CREATING OPTIMUM PORTFOLIO IN EFFECTIVE FINANCIAL MARKETS: A RATIONAL BEHAVIOR

Reza Nazari
Department of Accounting, Tabriz Branch, Islamic Azad University, Tabriz, Iran
Email: nazari@iaut.ac.ir

ABSTRACT
In this article, a mathematical model of the effective financial market in which an investor behaves rationally has been looked through in this regard. In this model, a rational behavior is characterized by each investor to have the optimum portfolio. Thus, there are not any opportunities for the arbitration since the prices of financial instruments are fair in this regard.

KEYWORDS: Firm’s Size, Return, Risk, investor, bond, share, call option, efficient financial market, speculative Security, average of distribution. Rational behavior

INTRODUCTION
A comprehensive definition of the investment is subjected to the results of capital and increasing financial media and market and this structure may be operative due to a series of operational system. The majority of these operations are related to the financial markets and absorbing these structural operations. Fulfilling these operations and sharing in the related operations have been designed in the following diagram long with structures and financial market Investment in its public meaning includes an operational system for increasing the investment value and other existed properties and conserving its property and capital in the lack of probability of the mentioned increasing. The great part of this operation is done by using the tools and financial structures. The relationship among the fields of applications, structures of participants in it and financial markets can be drawn as below:

![Diagram of Investment Relationships]

According to above figure, the main status in operating was for financial marketing and this issue is considered completely in analyzing the financial situation so that analyzing the continued financial marketing as the important problem of the financial analyzing and financial engineering has attracted the most attentions (Musayev and Qahramanov, 1999; Sadeqov et al., 2007).

The characteristics of fields and structures shown above can be explained as below:
Personal investors- in economic modeling, the financial activities of this group of investors are adverted to the using-saving and placing fields by using the “optimizing” methods. Moreover, according the optimizing theory of Fon Neiman-Morgan, the personal investors can attend to quantity evaluation financial decisions and or every other activity. Companies (companies, cooperation, …) - companies in addition to facilities which the personal investors have, act by having the ground, factory, machinery and other facilities in different economic, and attend in managing the capital and creating the production process fields and attend to spread and sell the stocks and bonds (Valiyov, 2008).

Broking structures:
- the broking structures include the: banks, cooperating investment companies, retiring bases, insurance companies, exchange, buying and selling the stocks and bonds (Orucav, 2010).
Financial markets: the financial markets are formed from exchanges, bank accounts, valuable metals and different currencies. The exchanges are considered as the financial tool because of the brokering role which they play. The financial tools are divided into two groups:

1) **Main financial tools:** A) Bank accounts B) Shares C) Exchanges
2) **The subsidiary financial tools:** A) Options - B) Future Contracts - C) Varrants - D) Swap - E) Combination F) Spreads G) Settlements

The financial tools belong to first group contribute mainly to increase the value of investment and the second group contributes to conserve the capital’s value; that is, decrease or destroy the financial operation risks and investment. In situations which the unsuitable condition is governed on market, describing the certain perspective about results of investing and financial activities will be impossible so, accepting some parts of hypotheses through the successful in analyzing the conditions of markets will be necessary. In analyzing as contemporary method, three hypotheses will be accepted:

1. The markets’ participants think about principal of prohibiting the other participants for accessing the income.
2. Without attending to the unsuitable condition ruling on markets, the possible situation of markets is unforeseen; it is possible to analyze the paying financial markets by considering the similar conditions which were existed in the past in these markets and or other markets, it means that the future situation of the markets will be similar as the condition in the past. From theoretical perspective, the concept of this issue is that the probability theory and mathematic and statistical methods will be used in analyzing the situation and future action of the behavior of markets.
3. for analyzing the changes in markets’ costs, it is possible to mention the special probabilities by using the statistical data about changes of costs in special period of past time. In relation to this fact, enough information in publishing related to the economic issues through the world has been presented. By accepting these information, counting a part of quantities will be possible:

In base of 3 important above hypotheses, the different models of markets have been created which are mentioned below:

Effective financial markets act reasonably; that is,

**RESULTS**

The cost changing process of markets doesn’t have discipline.

Cost changes has been functioned similarly with foreign changes, after a while it is done “justly”. On the other hand, these markets make income impossible to market participants by Speculation.

All participants have gotten all information about markets similarly and evaluated it, and they can correct their decisions temporary. Each one of participants considers the personal profits and tries to access the high income. In portfolio which is formed in effective markets, there are no exchanges which have high value. In markets like this, the mathematical model of markets will lean back to the theory of “amorphous motion”.

The ideal financial markets- in these markets, the optimum portfolio structure should be the mirror of the structures of its markets and repeater; that is, the share of portfolio risk should be same as the risk of exchanges in markets. This is the result of Tobin.

Here, we attend to explore the model of mono-portfolio in the effective financial markets.

Imagine the i investor specifies a part of \( x_{i0} \) his capital \( K_{i0} \) to buyer of the exchange without any risk and specifies the other part \( x_{ij} \) to buyer of exchange of type \( j \), \( (j = 1, n) \). If the total value of exchange type \( j \) is \( d_j \), so we have:

\[
K_{ij} = x_{i0} + \sum_{j=1}^{n} x_{ij} d_j
\]

If the random profitability of the risk exchanges in quantity markets \( G \) and the total volume of capital \( k \), the investor \( i \) will find the share of investment on the exchanges by maximizing the profitability and tries to optimum invest:

\[
u : (KG) = KG - R_i (KG - Km_p)^2, \quad m_p = M[G]
\]
Here, the sample $R_i$ shows the contact of investor $i$ with risk issue and $M$ shows his mathematical expect from investment.

As it was mentioned above, by attention to this fact that in effective markets, each investment tries to optimum investment, the effect of the risk part of their portfolios was similar and equals to the quantity of $d^*$.

If the investor $i$ invests his primary capital of share $x_{i0}$ on the exchange without any risk so, his capital will be equal to:

$$K_i^1 = x_{i0}K_i^0(1 + r_0) + (1 - x_{i0})K_j^0(1 + d^*)$$

The average profitability of this capital will be as below:

$$f_i(x_{i0}) = M[u_i(K_i^0d)] = x_{i0}K_i^0r_0 + (1 - x_{i0})K_j^0m^* - R_i(1 - x_{i0})^2(K_i^0)^2D^*$$

Here $m^* = M[d^*]$, math expect, and $D^* = D[d^*]$ $D$ is its variance. Then we can access the values of $x_{i0}$ which give the maximum value to the functions of the square $f_i(x_i)$ from condition $f_i(x_{i0}) = 0$.

$$x_{i0}^* = 1 - \frac{m^*}{R_iK_i^0D^*}$$

In this condition, all investors will invest more.

$$\sum_{i=1}^{N} (1 - x_{i0}^*)K_i^0 = \frac{m^* - r_0}{2D^*} \sum_{i=1}^{N} \frac{1}{R_i}$$

If the total value of exchange in markets is $d^*$ and the total value of capital specified to exchange is equal to $d^*$; so, there will be balance between supply and demand.

$$\frac{m^* - r_0}{2D^*} \sum_{i=1}^{N} \frac{1}{R_i} = d^* \quad (2)$$

On the other hand, it can be said that if there is balance, the cost of the risk exchange in markets will be "fare".

In base of orders (1) and (2), we can write the below relationship:

$$m = M[d] = m^*; \quad m_j = M[d^j] = M[d^j/d^j]$$

$$D = D[d^*] = \frac{1}{(d^0)^2} \quad D[d^*] = D^*$$

$$\beta_j = \frac{\text{cov}(d_j, c)}{D} = \frac{d^0 \text{cov}[d^j, d^1]}{d^0D[d^1]}$$

If beside the above mentioned relations (1) and $\alpha$ is considered, after a hierarchy of changes we will have:

$$d^0 = \frac{1}{1 + r_0} \left( M[d^j] - \frac{2D[d^j]}{\sum_{i=1}^{N} R_i} \right)$$

And for counting the "fair" cost of the exchanges type i, the below relationship will be accessed:
CONCLUSION

It is concluded that, in balanced situation because of costs’ “fairness”, the arbitrage will be vanished in markets.

REFERENCES


\[
d_i^0 = \frac{1}{1+r_0} \left( M[d_i^1] - 2 \frac{\text{cov}[d_i', d_i']}{\sum_{i=1}^{N} R_i^{-1}} \right)
\]