Identifying and Grading Factors Effective on People's Participation in Iran's Capital Market using Fuzzy Analytic Hierarchy Process (FAHP)

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Abstract

Many families do not invest in the capital market surprisingly. Different researches show that despite the high importance of the capital market, families are not inclined to keep shares. So, they propose their question as: Why many families do not participate in the capital market?

The present study intends to grade factors influential on people's participation in Iran's capital market in the field of prior to admission to the capital market and experiencing the first purchase. To this end, the Fuzzy Analytic Hierarchy Process (FAHP) has been used as one of the multifactor approaches for decision-making. Also, considering the uncertainty and ambiguity in judgments of decision makers for comparing variables, the fuzzy logic has been used.

In the present article, three main criteria of finance, knowledge and awareness, and demography, and 13 secondary criteria have been followed according to the research literature. Results of the study showed that the finance criterion and the investment revenue sub-criterion were the most important main and secondary factors, respectively.

Keywords: Capital market, capital market participation, financial variables, knowledge and awareness, Fuzzy Analytic Hierarchy Process (FAHP).

1. Introduction

Considering that the research literature in the field of capital market participation in divided into two sections: 1) participation of people in capital market before admitting to the market, which is related to decisions investors take for the first share purchase and admitting to capital market, B) participation of
people in capital market after admission to the market, which is related to decisions for buying and selling shares in capital market after admission to capital market (Christiansen et al., 2005). In the present article, the first field is studied. In other words, the study is aimed to investigate effects of the abovementioned factors on people's participation in capital market before admission of investors.

Foreword, Economic development requires capital accumulation. Most of economic schools of thought and inclinations have emphasized that capital accumulation is the first prerequisite for economic development. The capital market, as an established market, has played a key role in mobilizing financial and monetary facilities with the aim of economic development and progress of nations. Presently, in many countries of the world, it is responsible for providing necessary capitals for economic enterprises.

Appropriate function of capital market can improve efficiency, investment and growth (Baier et al., 2003) and enhance economic development, at least in the long-run, through reducing maintaining cash assets and increasing the growth rate of physical capitals (Bencivenga and Smith, 1991). Also, supplying saved resources and channeling them into economic productive activities, defining prices of cash flow and capitals, publishing and analyzing data and distributing economic risk are among the applications of the capital market (Davani, 2005).

In general, growth of the capital market and its expansion in different aspects has helped curb inflation and reduce unemployment and provided grounds for job creation through paying the way for developing economic activities, especially productive investments and distributing investment risks and increasing supply of new capital resources (Kadkhodaii, 2000).

Considering the role of capital market in development and progress of nations, capital markets in developing countries are facing many problems such as weak depth (limited number of securities to be dealt on the stock market), thin coverage of comprehensiveness (meager ratio of capital in the stock market compared to capital in the economy), difficulty of liquidity process, extensive fluctuations of the index average rate, existing grounds for brokerage and vulnerability against disorders and offences (Kadkhodaii, 2000).

Considering the importance of financial market (especially capital market) and the need to it toward economic development, paying attention to this important economic sector (the economic finance) seems to be necessary. To this end, the present article intends to grade the factors which are effective on people's participation in Iran's capital market using the fuzzy AHP method and accordingly provide appropriate information regarding the factors which are effective on people's participation in Iran's capital market in order to play a part in filling the existing gap in the country's research literature. Also, findings of the study can be helpful for other researchers and decision makers in the capital market, as well.

The research literature in the field of financial variables indicates various factors exist which are effective on decisions of people for investing in the stock market (Alan, 2005; Hong et al., 2004; Vissing-Yorgensen, 2002; Viceira, 2001). There are costs in the market that are related to investment in the stock market. These costs include monetary and time costs for participating in the stock market (Alan, 2005; Guiso and Jappelli, 2003; Vissing-Yorgensen, 2002). Costs for participating in the capital market are in close relation in structure with decisions of individuals to participate in the capital market (Vissing-Yorgensen, 2002), so that such costs can dissuade minor investors from buying stocks. Therefore, reducing the mentioned costs can change the combination of savings and investments and direct investors from low risk and output tools toward the capital market and the stock market (Alan, 2005; Bencivenga and Smith, 1991). Accordingly, exchange costs can increase or decrease the amount of investments in the stock market.

Christiansen et al (2005) believe that time-related costs spent on collecting and understanding information regarding the capital market are less for investors with little economic knowledge and expertise than for others. So, they are more probable to participate in the capital market. In other words, since continuous searching and assessing in the capital market and investment will cost much more the expected benefits from participating in the stock market, so most of families choose non-risk
assets (not stocks) (Bertaut, 2005). So, identifying investment opportunities and offering information on the stock market to individuals will reduce costs of participation in the stock market and will increase the probability of participation in the stock market by individuals, as well (Christiansen et. al (2005).

Viceira (2001) is of the opinion that distinct family portfolios (the amount of capital invested in non-risk assets and risky market portfolio) is dependent on risk-evasion level by investors as well as nonfinancial income and portfolio return, as well. Vissing-Yorgensen (2002) point out that nonfinancial income has a positive and direct effect on probability of participating in the stock market as well as amount of capital invested in the market.

Also, evidence shows that non-shareholder individuals do not embark on buying stocks because a major percentage of non-shareholders hold little cash assets, so wealth shortage is an important factor for non-participation of individuals in the stock market (Mankiw and Zeldes, 1991). Mankiw and Zeldes (1991) remarked that many individuals do not invest in the stock market despite holding sufficient cash assets. They say that liquidity shortage is not the only reason for not participating in the stock market, but some other factors such as fixed cost of information or non-economic factors are also effective on non-investment of people in the stock market.

Some factors, including risk-evasion growth, income risk and financial sources deficit, can also be effective on decisions of individuals and reduce inclination to participate in the capital market (Bertaut, 1998).

2. Knowledge and Awareness

Ignoring investment opportunities by individuals is a major obstacle in non-participation of people in the stock market. Ignoring opportunities emerges from lack of awareness (Guiso and Jappelli, 2003; King and Leape, 1978). A study on 40 percent of individuals who did not participate in the capital market showed that they had no reason to buy stocks due to not having sufficient information on the stock market. The research literature in the field of knowledge and awareness variable indicates that learning and acquiring information on financial markets can be effective on participation of people in the stock market. Such learning can be attained as a formal education (studying at school or university) or as an informal education (learning from others and previous experiences).

Christiansen et al. (2005) are of the opinion that level and type of education among families are effective on participation of people in the stock market. Individuals who have economic knowledge will participate more probably in the stock market due to their greater knowledge about investment opportunities and the risk-return balance. In other words, individuals having economic knowledge will be less risk-evading and more optimistic. Also, among investors with economic knowledge, those who enjoy higher education or economic awareness will participate more than those with lower economic knowledge in the stock market.

A study was carried out to respond the question of whether financial education effective in reaching financial objectives and goals. Results of the study showed that financial education will not only increase rate of saving, but also will lead families to positive net income more probably. In other words, families who study financial courses at schools or universities enjoy higher rate of saving compared to others (Bernheim et al, 2001). Also, evidence showed that acquiring financial knowledge in working environments is rapidly growing. Since weak financial decisions may lead to failure and loses, so individuals are voluntarily encouraged to obtain financial knowledge (Bernheim and Garrett, 2003).

Bernheim et al and Garrett (2003) opine that accessibility to financial education in working environments (through newspapers, attending seminars, publishing financial statements of companies, involving personnel with financial activities and employing financial consultants and experts) will increase savings of individuals, both generally and specifically (retirement). In other words, amount of accumulated capitals especially for retirement (in the form of stocks or cash) is meaningfully above the average when employees are offered financial programs.
In continuation, the literature existing in the field of informal education and its effect on participation of individuals in the capital market shows that participation in the capital market is influenced by social interaction and social investors participate more than others in the capital market. Also, families which are in social interaction with their neighbors or attend churches, participate more probably in the stock market than families which are not socially active. This finding is compatible with results of a study regarding effects of colleagues on investment decisions of individuals (Hang et al, 2004).

Also, investors who had previously participated in the stock market are more probable to participate in the stock market (compared to those who have not yet participated in the stock market) due to the fact that they have paid a portion of participation costs in the stock market and have probably acquired greater knowledge about investment opportunities Christiansen et al., 2005). Moreover, individuals who are active in financial sections (banks, insurance companies and finance institutions) or are busy with their own business or high-level professions (physicians, university professors, etc.) are more probable to participate compared to people in other jobs in the stock market.

Duflo and Saez (2002) corroborated the effect of colleagues on decisions of individuals related to participating in retirement plans, showing individuals learn from their colleagues and follow them due to the lack of necessary information to take investment decisions and to maintain social norms or ideas related to social norms dominating working environments. So, investing in retirement plans, through acquiring financial knowledge, will affect financial decisions of families and will increase the probability of their investment in the stock market (Weisbenner, 1999).

3. Fuzzy Analytic Hierarchy Process

Analytic Hierarchy Process (AHP) was invented and introduced in 1980 by Saaty (Al Khalili, 2002). This method is one of the Multi Attribute Decision Making (MADM) techniques which are used to take decision on selecting an option from among a variety of choices considering indices which are determined by the decision maker.

Analytic Hierarchy Process provides a framework and a structure for group participation and cooperation in decision-making or solving problems (Kurtita et al, 2000). In addition, the need for pair wise comparisons in AHP is one of the advantages of this method, because it forces the decision maker to deliberate on weights of factors and analyze the situation more seriously and profoundly. Moreover, the possibility to evaluate qualitative and quantitative issues is another advantage of AHP, so that mental preferences, elite knowledge, and objective information all exist and apply in AHP (Shrestha et al, 2004).

Taking the abovementioned issues into account, it should be considered that although elite persons benefit from their capabilities and mental abilities for doing comparisons, but AHP is not able to reflect human thinking style completely (Chang, 1996). So, using fuzzy logic components are more adaptable with linguistic and sometimes ambiguous human descriptions and utilizing them for long-term predictions and decision making seem to be more appropriate in the real world. Since the numbers used in this method are triangular fuzzy numbers (TFN), so fuzzy criteria used in the Fuzzy Analytic Hierarchy Process have been shown in table (1) and figure (1).

Table 1: Linguistic criteria for describing degree of importance (Kahraman, 2006)

<table>
<thead>
<tr>
<th>Reverse of Triangular fuzzy number</th>
<th>Triangular fuzzy number</th>
<th>Linguistic Scale of importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1,1,1)</td>
<td>(1,1,1)</td>
<td>Just equal</td>
</tr>
<tr>
<td>(2/3,1,2)</td>
<td>(1/2,1,3/2)</td>
<td>Equally important</td>
</tr>
<tr>
<td>(1/2,2/3,1)</td>
<td>(1,3/2,2)</td>
<td>Weakly more important</td>
</tr>
<tr>
<td>(2/5,1/2,2/3)</td>
<td>(3/2,2,5/2)</td>
<td>Strongly more important</td>
</tr>
<tr>
<td>(1/3,2/5,1/2)</td>
<td>(2,5/2,3)</td>
<td>Very strongly more important</td>
</tr>
<tr>
<td>(2/7,1/3,2.5)</td>
<td>(5/2,3,7/2)</td>
<td>Absolutely more important</td>
</tr>
</tbody>
</table>
In 1983, two Dutch researchers namely Laarhoren and Padrycz suggested a method for Fuzzy Analytic Hierarchy Process which was based on the logarithmic least square method. The complexity of this method caused it not to be used widely. In 1996, another method under the title of extent analysis method (EA) was proposed by a Chinese researcher named Chang. Numbers used in this method are triangular fuzzy numbers. In continuation, the Fuzzy Analytic Hierarchy Process from Chang’s point of view is explained and concepts and definitions of the Fuzzy Analytic Hierarchy Process are described based on the extent analysis method. Consider two triangular numbers \( M_1 = (l_1, m_1, u_1) \) and \( M_2 = (l_2, m_2, u_2) \), which have been depicted in figure (2).

\[
M_1 + M_2 = (l_1 + l_2, m_1 + m_2, u_1 + u_2) \quad (1)
\]

\[
M_1 \times M_2 = (l_1 * l_2, m_1 * m_2, u_1 * u_2) \quad (2)
\]

\[
M_1^{-1} = \left( \frac{1}{u_1}, \frac{1}{m_1}, \frac{1}{l_1} \right) \quad M_2^{-1} = \left( \frac{1}{u_2}, \frac{1}{m_2}, \frac{1}{l_2} \right) \quad (3)
\]

It should be noted that multiplying two triangular fuzzy number or reverse of a triangular fuzzy number will not be a triangular fuzzy number. These equations only show an approximation of multiplying two triangular fuzzy numbers. In the extent analysis method, the \( S_k \) value, which is a triangular number, is calculated for each row of the pairwise comparison matrix as the equation (4):

\[
S_k = \sum_{j=1}^{n} M_{kj} \times \left[ \sum_{i=1}^{n} M_{ij} \right]^{-1} \quad (4)
\]

In which \( k \) shows the number of row, \( i \) and \( j \) show choices and indices, respectively. In the extent analysis method, after calculating \( S_k \), the degree of magnitude compared to each other should be estimated. Generally, if \( M_1 \) and \( M_2 \) are two triangular fuzzy numbers, the degree of magnitude of \( M_1 \) compared to \( M_2 \), which is shown as \( V(M_1 \geq M_2) \), is described as the equation (5):
\[
\begin{align*}
V(M_1 \geq M_2) &= \begin{cases} 
1 & \text{if } m_1 \geq m_2 \\
V(M_1 \geq M_2) &= hgt(M_1 \cap M_2) & \text{otherwise}
\end{cases} 
\end{align*}
\] (5)

We have also:
\[
hgt(M_1 \cap M_2) = \frac{u_1 - l_2}{(u_1 - l_2) + (m_2 - m_1)}
\]

The magnitude of a triangular fuzzy number from \( k \) other triangular fuzzy numbers is calculated as follows:
\[
V(M_1 \geq M_2, \ldots, M_k) = V(M_1 \geq M_2), \ldots, V(M_1 \geq M_k)
\] (6)

To calculate weights of indices in the pair wise comparison matrix, the equation (7) is applied:
\[
W'(x) = \text{Min}\{V(S_i \geq S_k)\}, \quad k = 1, 2, \ldots, n \quad k \neq i
\] (7)

So, the weight vector of indices will be the same as the equation (8):
\[
W'(x) = [W'(c_1), W'(c_2), \ldots, W'(c_n)]^T
\] (8)

It is the non-normalized coefficient vector of the Fuzzy Analytic Hierarchy Process. Using the equation (9) the non-normalized results from the equation (8) are normalized. The normalized results from the equation (9), is called \( W \).
\[
W_i = \frac{w_i'}{\sum w_i'}
\] (9)

4. Research Methodology
The article uses the Fuzzy Analytic Hierarchy Process (FAHP) proposed by Mr. Chang in order for grading factors effective in participation of people in Iran's capital market. The job is done based on the following procedure:

- **Identifying objectives, criteria, sub-criteria, and options.**
- **Identifying degrees of importance of criteria and sub-criteria and delineating their relative importance compared to each other.**
- **Identifying general priorities of sub-criteria considering cases 1 and 2.**

Based on library studies and reviewing research literature in the studied field and according to the AHP concept, a hierarchy chart of criteria and sub-criteria effective on participation of people in Iran's capital market was prepared in the frame of the table (2). In continuation, an expert panel was formed, comprising university professors and managers, to define the degree of importance (weight) of criteria and sub-criteria using a special Fuzzy Analytic Hierarchy Process (FAHP) questionnaire in the frame of linguistic criteria of the figure (1) and the table (1). Then, their viewpoints were explained as fuzzy numbers. Calculation stages are shown in the tables (3) to (7).

**Table 2:** The hierarchy effective on participation of people in Iran's capital market

<table>
<thead>
<tr>
<th>Objective</th>
<th>Criteria</th>
<th>Sub-criteria</th>
</tr>
</thead>
</table>
| I₁: financial variable | | I₁,1: value of cash asset  
I₁,2: Investment in bank accounts  
I₁,3: Average annual income  
I₁,4: Value of immovable assets  
I₁,5: Costs of participation in capital market |
Table 2: The hierarchy effective on participation of people in Iran’s capital market - continued

<table>
<thead>
<tr>
<th>Grading factors effective on participation of people in Iran's capital market</th>
<th>I₂: knowledge and awareness</th>
<th>I₃: demography variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>I₂₁: Educating financial issues in working environment</td>
<td>I₃₁: Educational field of investor</td>
<td></td>
</tr>
<tr>
<td>I₂₂: Learning from colleagues</td>
<td>I₃₂: Educational level of investor’s spouse</td>
<td></td>
</tr>
<tr>
<td>I₂₃: Learning through investing in participation bonds</td>
<td>I₃₃: Investor’s job</td>
<td></td>
</tr>
<tr>
<td>I₂₄: Learning through interaction with other investors</td>
<td>I₃₄: Educational level of investor</td>
<td></td>
</tr>
</tbody>
</table>

First step: For each of the pair wise comparison matrix’s rows, the value of $S_i$, which is a triangular fuzzy number, is calculated using the equation (4):

Table 3: The criteria pair wise comparison matrix

<table>
<thead>
<tr>
<th></th>
<th>I₁</th>
<th>I₂</th>
<th>I₃</th>
<th>Main Criteria Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>I₁</td>
<td>(1,1,1)</td>
<td>(2/5,2/2,3)</td>
<td>(1/2,1,3/2)</td>
<td>0.4075</td>
</tr>
<tr>
<td>I₂</td>
<td>(2/5,1/2,2/3)</td>
<td>(1,1,1)</td>
<td>(3/2,2,5/2)</td>
<td>0.3474</td>
</tr>
<tr>
<td>I₃</td>
<td>(2/3,1,2)</td>
<td>(2/5,1,2/2)</td>
<td>(1,1,1)</td>
<td>0.2451</td>
</tr>
</tbody>
</table>

It should be noted that the mentioned fuzzy criteria in the table (3) have been specified after negotiating among expert panel members.

$$\left[ \sum_{i=1}^{m} \sum_{j=1}^{n} M_{ij} \right]^{-1} = (7.9667, 10.000, 12.8333)^{-1} = (0.0779, 0.1000, 0.1255)$$

$$S₁ = (3.0000, 4.0000, 5.0000) \otimes (0.0779, 0.1000, 0.1255) = (0.23384, 0.40000, 0.6276)$$

$$S₂ = (2.9000, 3.5000, 4.1667) \otimes (0.0779, 0.1000, 0.1255) = (0.2260, 0.3500, 0.5230)$$

$$S₃ = (2.0667, 2.5000, 3.6667) \otimes (0.0779, 0.1000, 0.1255) = (0.1610, 0.2500, 0.4603)$$

Second step: After calculating $S₁$, degree of magnitude of each element compared to other elements should be calculated using the equations (5) and (6) as follows:

$$V(S₁ ≥ S₂) = 1, V(S₁ ≥ S₃) = 1$$

$$V(S₂ ≥ S₁) = 0.8526 , V(S₂ ≥ S₃) = 1$$

$$V(S₃ ≥ S₁) = 0.6016 , V(S₃ ≥ S₂) = 0.7008$$

Third step: To calculate weights of indices in the pair wise comparison matrix based on the equation (7), we have:

$$\min V(S₁ ≥ S₂, S₃) = \min(1,1) = 1$$

$$\min V(S₂ ≥ S₁, S₃) = \min(0.8526,1) = 0.8526$$

$$\min V(S₃ ≥ S₁, S₂) = \min(0.6016,0.7008) = 0.6016$$

So, the non-normalized weight vector will be:

$$W' = [1, 0.8526, 0.6016]^T$$

Fourth step: Now, based on the equation (9), the normalized weights of main criteria will be calculated as follows:

$$W = (W₁, W₂, W₃) = (0.4075, 0.3474, 0.2451)$$

In continuation, pair wise comparison matrices related to sub-criteria was carried out according to the abovementioned equations. Due to limitation in space, we have not brought related analyses, but results are shown in the tables (4), (5) and (6).
Table 4:  Pair wise comparison matrix for financial variable sub-criteria

<table>
<thead>
<tr>
<th></th>
<th>$I_{1,1}$</th>
<th>$I_{1,2}$</th>
<th>$I_{1,3}$</th>
<th>$I_{1,4}$</th>
<th>$I_{1,5}$</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{1,1}$</td>
<td>(1,1,1)</td>
<td>(3/2,2,5/2)</td>
<td>(1/2,2,3,1)</td>
<td>(3/2,2,5/2)</td>
<td>(3/2,2,5/2)</td>
<td>0.3468</td>
</tr>
<tr>
<td>$I_{1,2}$</td>
<td>(2/5,1/2,2/3)</td>
<td>(1,1,1)</td>
<td>(2/5,1/2,3)</td>
<td>(1/2,2,3,1)</td>
<td>(1,3/2,2)</td>
<td>0.0649</td>
</tr>
<tr>
<td>$I_{1,3}$</td>
<td>(1/3,2,2)</td>
<td>(3/2,2,5/2)</td>
<td>(1,1,1)</td>
<td>(2,5/2,3)</td>
<td>(2,5/2,3)</td>
<td>0.4489</td>
</tr>
<tr>
<td>$I_{1,4}$</td>
<td>(2/5,1/2,2/3)</td>
<td>(1/3,2,2)</td>
<td>(1/3,2/5,1/2)</td>
<td>(1/2,2,3,1)</td>
<td>(1/2,1,3/2)</td>
<td>0.0927</td>
</tr>
<tr>
<td>$I_{1,5}$</td>
<td>(2/5,1/2,2/3)</td>
<td>(1/2,2,3,1)</td>
<td>(1/3,2/5,1/2)</td>
<td>(2,3,1,2)</td>
<td>(1,1,1)</td>
<td>0.0476</td>
</tr>
</tbody>
</table>

Table 5:  Pair wise comparison matrix for knowledge and awareness sub-criteria

<table>
<thead>
<tr>
<th></th>
<th>$I_{2,1}$</th>
<th>$I_{2,2}$</th>
<th>$I_{2,3}$</th>
<th>$I_{2,4}$</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{2,1}$</td>
<td>(1,1,1)</td>
<td>(1,3/2,2)</td>
<td>(3/2,2,5/2)</td>
<td>(1/2,1,3/2)</td>
<td>0.3168</td>
</tr>
<tr>
<td>$I_{2,2}$</td>
<td>(1/2,2,3,1)</td>
<td>(1,1,1)</td>
<td>(1,3/2,1)</td>
<td>(3/2,2,5/2)</td>
<td>0.2990</td>
</tr>
<tr>
<td>$I_{2,3}$</td>
<td>(2/5,1/2,2/3)</td>
<td>(1/2,2,3,1)</td>
<td>(1,1,1)</td>
<td>(1/2,1,3/2)</td>
<td>0.1647</td>
</tr>
<tr>
<td>$I_{2,4}$</td>
<td>(2,5/2,3)</td>
<td>(3/2,2,5/2)</td>
<td>(1,1,1)</td>
<td>(1/2,1,3/2)</td>
<td>0.2194</td>
</tr>
</tbody>
</table>

Table 6:  Pair wise comparison matrix for demography sub-criteria

<table>
<thead>
<tr>
<th></th>
<th>$I_{3,1}$</th>
<th>$I_{3,2}$</th>
<th>$I_{3,3}$</th>
<th>$I_{3,4}$</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{3,1}$</td>
<td>(1,1,1)</td>
<td>(1,3/2,2)</td>
<td>(1/3,2/5,1/2)</td>
<td>(2/5,1/2,2/3)</td>
<td>0.0333</td>
</tr>
<tr>
<td>$I_{3,2}$</td>
<td>(2/3,2,1)</td>
<td>(1,1,1)</td>
<td>(2/5,1/2,2/3)</td>
<td>(1/2,1,3/2)</td>
<td>0.2255</td>
</tr>
<tr>
<td>$I_{3,3}$</td>
<td>(2,5/2,3)</td>
<td>(2,5/2,2)</td>
<td>(1,1,1)</td>
<td>(1/2,1,3/2)</td>
<td>0.4628</td>
</tr>
<tr>
<td>$I_{3,4}$</td>
<td>(3/2,2,5/2)</td>
<td>(1/2,2,3,1)</td>
<td>(1/2,2,3,1)</td>
<td>(1,1,1)</td>
<td>0.2784</td>
</tr>
</tbody>
</table>

5. Defining Final Degree of Importance of Sub-Criteria

After defining degrees of importance of sub-criteria and also defining weights of criteria, the final degree of importance for sub-criteria should be calculated. To this end, each of importance degree vectors of sub-criteria is multiplied by related criterion weight. So, two criterion and sub-criterion levels existing in the hierarchy model are turned into one level. Final results for 13 sub-criteria are shown in the table (7).

Table 7:  Ranking based on the Fuzzy Analytic Hierarchy Process (FAHP)

<table>
<thead>
<tr>
<th>Main Criterion</th>
<th>Sub criterion</th>
<th>Sub criterion Weight</th>
<th>Final Weight</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_1$ = 0.4075</td>
<td>$I_{1,1}$</td>
<td>0.3468</td>
<td>0.1413</td>
<td>2</td>
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6. Conclusion

From the viewpoint of macroeconomic theories accumulation of physical assets is the necessary (but not sufficient) requirement for national economic development. Meanwhile, capital market is a place which can provide grounds for capital accumulation and secure required financial resources for...
production units and also make necessary facilities available for channeling people’s assets into investment opportunities.

Different studies indicate that considering the importance of capital market families do not show much inclination toward holding shares. So, they propose their question as: Why many families do not participate in the capital market? In this line, the present study investigates factors effective on the participation of people in Iran’s capital market and specifies the degree of importance of each factor in investment decision-making and the factors were categorized.

Considering importance of the subject and in line with the financial literature regarding effective factors on participation of people in the capital market, 3 criteria namely money, knowledge and awareness, and demography were identified.

Then, sub-criteria related to each main criterion were specified. For the financial criterion, the five sub-criteria namely value of cash assets, investing in bank accounts, average annual income, value of immovable assets, and participation costs in the capital market were specified. Also, for the knowledge and awareness criterion, four sub-criteria namely educating financial issues in working environment, learning from colleagues, learning through interaction with other investors and learning through investing in participation bonds were specified. Finally, for the demography criterion, four sub-criteria namely educational field of investor, educational level of investor’s spouse, investor’s job, and educational level of investor were specified. Results of the study show that the financial criterion is the most important among the main criteria effective on people’s decision to invest. The knowledge and awareness and the demography criteria are in the second and the third places in terms of importance. Also, studying sub-criteria of the financial variable indicate that the investor’s average income sub-criterion is of higher importance than other sub-criteria. The value of cash assets, the value of immovable assets and investing in bank accounts are in the next ranks. Also, the sub-criterion of participation costs in the capital market has the lowest degree of importance.

In continuation, results of the study regarding importance of sub-criteria of the knowledge and awareness variable show that educating financial issues in working environment and learning from colleagues are respectively of the highest degree of importance and learning through interaction with other investors and learning through investing in participation bonds are places in the next steps.

Regarding the demography variable, results show that the investor’s job is of the highest importance, with the investor’s educational level, the investor’s spouse educational level, and the investor’s educational field ranking the next, respectively.

Finally, analyzing all the sub-criteria shows that the investor’s average income, the value of cash assets, and the investor’s job, are of the highest importance in people’s investment decision-making. Also, educating financial issues in working environment, learning from colleagues, learning through interaction with other investors, the investor’s educational level, and learning through investing in participation bonds are in the next degrees of importance, respectively. The investor’s educational level, the value of immovable assets, investing in bank accounts, participation costs in the capital market, and the investor’s educational field are in order the sub-criteria of lower importance.

References