portfolio, 2012). If correlations increase then investors lose some of the benefits of diversification[9].

1-4Efficient Frontier:

Because portfolios can consist of any number of assets with differing proportions of each asset, there is a wide range of risk-return ratios. If the universe of these risk-return possibilities-**the investment opportunity set**- were plotted as an area of a graph with the expected portfolio return on the vertical axis and portfolio risk on the horizontal axis, the entire area would consist of all feasible

portfolios-those that are actually attainable-. In this set of attainable portfolios, there would be some which have the greatest return for each risk level, or, for each risk level, there would be portfolios that have the greatest return. The **efficient frontier** consists of the set of all **efficient portfolios** that yield the highest return for each level of risk. The **efficient frontier** can be combined with an investor's utility function to find the investor's **optimal portfolio**, the portfolio with the greatest return for the risk that the investor is willing to accept.

Figure 2: Efficient Frontier



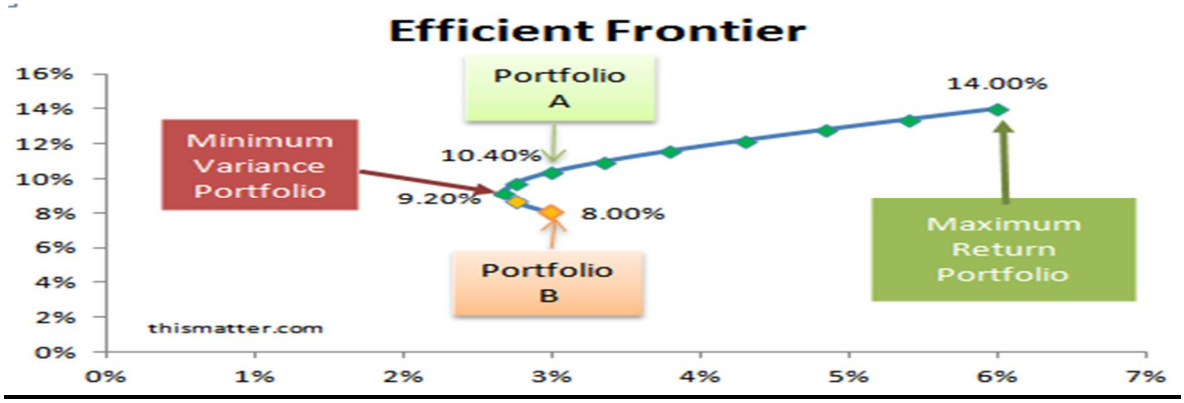
Portfolio risk

On the **efficient frontier**, there is a portfolio with the minimum risk, as measured by the variance of its returns -hence, it is called the **minimum variance portfolio** - that also has a minimum return, and a **maximum return portfolio** with a concomitant maximum risk. Portfolios below the efficient frontier offer lower returns for the same risk, so a wise investor would not choose such portfolios.

Below is a diagram constructed by combining an Asset A that has an expected return of 14% and a standard deviation of 6%, with an Asset B that has an expected return of 8% and a standard deviation of 3%, into various portfolios by changing the weighting for each asset in each portfolio. All of the portfolios consisting of these 2 assets lie on the graph below, which is the investment opportunity set. The **efficient frontier** extends from the minimum variance portfolio to the maximum return portfolio. Two of the portfolios lie below the efficient frontier. These 2 portfolios will yield a smaller return for the same risk as those on the efficient frontier. For instance, if an investor did not want to assume any greater risk than that offered by Portfolio A and

Portfolio B, then the investor would choose Portfolio A over B, because both have the same risk, but Portfolio A returns 10.4% while Portfolio B returns only 8%. Portfolio B consists only of Asset B, the maximum return portfolio consists only of Asset A. Note that the minimum variance portfolio not only has a greater expected return, but also a lower risk than a portfolio consisting only of Asset B.

Figure 3: efficient frontière



Source: http://thismatter.com/money/investments/modern-portfolio-theory.htm

1-5-Utility value and risk aversion:

Most investors will assume a greater risk for a greater return. However, investors differ in the amount of risk they are willing to take for a given return. Investors who are **risk averse** require a greater return for a given amount of risk than a**risk lover**. A **risk-neutral** investor is only concerned with the magnitude of the return. However, most investors are risk averse to varying degrees.

Although investors differ in their risk tolerance, they should be consistent in their selection of any portfolio in terms of the risk-return trade-off. Because risk can be quantified as the sum of the variance of the returns over time, it is possible to assign a **utility score** (**aka utility value**, **utility function**) to any portfolio by subtracting its variance from its expected return to yield a number that would be commensurate with an investor's tolerance for risk, or a measure of their satisfaction with the investment. Because risk aversion is not an objectively measurably quantity, there is no unique equation that would yield such a quantity, but an equation can be selected, not for its absolute measure, but for its comparative measure of risk tolerance. One such equation is the following utility formula (Modern portfolio theory : efficient and optimal portfolio, 2012):

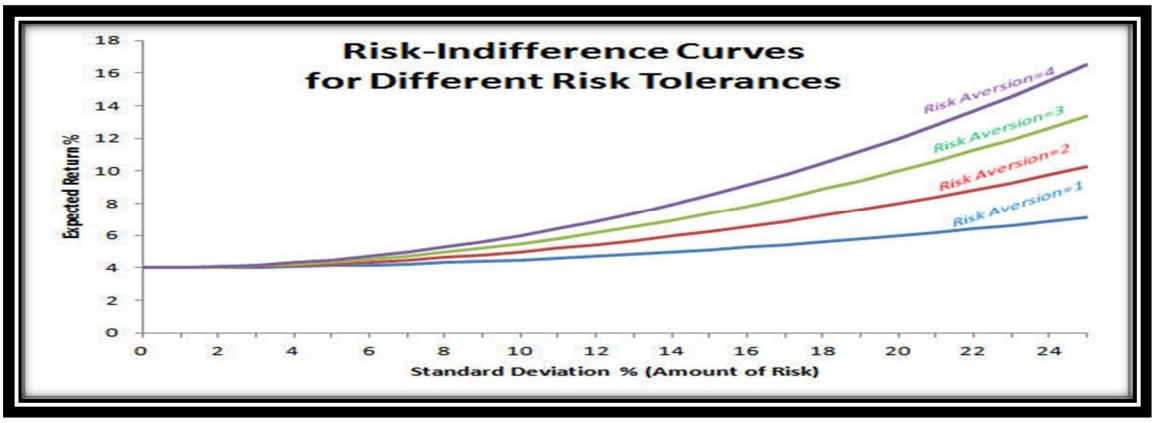
Utility Score = Expected Return – $0.005\sigma^2$ × Risk Aversion Coefficient

Another way to measure the risk averseness of an investor is by comparing the desirability of a risky investment to a risk-free investment. The **certainty equivalent rate** is the rate of return of a risk-free investment

that would be equally attractive as a risky investment. Since the utility score of a risk-free investment is simply its rate of return (in other words, the variance of a risk-free investment is considered zero, hence the 2nd term of the utility score formula is zero), the certainty equivalent rate would equal the utility score of the risky investment. So for the 1st investor above, a risk-free yield of 5.75% would be equally attractive as XYZ stock yielding a risky 12%, while the 2nd investor would only consider XYZ stock if the risk-free rate were only 2.625%. In other words, each investor would **bein different** to either investment if the risk-free rate were equal to their certainty equivalent rate .

The set of all portfolios with the same utility score plots as a **risk-indifference curve**. An investor will accept any portfolio with a utility score on her risk-indifference curve as being equally acceptable.

Figure 3: Risk –Indifference Curves for Different Risk Tolerances



Source:

However, there are many possible portfolios on many risk-indifference curves that do not yield the highest return for a given risk. All of these portfolios lie below the efficient frontier. The **optimal portfolio** is a portfolio on the efficient frontier that would yield the best combination of return and risk for a given investor, which would give that investor the most satisfaction.

1-6-Stock Market Anomalies:

Stock market anomalies reflect behavior that contradicts the efficient market hypothesis, in other words, anomalies show that it may be possible to "beat the market." These anomalies have been identified and studied but can change and evolve over time. So investors have to be careful about treating these as trading rules (Craig Kinnunen, 2012) .

Table 3: Stock Market Anomalies

Anomaly	Description
January effect	Buy stocks in december qnd sell in january of each year (especially small stocks)
Dividend-yield anomaly	Buy stocks with high dividend rates
Weekend effect	Buy stocks on Mondays
Low P/E	Low P/E stocks outperform high P/E stocks
Size (small firm) effect	Small –cap stocks outperform larde-cap stocks
BV/MV effect	Stocks with high book to market price outperform stocks with low book to market price
Neglected firm effect	Buy stocks followed by few analysts
Value Line effect	Stocks rated 1 in value line outperform stocks rated 5

Source: Craig Kinnunen, **Modern portfolio theory & behavioral finance**, college for financial planning, 2012, p.27.

1-6-1- January effect:

The January effect anomaly strives to take advantage of lower prices in December (in part due to tax selling), and then sell at higher prices at the beginning of the year. Studies done in other countries that do not have our tax laws also found abnormal returns in January, so the tax selling explanation may not be the reason (or the entire reason) . Like many of the anomalies, they often raise as many questions as they answer. One thing to note about the January effect is that as more and more investors have become familiar with it and have tried to benefit from it, it has moved up in time. So part of the January effect is now occurring in December, or even earlier.

1-6-2-Dividend-yield anomaly:

This anomaly found that over time, stocks paying higher dividend rates tend to outperform stocks paying lower dividend rates.

1-6-3-Weekend effect:

Research has found that stocks tend to peak in value on Friday, and then they generally decline in value on Monday. So the time to buy is on late Monday, and sell on late Friday. The problem with this anomaly is that over time the price movements may not be enough to cover transaction costs.

1-6-4-Low P/E effect:

According this anomaly, investing in stocks with low price-toearnings ratios is the best way to make money in the market. Studies have shown that generally low P/E stocks do outperform high P/E stocks over time.

1-6-5-Size effect:

This is also referred to as the "small-firm effect." Studies have shown (such as the numbers published by Ibbotson) that over time, small firms do outperform large firms. Bear in mind, though, that the variability of returns (standard deviation) of small firms can be nearly twice that of large firms.

1-6-6- BV/MV effect:

The book value to market value effect comes from studies that show stocks with high book values relative to their market value tend to outperform stocks that have lower book value relative to their market value. This means that the higher the book value relative to market value, the more likely the stock may be undervalued.

1-6-7- Neglected firm effect:

The neglected firm effect is from studies that have shown stocks followed by few or no analysts tend to outperform stocks followed by many analysts. Some believe that the neglected firm effect is just an extension of the small firm effect, since many "neglected" firms also tend to be small.

1-6-8- Value Line effect:

Value Line researches stocks and then gives a rating for timeliness, with "1" being the highest rating, and "5" the lowest. Research has shown that investing in the stocks ranked "1" over time has provided superior results, but frequent trading will increase transaction costs and reduce returns.

2-Definition of financial-behavioral:

Behavioral finance attempts to explain and increase understanding of the reasoning patterns of investors, including the emotional processes involved and the degree to which they influence the decision-making process. Essentially, behavioral finance attempts to explain the what, why, and how of finance and investing, from a human perspective. For instance, behavioral finance studies **financial markets** as well as providing explanations to many stock market anomalies (such as the January effect), speculative market bubbles (the recent retail Internet stock craze of 1999), and crashes (crash of 1929 and 1987). There has been considerable debate over the real definition and validity of **behavioral finance** since the field itself is still developing and refining itself. This evolutionary process continues to occur because many scholars have such a

diverse and wide range of academic and professional specialties.

In reviewing the literature written on **behavioral finance**, our search revealed many different interpretations and meanings of the term (Zeineb Rezaei, 2013). The selection process for discussing the specific viewpoints and definitions of **behavioral finance** is based on the professional background of the scholar.

2-1-Financial Behavioral Theory:

There is huge psychology literature which proves with evidences that people commit systematic errors in their thought. They always decide easily, have high confidence and value current experience (agency), separate decision making which must be merged (intellectual accounting), mistake in individual problems (frame), tendency for slow changes (conservatism) and their regulations prevent losses and meet achievements.

Financial behavioral uses models that in them some next factors are rational because of regulations or wrong beliefs. In the case of regulations, it is assumed that people oppose losses, because they are bas Bayesians (statistical methods, probability, guess), there are wrong beliefs. Most of the basic **financial-behavioral** theories are concerned with a series of new concepts called "limited rationality", a term which is associated with Herbkst Simon (1947, 1983). This term relates to cognitive limitations in **decision making**. As a result, behavior of human is built based on simplified methods and innovations (Torskey and Conman, 1974). This is consistent with the study of Slavy (1972) on risk taking behavior of investor. He found that human had limitations as a processor of information and showed some judgment prejudices which guide people in the direction of extra information. Individuals are inclined to show extreme reaction to information (DeBandet and Thaler, 1985, 1987). Shiller (1999) presented some key ideas in **financial-behavioral** including landscape theory, regret theory, stabilization, extreme and less sensitivity. Landscape theory by Comnan and Torsky (1979, 1981, and 1986) showed that people give different answers to same situation depending loss theory.

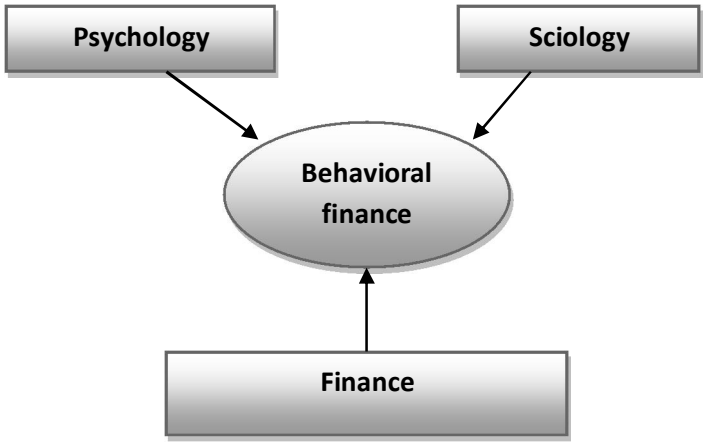
Generally, investors in loss landscape are anxious and are consent with likely achievements. Sometimes they face certain profit. Most of the investors escape from risk but in encountering certain loss they become risk takers. According to Conmon theory, investors hate losses. This hatred of losses means that they take more risks to avoid losses and increase gains. Hatred of losses explains this essential notion that although investors are optimists about predictions (this stock is certain), but they are inclined to lose less money than earn.

2-2-The Foundations of Behavioral Finance:

Discussions of behavioral finance appear within the literature in various forms and viewpoints. Many scholars and authors have given their own interpre- tation and definition of

the field. It is our belief that the key to defining **behavioral finance** is to first es- tablish strong definitions for psychology, sociology and finance (please see the diagram located below).

Figure 4: The Foundations of Behavioral Finance



Source: Zeineb Rezaei, **The study of behavioral finance effect on investors behavioral**; journal of novel applied sciences; 2013. P.563

2-3-What investors want…an asymmetric portfolio:

Modern Portfolio Theory provided the environment that allowed the variance in asset prices to be used as a proxy for risk. This elegantly simple approach allowed a readily available set of tools to be applied to modelling portfolio characteristics and allowed a rigour to be brought into the process. Using the statistical methods of determining correlation coefficients, equities could be analysed and the covariance of the relevant equities employed as a method to represent the reduced "riskiness" of the portfolio (John Livanas, 2006).

So, for example, if the distribution of the expected price of inequity was expected to be normal, this equity's expected mean and variance would completely describe its risk-return characteristic. Correspondingly, the expected mean, variance and covariance of two equities in a two-equity portfolio would determine the expected risk-return characteristics of the portfolio. Risk in this context is merely accorded the proxy of the expected distribution of returns, either side of the mean.

2-4-The roles of behavioral factors:

They are numerous identified psychological biases in behaviorale finance literature .each has implications on financial decision-making and behavior. The table shows the nine biases analyzed, their key effects on investors and its consequences (Rahul Subash, 2012).

Table 04: key effects on investors and its consequences

Name of bias	Key many trades, too much risk, failure to diversify	Pay too much brokerage and taxes, chance of high losses
Representativeness	Tendency to associate new event to known event and make investment based on it	Purchasing overprised stocks
Herding	Of individuality in decision making	Purchasing overpriced stocks
Anchoring	Tendency to consider logically irrelevent price level as important in the process of decision making	Missed investement opportunities, or bad entry timing into the market
Cognitive dissonance	Ignore new inforrmation that contradicts known beliefs and decisions	Reduced ability to make rational and fair investement decisions
Regeret aversion	Selling winners too soon, holding losers too long	Reduced returns
Gamblers fallacy	Taking too much risk after a lucky win	Chance of high losses
Mental accounting	Low or no diversification	Irrational and negative effects on returns
Hindsight	The tendency to feel that a past event was obvious when it really was not, at onset	Incorrect oversimplification of decision making.

Source: Rahul Subash, **Roles of behavioral finance in portfolio investment decisions: evidence from India**, master thesis, Charles University in Prague, faculty of social sciences, 2012, p.27.

2-5- Churn, and implications for portfolio design:

Two complexities arise however when portfolio design is expanded to include multiple investors in a pooled portfolio. Firstly, the individual time horizon for individual investors will in itself be dispersed.

Investors capacity and timing to invest, and requirements to be paid out, will vary significantly amongst investors, dependant on each investor's individual circumstance. In addition, the investor's investment into a pooled portfolio is often one of a number of investments with differing time horizons.

Furthermore, indicated that investors often do not discriminate based on the time horizon of the pooled portfolio in selecting portfolio options.

Secondly, the mean time horizon of the portfolio itself, will also vary, dependant on money flows from investors, timing of investment income, payment of tax, fees and

other costs, etc. As a result, selecting the appropriate time horizon for a pooled portfolio is often complex. (Paradoxically, the time horizon of a defined benefit fund is often more predictable, with constraints on timing of the cashflows often imposed by the trust deed). Consequently any portfolio design is a compromise, and to talk about optimising the time horizon for a pool of investors is not defendable. Techniques to determine the appropriate time horizon of a pooled portfolio could be borrowed from Bond Theory, and it might be useful to use the Macaulay Duration calculation to derive the time horizon of the portfolio.

Using the calculation for the Macaulay duration, discounting the expected cashflows with the risk free rate, the Expected time horizon of the portfolio can be modelled as follows (John Livanas, 2006):

$$E(Hp) = MEAN \{ S [1/(1+Rf)^t * (E(FI_t) - E(FO_t)) * t] \}$$

Where E(Hp) is the expected mean time horizon of the expected net flows of the portfolio, E(FIt) and E(FOt) are the times of expected funds inflows and outflows at time t, over period N, and Rf is the risk free rate. Therefore, the only defendable method of developing a perspective of time horizon for a portfolio is to model the flows of assets into and out of the portfolio. In superannuation with significantly positive flows, the time horizon of the portfolio can in fact be decades. This has very significant implications for the asset classes selected and the modeling of the portfolio characteristics.

2-5-BT-MA: Behavioral portfolio theory with Multiple Accounts:

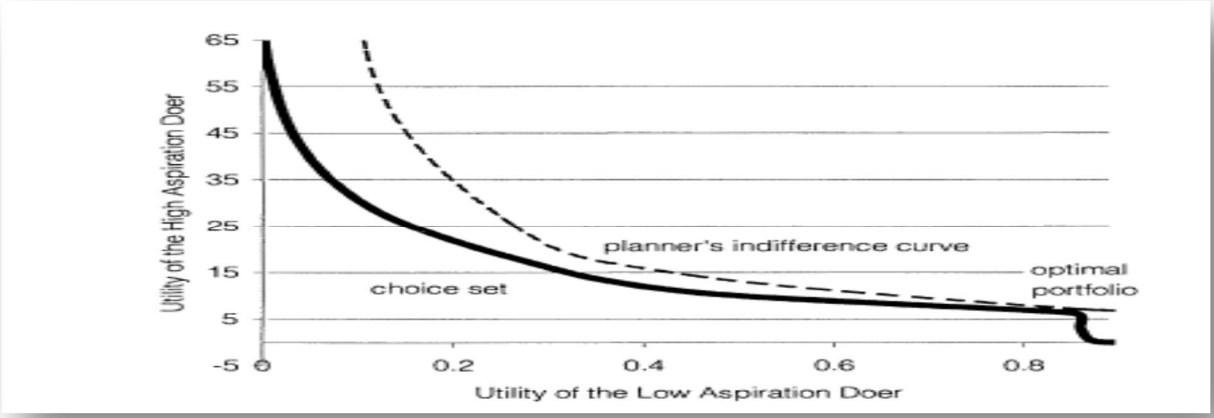
Some investors have low aspirations and others have high aspirations, exclusively. Most investors combine the two, they want to avoid poverty, but they also want a shot at riches. Portfolios that combine low and high aspirations are often depicted as layered pyramids where investors divide their current wealth between a bottom layer, designed to avoid poverty, and a top layer, designed for a shot at riches.

Mental accounting is the feature that underlies the difference between BPTSA, the single account

version of BPT, and BPT-MA, the multiple account version. BPT-SA investors act as if they consider covariances they integrate their. Portfolios into a whole. BPT-MA investors act as if they overlook covariances-they segregate their portfolios into distinct mental accounts. This feature is captured in the adage "people keep their money in separate pockets[16].

Tversky and Kahneman (1986) present evidence of the difficulty that co-variance and other properties of joint probability distributions impose on mental processes. People simplify choices by dividing joint probability distributions into mental accounts and in the layered pyramid structure of portfolios.

Figure 4: The Choice Set of BPT-MA Portfolios Available to a Planner with Two Doers and the Optimal Portfolio of a Planner



Al accounts and in the layered pyramid structure of portfolios . There is considerable evidence, from experiments and practice, that investors overlook co-variances. Kroll, Levy, and Rapoport (1988) conducted experiments where three groups of subjects were given expected returns and the variance covariance matrix of three securities, A, B, and C, and asked to form portfolios. The correlations between A and B and A and C were set at zero for all three groups, but the correlation between B and C was set at zero for the first group, at 0.8 for the second group, and at -0.8 for the third group. The differences be-tween the co-variances set for the three groups are such that if the subjects in the three groups considered co-variances, the average proportion allocated to each of the stocks would have been different across the three groups. Yet Kroll, Levy, and Rapoport find no significant differences between the portfolios of the three groups. In essence, subjects ignored co-variances as they constructed their portfolios.

BPT-MA investors match mental accounts with goals. The two mental accounts are not integrated. As a result, BPT-MA investors may take offsetting positions, borrowing for leverage in their high aspiration

accounts, while they lend in their low aspiration accounts.

Conclusion:

Behavioral finance, a study of the markets that draws on psychology, is throwing more light on why people buy or sell the stocks they do - and even why they do not buy stocks at all. This research on investor behavior helps to explain the various 'market anomalies' that challenge standard theory.

The field merges concepts from financial economics, psychology and sociology in an attempt to construct a more detailed model of human behavior in financial markets. Currently, no unified theory of behavioral finance exists. Shefrin and Statman, (1994) began work in this direction, but so far, most emphasis in the literature has been on identifying behavioral decision-making attributes that are likely to have systematic effects on financial market behavior. Even as behavioral factors undoubtedly play a role in the decision-making processes of investors, they do not quash all the predictions of efficient market theory; they offer plausible explanations of financial markets which would otherwise be categorized as anomalous. The current state of

research from the efficient market and behavioral perspectives therefore suggests that an inclusive and diverse approach in the choice of theoretical explanations of the behavior of financial markets will be the pragmatic response to the inconclusive results on either side of the debate.

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