

“Financial Product Preferences of Trichirapalli investors using Analytical Hierarchy process and fuzzy Multi Criteria Decision Making”

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Financial product preferences of Tiruchirapalli investors using analytical hierarchy process and fuzzy multi criteria decision making

Abstract

Decision-making is the most important scientific, social and economic endeavor. Many classical methods are available in the literature if the relationship between alternatives and criteria is in linguistic terms. Among them Fuzzy Analytic Hierarchy processes is a very much useful method. In this paper we are dealing with six financial investment products. Since each alternative has a slight difference with one another, the selection of the best alternative needs fuzzy knowledge. Our objective is to rank financial products in order according to the preference of the respondents who select, and rank them according to various attributes, namely Safety of principal, Liquidity, Stability of income, Capital growth, Tax benefit, Inflation resistance and Concealability.

Keywords: fuzzy AHP, fuzzy numbers, investment decisions, behavioral finance.

JEL Classification: G11.

Introduction

Unlike any other consumer products financial investment products have several distinct characteristics. Importantly, they are intangible goods. Investment products have their own value irrespective and independent of its producers and buyers, ownership belongs to the investors who purchase them, and they can be further sold or bought, pledged at different periods of time and places.

In choosing specific investments, investors need definite ideas regarding features which their portfolio should possess. These features should be consistent with the investors' general objective and in addition, should afford them all the incidental conveniences and advantages which are possible under the circumstances.

The various criteria needed for a financial investment product have been studied by many researchers. Hirschman and Holbrook (1982) found that the various concepts and unique features of an investment product are keenly taken into consideration by the investors to have a maximum benefit from the product. Madhusudan V. Jambodekar (1996) in his study found investors look for safety of Principal, Liquidity and Capital appreciation in the order of importance. Arenas, Bilbao, Rodriguez (2001) took into account three criteria namely return, risk and liquidity, to solve the investment selection problem. Harlis, Peterson (1998) found that while choosing the investment, the investor will look for the performance on the return aspect and not be bothered about the risk, or transaction cost. Similarly Alexander, Jones and Nigro (1998) mapped high income individuals switching between the investment products for increased return are not considering the increase in

transaction cost because they expect that the return from the investment will offset transaction cost. Frankfurter and Lane (1992) found that the rate of return of an investment will predominantly play an important role in the selection of an investment product. Solt and Statman (1998) revealed that according to the investor, good investments are stocks that increase in price more than other stocks or the relative change in indices. The above statement clearly confirms the investor's expectation on the capital appreciation. Jason Glazier, Kathryn Wilkens (1999) concluded that the increase in turnover in investment will increase transaction cost and affect the portfolio performance. So the investor should calculate the transaction cost before enhancing his turnover in his financial product. Gary V. Engelhard (1996) suggests that tax subsidies will improve the individual's investment across their financial assets. Evans (1990) analyzed the personal investments in the United States and concluded that change in inflation will change the investment behavior of an individual. John F. Casey (2002) says that those financial products which are good in customer service, management quality, value of efficiency, and prompt distribution alone can win the customers.

But only few of the researchers had studied the simultaneous influence of the criteria on the individual investment decisions. Arenas et al. took into account only the three criteria (return, risk and liquidity) and used a fuzzy goal programming approach to solve the portfolio selection problem. Arthur, Martha and Annika (1997) studied the financial planning decisions and its influence on the investment behavior with a focus group.

So in this paper an attempt has been made using Analytical Hierarchy process and Multi criteria decision making to rank the financial products by taking into account all factors influencing an individual investment decision.

1. Objective of the study

The study was conducted to identify the ranking preference of the investors over the financial products and their expectations regarding the core characteristics of the financial product they have invested in. This above finding will be very useful to the financial services marketing companies in redesigning their product or highlighting their product with respect to the core expectations of the investors.

Further, the public sector undertakings like the nationalized banks and the Government of India operated post office saving schemes can improve their own products and compete with other products available in the market using the result of this study.

The ranking of the financial products and prioritization of the criterion for each financial product will definitely help the investing community, as they can be aware of the performance of each financial product with respect to their own selected criteria.

2. Methodology

This study was conducted in two phases. The first phase may be described as the formulation phase where the basic selection problem was formulated as a multi criteria decision making problem. The second phase was the demonstration phase where the formulated problem was actually applied on a set of participants in the study to come out with conclusions for the larger audience of future investors.

2.1. Data collection. The study is confined to the Tiruchirapalli Corporation, historic town of Tamilnadu. It has an area of 11075 kilometers and a population of 8.47 Lakhs. The type of data collected was primary data. Data were collected from April, 2007 to August, 2007 in the Tiruchirapalli Corporation. The respondents were selected from the tax payers list of the local administration office. The Tiruchirapalli Corporation consists of 60 blocks. So a Stratified random sampling technique was adopted to select about 120 respondents i.e., two respondents from each block. These respondents were requested through a letter to discuss with the professional tax payers of their respective block about the financial preferences and the criteria expectations. In the same letter they were asked to be present for a group discussion at a specified location and time. They were provided with a self-addressed envelope, so that the respondents can first send the list of criteria expectations and the common financial products that are used as an investment vehicle to the author within a week. 30-day gap was given between the date of dispatch of letters asking them to discuss within the block and the group discussion. The invitation

elaborated the need for the discussion. Those items listed as expectations from a financial product by more than 50% of the respondents were alone taken for the further study as the criteria. Similarly those financial products that were listed by more than 75% of the respondents alone were taken for the study.

Out of the 120 invitations sent only 65 respondents turned up to the venue. These 65 respondents can be called as opinion ambassadors of their block. When there were 2 respondents from the same block then they should agree mutually, who should be the participant in the group discussion. Out of the 65 respondents only 45 respondents were selected to participate in the group discussion. Those who told that they were not satisfied with their own discussion with their block professional tax payers were also deleted for further group discussion. So these 45 were divided into 9 groups for a group discussion among them. Before starting the group discussion, the respondents were elaborated the need and area for the group discussion. Each group was told to elect a group leader, so the leader can reflect the consensus on a questionnaire supplied to them. The questionnaire provided during the group discussion was prepared with the help of about 30 investment advisors. The maximum time taken for discussion by the group for submitting the questionnaire was 60 minutes. There was no confrontation reported among the members of the groups at the end of the discussion or in filling the questionnaire. After the discussion it took 5 minutes for the leader of the group to fill in the questionnaire. The questionnaire had only linguistic terms. Each response satisfied with the Consistency Index (where $C.I < 0.1$). So the outcome can be taken as a reflection of the block.

3. Financial investment product selection criteria

Most often the financial product selection happens based on the input from the environment and one's own understanding of various strengths and weaknesses of the financial product. Most of the researchers classify the financial product preference according to the return on investment and the risk associated with it. At a bird's eye view, the above mentioned two items are considered while selecting a financial product, but however a more elaborate set of criteria are used in selecting or preferring a financial product which are rarely studied. The criteria considered are listed based on the responses received through a questionnaire from the respondents. Table 1 presents the final set of seven key criteria after suitably rewording some of the elements and dropping some that conveyed the same meaning.

Ideally, an investor would like all the elements to be present to a high degree in a potential financial product but at the same time, the investor is unlikely

Table 1. Key criteria considered in financial investment product selection

Criteria	Description
Safety of principal (SP)	Protection mechanism against loss under reasonable conditions.
Liquidity (L)	Converted into cash without delay at full market value in any quantity, at short notice of time.
Stability of income (SI)	Uniform and assured return to meet the investor needs.
Capital growth (CG)	Quick increase in the capital value.
Tax benefit (TB)	The return is exempted from tax. So, the net return does not decrease.
Inflation resistance (IR)	The return from the investment always beats the prevailing country's inflation.
Concealability (C)	To be safe from social disorders and government confiscation.

to find such financial product which is better on each of the above mentioned attribute than all other potential financial products. Therefore an investor needs to make choices depending on what is available and what are his own priority ratings of the attribute he seeks in the financial product. So, there is a necessity to identify a technique, so that the relative importance of the elements can be worked out for any number of the products. Thus we need to be able to assign importance weights in an objective manner to the seven elements in Table 1. The technique that is proposed here is the analytical hierarchy process, which is described briefly in the next section.

4. Formulating the financial product selection problem

Saaty (1980) developed the Analytic Hierarchy Process (AHP) to enable decision making in situations characterized by multiple attributes and alternatives. AHP allows selection and priority ordering of alternatives based on multiple criteria. It is a decision tool that structures a complex decision problem in a hierarchical fashion, allows comparison of tangible and intangible factors, and sets priorities among alternative course of action (Foreman & Gass, 2001).

There are four major steps in applying the AHP technique:

1. *Develop a hierarchy of factors impacting the final decision:* this is known as the AHP decision model. In this case these are the seven elements (Table 1) that make up the first level of the hierarchy. The second level is the candidate alternatives, i.e. the set of potential financial products.
2. *Elicit pair wise comparisons between the factors using inputs from decision makers:* pair wise comparison of the elements will allow the derivation of priority/significance weights for the elements. While comparing two elements we

follow the simple rule as recommended by Saaty (1980), though more complicated methods using fuzzy triangular numbers are often used to impute values to linguistic variables. The values assigned to a comparison can range from 1/9 to 9, where 1/9 would imply that the one element is extremely less important than the other, and 9 implies that the element is extremely more important than the other (Saaty, 1980). A case of equal importance is indicated by the value 1. Furthermore the importance of one element with respect to another is the reciprocal of the value assigned to the importance of the second compared to the first. Once a matrix of paired comparisons is obtained the priority weight vector is the Eigen vector of the matrix corresponding to the largest Eigen value. Thus while comparing two elements X and Y, we assign the values in the following manner:

- ◆ 1, if X and Y are equally important;
 - ◆ 3, if X is weakly more important than Y;
 - ◆ 5, if X is strongly more important than Y;
 - ◆ 7, if X is very strongly more important than Y;
 - ◆ 9, if X is absolutely more important than Y;
 - ◆ Reciprocal values are used when X and Y are interchanged.
3. *Evaluate relative importance weights at each level of the hierarchy:* Here there are only two levels: the criteria elements and the set of financial products.
 4. *Combine relative importance weights to obtain an overall ranking of the candidate alternatives:* In this case the alternatives are the potential financial product from which the investor selects one by using a synthesis process that compares alternatives in light of the relative weights of the criteria elements.

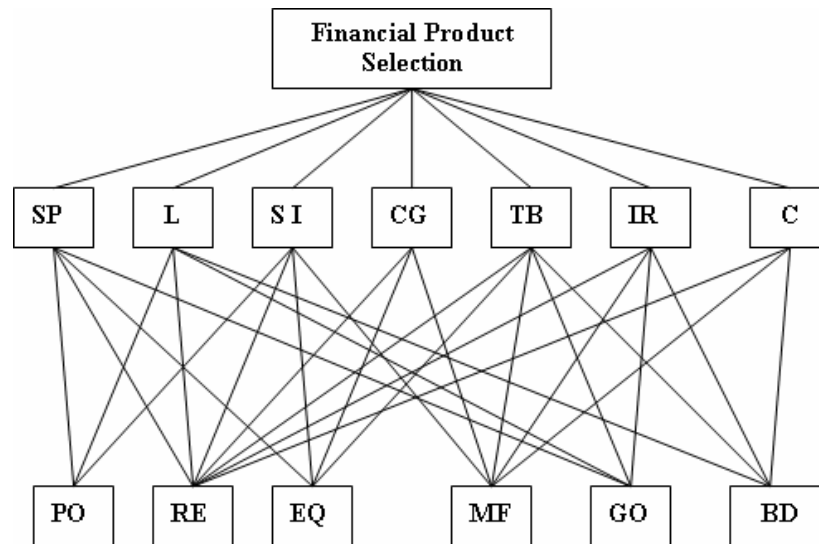


Fig. 1. Hierarchical structure of the financial product selection problem

Notes: PO = Post office; RE = Real estate; EQ = Equity; MF = Mutual fund; GO = Gold; and BD = Bank deposit.

From Figure 1: The top level of the hierarchy represents the objective of the decision problem. In this case, ranking of the financial product is the decision problem being addressed. The set of choices from which a selection has to be made is the last level of the hierarchy. In this case, the respondents are considering six financial products. This level can have any number of alternatives as one wish, without changing the process of obtaining the preference weights.

The various criteria that need to be satisfied and any categorization of such criteria make up the middle level of the hierarchy. The problem formulated above is that of ranking from the six alternatives, namely Post office, Real estate, Equity, Mutual fund, Gold and Bank deposit. The decision will be based on the relative importance of the elements for the respondents and the degree of fulfilment of the elements by each of the financial product. The financial product with highest total rating, which is obtained through a synthesis process, is the one to be ranked first.

5. Analysis

The data obtained through the questionnaires were analyzed using the Analytical hierarchy process.

From the data, the pairwise comparison of financial products with respect to each criterion is formed by nine decision makers using the following linguistic comparative words: Equivalently good; Equivalently to moderately Good; Moderately good; Moderately to strongly preferred; Strongly preferred; Strongly to very strongly preferred; Very strongly preferred; Very strongly to extremely preferred; Extremely preferred.

Now each entry of the above pairwise AHP comparison matrix with respect to each criterion is

divided by its column sum. Now the row average of the resulting matrix is the AHP priority vector with respect to each criterion.

Finally the AHP score of financial product is the sum of the products of weights of criteria with their corresponding AHP numbers in AHP priority vectors. For each decision maker, the preference orderings are given with respect to their total scores.

The preference orderings of nine experts are given by

$(A_3, A_1, A_6, A_2, A_5, A_4)$; $(A_1, A_6, A_5, A_3, A_2, A_4)$; $(A_6, A_1, A_3, A_2, A_4, A_5)$;

$(A_3, A_5, A_6, A_2, A_1, A_4)$; $(A_6, A_2, A_5, A_4, A_3, A_1)$; $(A_2, A_1, A_6, A_4, A_5, A_3)$;

$(A_2, A_1, A_3, A_5, A_6, A_4)$; $(A_1, A_2, A_6, A_5, A_3, A_4)$ and $(A_3, A_4, A_1, A_6, A_5, A_2)$,

where A_1 is Post Office, A_2 is Real Estate, A_3 is Gold, A_4 is Mutual Fund, A_5 is equity investment, and A_6 is Bank Deposit.

Now the social preference relation matrix $S = (S_{ij})$, where $S_{ij} = (N(x_i, x_j)) / n$ is given by

$$S = \begin{pmatrix} A_1 & A_2 & A_3 & A_4 & A_5 & A_6 \\ A_1 & 0 & 5/9 & 5/9 & 7/9 & 7/9 & 6/9 \\ A_2 & 4/9 & 0 & 4/9 & 8/9 & 6/9 & 3/9 \\ A_3 & 4/9 & 5/9 & 0 & 7/9 & 5/9 & 4/9 \\ A_4 & 2/9 & 1/9 & 2/9 & 0 & 3/9 & 1/9 \\ A_5 & 2/9 & 3/9 & 4/9 & 6/9 & 0 & 2/9 \\ A_6 & 3/9 & 6/9 & 5/9 & 8/9 & 7/9 & 0 \end{pmatrix}$$

α -Cuts of S for all α in the level set are given by

$$\delta\delta_S = \{(A_2, A_4), (A_6, A_4)\}$$

- $.77_S = \{(A_1, A_4), (A_1, A_5), (A_2, A_4), (A_3, A_4), (A_6, A_4)\}$,
- $.66_S = \{(A_1, A_4), (A_1, A_5), (A_1, A_6), (A_2, A_4), (A_2, A_5), (A_3, A_4), (A_5, A_4), (A_6, A_2), (A_6, A_4), (A_6, A_5)\}$,
- $.55_S = \{(A_1, A_2), (A_1, A_3), (A_1, A_4), (A_1, A_5), (A_1, A_6), (A_2, A_4), (A_2, A_5), (A_3, A_2), (A_3, A_4), (A_3, A_5), (A_5, A_4), (A_6, A_2), (A_6, A_3), (A_6, A_4), (A_6, A_5)\}$,
- $.44_S = \{(A_1, A_2), (A_1, A_3), (A_1, A_4), (A_1, A_5), (A_1, A_6), (A_2, A_1), (A_2, A_3), (A_2, A_4), (A_2, A_5), (A_3, A_1), (A_3, A_2), (A_3, A_4), (A_3, A_5), (A_3, A_6), (A_5, A_3), (A_5, A_4), (A_6, A_2), (A_6, A_3), (A_6, A_4), (A_6, A_5)\}$,
- $.33_S = \{(A_1, A_2), (A_1, A_3), (A_1, A_4), (A_1, A_5), (A_1, A_6), (A_2, A_1), (A_2, A_3), (A_2, A_4), (A_2, A_5), (A_2, A_6), (A_3, A_1), (A_3, A_2), (A_3, A_4), (A_3, A_5), (A_3, A_6), (A_4, A_5), (A_5, A_2), (A_5, A_3), (A_5, A_4), (A_6, A_1), (A_6, A_2), (A_6, A_3), (A_6, A_4), (A_6, A_5)\}$,
- $.22_S = \{(A_1, A_2), (A_1, A_3), (A_1, A_4), (A_1, A_5), (A_1, A_6), (A_2, A_1), (A_2, A_3), (A_2, A_4), (A_2, A_5), (A_2, A_6), (A_3, A_1), (A_3, A_2), (A_3, A_4), (A_3, A_5), (A_3, A_6), (A_4, A_1), (A_4, A_3), (A_4, A_5), (A_5, A_1), (A_5, A_2), (A_5, A_3), (A_5, A_4), (A_5, A_6), (A_6, A_1), (A_6, A_2), (A_6, A_3), (A_6, A_4), (A_6, A_5)\}$,
- $.11_S = \{(A_1, A_2), (A_1, A_3), (A_1, A_4), (A_1, A_5), (A_1, A_6), (A_2, A_1), (A_2, A_3), (A_2, A_4), (A_2, A_5), (A_2, A_6), (A_3, A_1), (A_3, A_2), (A_3, A_4), (A_3, A_5), (A_3, A_6), (A_4, A_1), (A_4, A_2), (A_4, A_3), (A_4, A_5), (A_4, A_6), (A_5, A_1), (A_5, A_2), (A_5, A_3), (A_5, A_4), (A_5, A_6), (A_6, A_1), (A_6, A_2), (A_6, A_3), (A_6, A_4), (A_6, A_5)\}$.

From the total orderings formed with possible combination as per the pairs in each α -Cuts, we could find that only $.55_S$ intersects with the total orderings. So we get the Single crisp ordering $(A_1, A_6, A_3, A_2, A_5, A_4)$. Hence, the nine decision makers agreed the above crisp ordering at the level of 0.55.

Conclusion

From the data collected from different levels of people, nine decision makers gave their suggestions and importance of criteria in fuzzy linguistic terms. By the preference orderings found by AHP and hence by fuzzy Multi Person Decision Making (MPDM) method, two objectives are served by this analysis. First, a general picture emerges regarding importance given to various elements in selecting a financial product. Secondly, the analysis brings out the differing priorities of different investor groups.

From Table 2 we can observe that the criterion “security of principle” has been placed first by three groups and at the second place by three groups. The criterion “liquidity” is placed first by only one group, and the criterion “stability of income” is placed first by two groups. The criterion “inflation resistance” is placed first by only one group. The criteria “concealability” and “tax benefit” are not placed first by any group. The old investors are mostly inclined towards the safety of their principal and want a stable return from their investment to meet their routine expenses like travel, medication, recreation, etc. This is because they don’t have any more earning years. So the group with old investors should have preferred the criteria “security of principal” and “stability of return”. The group with young investors should have preferred the criterion “capital growth” as the growth is usually at the cost of risk. As the young investors have good future years left to work, so they are not quite bothered about the risk.

It is observed from Table 10 that gold is preferred first by three groups. Post office investment, real estate and bank deposit investments are placed first by two groups. The preference of gold as their first choice by the three groups may be due to the fact that the group might have reflected their female member’s opinions, which are fond of gold and gold ornamental products. By referring the tables of the financial product preference with respect to a particular criterion, we can understand which product is preferred for particular criteria. By taking the preference of all the group leaders and while analyzing by using the AHP we get a total orderings or ranking in the following manner: This is followed by the bank deposit, gold, real estate, equity investment and finally the mutual fund.

So, we can conclude that the nine group leaders have agreed the following rank preference of the financial product:

- ◆ post office;
- ◆ bank deposit;
- ◆ gold;
- ◆ real estate;
- ◆ equity investment;
- ◆ mutual fund.

Scope for further research

In future, research can be done in the area of financial product preference with respect to the personal factors like age, income, dependents, educational qualification, and nativity. Moreover, each and every financial product can be analysed with respect to the

scheme, companies or brands. Apart from using the AHP, further research also can be carried out in the above topic using Triangular Fuzzy Numbers (TFN), which will provide very accurate results.

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Appendix A

Table 2. The weights assigned by the group leader for the criterion of a financial product

Criteria	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Security of principle	0.222603	0.366847	0.25587	0.68695	0.37879	0.073906	0.151844	0.237949	0.079385
Liquidity	0.380678	0.064784	0.031834	0.122883	0.219284	0.036397	0.110424	0.07391	0.038735
Stability of income	0.156118	0.235057	0.31387	0.236826	0.178249	0.397635	0.080542	0.097091	0.137209
Capital growth	0.043084	0.10549	0.203674	0.397788	0.091891	0.125665	0.198976	0.397636	0.276873
Tax benefit	0.071089	0.043096	0.058621	0.052297	0.070726	0.0971	0.061556	0.036397	0.105097
Purchasing power	0.086587	0.157572	0.106787	0.028283	0.035382	0.237948	0.370687	0.031352	0.329546
Conceal ability	0.039841	0.027155	0.029344	0.093228	0.030588	0.031349	0.025971	0.125665	0.033155

Table 3. AHP priority vector of financial products based on the aspect security of the principle

Financial product	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Post office	0.42482	0.43321	0.130699	0.18512	0.041771	0.163423	0.089262	0.260219	0.028903
Real estate	0.128732	0.033302	0.032306	0.031446	0.147298	0.308296	0.308304	0.433986	0.332314
Gold	0.249584	0.142997	0.250035	0.411147	0.03666	0.049473	0.163406	0.036648	0.110477
Mutual fund	0.102342	0.059522	0.105288	0.225769	0.260214	0.35915	0.030398	0.080076	0.213279
Shares	0.042008	0.073017	0.053897	0.051711	0.08008	0.030398	0.359158	0.04177	0.26946
Bank deposits	0.048851	0.257951	0.427777	0.094807	0.433977	0.08926	0.049473	0.147301	0.045567

Table 4. AHP priority vector of financial products based on their liquidity nature

Financial product	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Post office	0.051712	0.04109	0.08406	0.225767	0.037926	0.08405	0.053956	0.055338	0.063784
Real estate	0.031447	0.128886	0.029524	0.094795	0.468973	0.029524	0.250007	0.267259	0.128878
Gold	0.411151	0.487344	0.047594	0.411142	0.199836	0.047591	0.427722	0.033305	0.487307
Mutual fund	0.094797	0.06372	0.27713	0.031446	0.043429	0.277134	0.130685	0.103078	0.050293
Shares	0.185122	0.050298	0.338022	0.05171	0.084583	0.338028	0.03234	0.209396	0.041086
Bank deposits	0.225771	0.228663	0.22367	0.185141	0.165253	0.223673	0.105289	0.331623	0.228651

Table 5. AHP priority vector of financial products based on their stability of income

Financial product	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Post office	0.433986	0.144212	0.338887	0.166353	0.05534	0.260218	0.359153	0.408321	0.185122
Real estate	0.147301	0.296845	0.143166	0.354654	0.267254	0.433985	0.089261	0.091333	0.031447
Gold	0.036648	0.034336	0.03548	0.040225	0.033306	0.036652	0.030396	0.182691	0.411151
Mutual fund	0.080076	0.057909	0.078671	0.08713	0.103092	0.080076	0.163422	0.040307	0.225771
Shares	0.4177	0.114936	0.040253	0.04489	0.209391	0.04177	0.049469	0.053198	0.051712
Bank deposits	0.260219	0.351761	0.363542	0.039749	0.331617	0.1473	0.308299	0.22415	0.094797

Table 6. AHP priority vector of financial products based on the capital growth

Financial product	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Post office	0.049473	0.037159	0.030392	0.036656	0.050297	0.028898	0.059522	0.407576	0.257952
Real estate	0.35915	0.150333	0.359172	0.1473	0.063781	0.332318	0.25795	0.196346	0.073022
Gold	0.308296	0.265561	0.308318	0.260217	0.128874	0.110478	0.433209	0.093375	0.433211
Mutual fund	0.08926	0.04243	0.089265	0.041769	0.228672	0.213282	0.073017	0.030427	0.059516
Shares	0.163423	0.420427	0.163429	0.433983	0.487283	0.269464	0.142996	0.049574	0.033302
Bank deposits	0.030398	0.08409	0.049424	0.080076	0.041094	0.04556	0.033306	0.222702	0.142997

Table 7. AHP priority vector of financial products based on their inflation resistant nature

Financial product	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Post office	0.03214	0.053896	0.407621	0.142998	0.130685	0.103091	0.332791	0.028903	0.084059
Real estate	0.436469	0.250033	0.196363	0.257954	0.053957	0.033162	0.377072	0.33231	0.029523
Gold	0.246629	0.105287	0.093394	0.411142	0.032341	0.03304	0.03207	0.11049	0.047591
Mutual fund	0.101644	0.130698	0.03038	0.033295	0.250007	0.209393	0.06916	0.213276	0.277132
Shares	0.129655	0.427773	0.049521	0.059517	0.427721	0.055337	0.056676	0.269456	0.338023
Bank deposits	0.053463	0.032313	0.222722	0.433217	0.10529	0.267256	0.132231	0.045567	0.223671

Table 8. AHP priority vector of financial product based on their tax benefit

Financial product	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Post office	0.411134	0.359189	0.049473	0.427734	0.272777	0.332318	0.267263	0.433983	0.203984
Real estate	0.031448	0.030379	0.030396	0.032333	0.030507	0.110478	0.027863	0.1473	0.262001
Gold	0.225763	0.049394	0.359151	0.130688	0.084708	0.04556	0.05883	0.036656	0.326451
Mutual fund	0.094806	0.089269	0.308296	0.053952	0.047911	0.028898	0.210021	0.080076	0.059606
Shares	0.18514	0.163436	0.163423	0.10528	0.224692	0.269464	0.331045	0.041769	0.035238
Bank deposits	0.05171	0.308333	0.08926	0.250013	0.339406	0.213282	0.104977	0.260217	0.112719

Table 9. AHP priority vector of financial product based on their concealable nature

Financial product	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Post office	0.059522	0.257987	0.257973	0.408325	0.048617	0.217899	0.21792	0.053957	0.43321
Real estate	0.257948	0.072982	0.073024	0.091323	0.248009	0.111718	0.111715	0.25001	0.033306
Gold	0.433206	0.433282	0.433254	0.182693	0.040715	0.482384	0.482369	0.105278	0.142996
Mutual fund	0.142995	0.033269	0.059466	0.040308	0.127643	0.066267	0.066265	0.130686	0.059516
Shares	0.073022	0.059464	0.033274	0.053198	0.101531	0.03558	0.035587	0.427728	0.073022
Bank deposits	0.033307	0.143015	0.143008	0.224153	0.433485	0.086152	0.086144	0.03234	0.257951

Table 10. Total score of financial products using AHP numbers

Financial product	GL 1	GL 2	GL 3	GL 4	GL 5	GL 6	GL 7	GL 8	GL 9
Post office	0.219333	0.230379	0.202673	0.158208	0.063823	0.18587	0.205755	0.291202	0.165088
Real estate	0.129402	0.14889	0.152189	0.173895	0.223062	0.331326	0.277328	0.257159	0.094274
Gold	0.285742	0.1506	0.183164	0.216612	0.083687	0.061317	0.188726	0.084077	0.258738
Mutual fund	0.096454	0.069396	0.101697	0.064856	0.162335	0.149981	0.087023	0.068709	0.165901
Shares	0.120682	0.177475	0.086316	0.205701	0.164722	0.105469	0.132855	0.114012	0.156817
Bank deposits	0.148387	0.22326	0.27396	0.180693	0.30237	0.166038	0.108312	0.184841	0.159182