International Journal of Scientific Research and Management (IJSRM)
||Volume||5||Issue||06||Pages||5687-5691||2017||
Website: www.ijsrm.in ISSN (e): 2321-3418
Index Copernicus value (2015): 57.47 DOI: 10.18535/ijsrm/v5i6.44

A Deliberation on Investment Decisions

Dr.Vandana Bagla

Maharaja Agrasen Institute of Technology,
Guru Gobind Singh Indraprastha University,
Sector-22, Rohini, Delhi-110085, India.
vandanabagla6928@gmail.com

Abstract: ***An investment is rendered with the anticipation that it will generate some legitimate income or will appreciate in the future. Apart from taxation purpose, an added enticement is to create future wealth. While making an investment, the basic criteria under consideration are returns on investment, risks associated with the investments, tenure and last but not the least is liquidity of the investment in hour of need. Broadly one can invest money in four major categories viz. fixed income schemes, market based ventures, gold purchase and property. The most felicitous investment option may be opted as per need, budget and future planning. This paper is intended to determine the aspects that an investor should keep in mind while putting in his stake. A weighing technique based on pair wise comparison matrices has been used to suggest investment ratio for middle class investors.***

Keywords: Consistency, MCDM (Multi Criteria Decision Making), Returns, Risk, Tenure, Liquidity.

1. Introduction

Investments are assets; one puts his money in to get profitable returns. With the fast growing economy, numerous investment options are available to meet one's requirements and investment capacity. Returns, risks, time frame and liquidity are the major aspects that click in your mind instantly whenever you think of getting into an endeavor. Fixed income schemes as name suggests, offer assured returns from investment after a prescribed time period. One can also opt for monthly income schemes for regular income. Rate of return and time frame under these schemes are fixed and negligible risks are involved in these investments. Market based investments include shares or equities, mutual funds and unit linked plans offered by banks or companies. In these types of investments, fund values keep on fluctuating according to the fund holdings proportionally as per gains or losses in the fund. Investors may reap high profits if the market surges and also these investments are prone to market risks and may experience losses due to factors that affect the overall performance of the financial markets. An equity investment is also a market based investment and generally refers to the buying and holding of shares of stocks by individuals and firms. Share holders can anticipate good income from dividends and capital gains depending upon the market performance of the stock, where the investment has been made. Mutual funds are usually run by asset management companies who invest their money in stocks, bonds and other securities. Gold is believed to be the most robust mode of investment by majority of people rich or poor. Undoubtedly, it is the favorite investment avenue for females in form of ornaments as it not only satisfies their just for tradition but also craving for exhibition and also it can be encashed anytime in the hour of need. For the right reasons, the investment in gold is the suitable asset to let your savings keep a step ahead of the inflation. If someone has high investment potential and is looking for low risk assets, which offers good returns in the long run, then spending in property would be the right choice. Capital grows as the worth of the property goes up and also regular incomes may be earned through renting.

This article intends to evaluate the most befitting investment avenues for middle class people in various assets to keep going their day to day needs as well as grow their money for future prosperity. Various investment portfolios and articles were surveyed for this purpose. In an article by Jacobs and Levy [1], irregularities in equity returns have been discussed. Black and Gilson [2] have compared bank savings with stock markets. Ackermann et.al. [3] have explored risks, return and incentives on investments, while Lynch [9] highlights how to invest big in various assets for rich gains.

We have employed a ranking methodology which provides weights to various investment options based on different criteria viz. returns, tenure, liquidity and risk factor, using pair wise comparison matrices as in Bagla et.al. [11]. Over the last three decades, a number of methods have been developed which use pair wise comparisons of the alternatives and criteria for solving MCDM problems. AHP proposed by Saaty [10] has been a very popular approach to MCDM that involves pair wise comparisons for an objective analysis. It has been used during the last thirty years in many decision making situations and a wide range of applications in various fields. Bagla et.al [11] portrayed that the calculated priorities are presumable only if the comparison matrices are consistent or near consistent. The concept of pair wise comparisons is more than two hundred years old. Borda [6] and Condorcet [13] introduced it in eighteenth century by using only 0 and 1 in the pair wise comparison matrices. The method was efficiently carried out by Thorndike [4] to tackle the classical techniques of experimental psychology. Thurstone [7] also used pair wise comparisons for characterizing social values in twentieth century.

The paper is organized in four sections. Section 1 is introductory highlighting importance of investing in right assets and incorporating a brief history of pair wise comparisons and the employed methodologies. Section 2 describes the problem under consideration by presenting a hierarchical structure of criteria for investment decisions and introduces an application. Section 3 explains the application part using proposed methodologies to provide final ratios.

Finally we draw some conclusions, followed by giving applications for further research in section 4.

2. Problem Statement

Investment is a tricky business, especially for middle class people who cannot afford big risks and on the other hand they want to grow their money for future security and prosperity. For effective investing, one needs to have a concrete understanding of the state of the market, as well as a clear idea of expected future cash flows based on the returns on investment and liquidity at the time of need, taking into account prodigious risk factors. A middle class investor looking to invest his hard earned money into any asset has to critically analyze the criteria like returns, risk profile, time frame and also liquidity aspects. Various investment options are available, which can be broadly categorized as fixed income schemes, market based ventures, gold purchase and investment in property. The key issue is to design a model suggesting ratio of investment into various ventures which is befitting the middle class investors, accounting all the above mentioned criteria. Usually there is no optimal solution; as no attribute is the best one on each criterion. Problem is to provide weights to various investment options according to their credibility on the set of above mentioned criteria for middle class investors. The problem of weighing of investment options is submitted to multi criteria evaluation using methodology [12] explained in next section. Potentially all the investment options are to be judged on valid set of criteria that are acceptable to all the investors. The most critical phase in designing the weighing model is to structure the decision problem. As conflicting views may arise among different investors in determining the most important criteria of evaluation, a general survey was conducted to develop the main criteria for weighing investment options. Figure 1 shows the developed hierarchical structure.

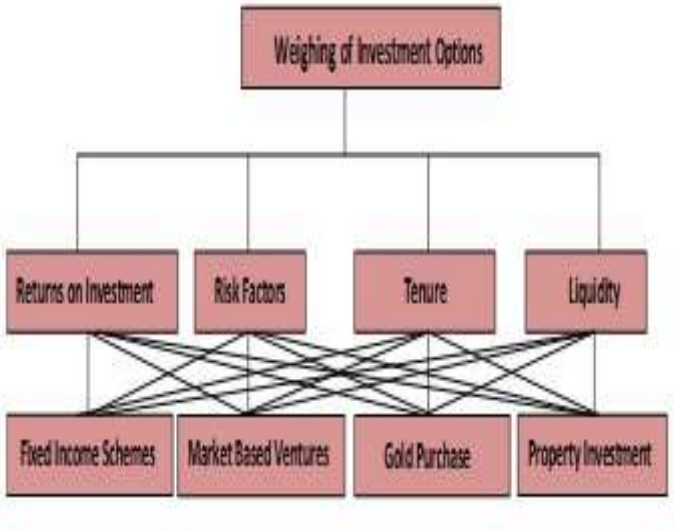

Figure 1: Hierarchy

The criteria under consideration are returns on investments, risk factors associated with the investment, tenure or time frame and liquidity of investment or cash in hand when required Investing in right place is quite challenging but can bring great rewards if done wisely. This inquisition leads to a systematic investment plan involving sensible and practical suggestions which can validate above set of criteria.

3. Solution Procedure

The proposed methodology of designing a balanced investment plan for middle class investors consists of three steps:
(1) Identify the criteria to be used in the model; (2) weigh the criteria by using expert views; (3) evaluation of alternatives and determination of the final weights to various investment options. In the first step, with the help of expertise opinion of skilled financial advisors, we have devised the affecting criteria in making investment decisions discussed in section 2. To evaluate the above hierarchy using pair wise comparisons, decision makers are asked to allot rankings to the leveled criteria according to their thoughtful priorities. Numeric weights are provided to all the criteria using the procedure explained explicitly in section 3.1. Final weights are provided using SAW (Simple Additive Weighing) given in section 3.2.

3.1 Procedure to Find criteria weights using pair wise comparisons

It is an approach to decision making that involves structuring multiple judgment criteria into a hierarchy, assessing the relative importance of these criteria, assessing alternatives for each criterion, and determining overall weights of the alternatives. These evaluations are in form of numerical values that can be processed and compared over the entire range of the problem. A numerical weight or priority is derived for each element of the hierarchy, allowing distinct and often incommensurable elements to be compared to one another in a rational and consistent way. For this, the elements of a problem are compared in pairs with respect to their relative impact on the property they share in common.
A decision-maker should first rank all the *n* attributes to be weighed, according to their importance in the preferred domain and reorder them in an ascending order of priorities. The pair wise comparison is quantified in a matrix form in which the $(i, j)^{th}$ element a_{ij} is filled by the corresponding number using the scale $\{a/b : a, b \in \{I+\}\}$. If any two or more criteria are equally significant, obvious priority of one over the other is '1' using the given scale. Exercise $(n-1)$ comparisons among the consecutive criteria using the given scale. Priorities for remaining pairs (non-consecutive) can easily be computed logically as follows:
If B be prioritized *r* times to A and C is prioritize *s* times to B, then C is prioritized $r \times s$ times to A. Objective ratings to all potential pair wise comparisons can be provided in this manner and represented in a matrix form to provide weights to given set or criteria. It is conspicuous to mention here that priorities within a given pair of attributes are self-reciprocal, i.e. if B be prioritized q times to A then preference of A over B is 1/q times. *A* is a typical pair wise comparison matrix of *n* alternatives representing the intensities of the expert's preference between individual pairs of alternatives

. A_i versus A_j, for all i,j$A = \begin{pmatrix} 1 & a_{12} \dots & a_{1n} \\ \frac{1}{a_{12}} & 1 \dots & a_{2n} \\ \dots & \dots & \dots \dots \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} \dots & 1 \end{pmatrix}$

The matrix so formed is called the reciprocal matrix. This reciprocal matrix is used to calculate the local priority weight of each criterion. The local priority weight (w) is the normalized eigen vector of the priority matrix corresponding to the maximum eigen value of the matrix.

For detailed reasoning of this account we refer to Lunging [5], Bryson and Mobolurin [8] and Ball et.al.[12]. An interesting property of the priority matrix is that if in addition its elements satisfy the relation $a_{ij}\, a_{jk} = a_{ik}$, $i \leq j \leq k$, the reciprocal matrix is called consistent. However in practice, Saaty [10] introduced the concept of consistency index CI of a reciprocal matrix as the ratio $\frac{\lambda_{max}-1}{n-1}$ for measuring consistency of priority matrices, where λ_{max} and n respectively stand for the maximum eigen value and order of the reciprocal matrix. In general, a consistency ratio comes out to be nearly zero. If consistency is poor, inconsistency of judgments within the matrix has occurred and the evaluation process should therefore be reviewed and recalculated.

The procedure described V.Bagla et.al [11] results in perfectly consistent comparison matrix supported by the fact $\lambda_{max} = n$ and hence CI $\approx$ 0. Eigenvector corresponding to this maximum eigen value provides the requisite criteria weights. The outcome is a prioritized weighting of each decision alternative. This accomplishes aggregated matrices for the set of criteria at various levels of hierarchy. The nodes at each level are compared pair wise with respect to their contribution to the nodes above them to find their respective global weights. We rank each of the criteria in the final set by evaluating it with respect to upper level attributes separately. The evaluation process finally generates the global weights for each requisite criterion of interest. In a realistic scenario, the technique is very adaptable and can handle any number of attributes in a system. This simplification can reduce the calculation effort for the weights significantly, especially when judgment criteria are large in number and pair wise comparisons are difficult to be accomplished.

3.2 SAW (Simple Additive Weighing)

The SAW method is probably the best known and most widely used MCDM method. It is intuitive and easy. A score in the SAW method is obtained by contributions from each criterion.

Since two items with different measurements cannot be added, a common numerical scaling system such as normalization is required to permit addition among criteria values. The total score for each alternative can be computed by multiplying the comparable ratings for each alternative with its respective criterion weight and then adding these products over all the criteria. In general, suppose that a given MCDM problem is defined on *m* decision criteria *n* alternatives.

Furthermore, let us assume that all the criteria are beneficial criteria. That is, the higher the values are, the better it is. Next suppose that w_i denotes the relative weight of importance of the criterion C_i and p_{ij} is the normalized performance value of alternative A_j when it is evaluated in terms of criterion C_i. Then the total importance of alternative A_j, denoted as R_j is defined as follows: $R_j = \sum p_{ij}\, w_i \quad \forall j$

3.3 Allotting Weights to Criteria and Investment Options

An economic survey was conducted on selected financial advisors to give their priorities to above specified parameters and also to various investment options in lieu of middle class investors. They were solicited to rank four attributes viz. returns on investments, risk factors, tenure and liquidity in ascending order in conformance with their priorities. To evaluate the hierarchy (Figure1), they were also requested to rank the investment options viz. fixed income schemes, market based ventures, gold purchase and property in ascending order of importance.

The ranking awarded by to four criteria was (Tenure, Liquidity, Risk Factors and Returns) in ascending order of priorities where Liquidity is prioritized 3 times over Tenure, Risk Factors are prioritized 2 times over Liquidity and Returns are prioritized 2 times over Risk Factors. Allotted weights using procedure discussed in section 3.1 are (0.0454545, 0.136364, 0.272727 and 0.545455) as shown in Table 2.

Table 2 : Prioritized Weights for financial criteria

	Returns	Risk Factors	Tenure	Liquidity	Weights
Returns	1	2	12	4	.545455
Risk Factors	1/2	1	6	2	.272727
Tenure	1/12	1/6	1	1/3	.0454545
Liquidity	1/4	1/2	3	1	.136364
λmax = 4, C.I. = 0					

Table 3, 4, 5 and 6 respectively provide the priorities of various investment options with respect to each criterion.

Table 3: Prioritized weights with respect to returns

Returns	Fixed Income Schemes	Market Based Ventures	Gold Purchase	Investment in Property	Weights
Fixed Income Schemes	1	1/2	1/4	1/16	.0434783
Market Based Ventures	2	1	1/2	1/8	.0869565
Gold Purchase	4	2	1	1/4	0.173913
Investment in Property	16	8	4	1	0.695652
λmax = 4, C.I. = 0					

Table 4: Prioritized weights with respect to risk factors

Risk Factors	Fixed Income Schemes	Market Based Ventures	Gold Purchase	Investment in Property	Weights
Fixed Income Schemes	1	2	1/3	1/6	0.0952381
Market Based Ventures	1/2	1	1/6	1/12	0.047619
Gold Purchase	3	6	1	1/2	0.285714
Investment in Property	6	12	2	1	0.571429
λmax = 4, C.I. = 0					

Table 5: Prioritized weights with respect to tenure

Tenure	Fixed Income Schemes	Market Based Ventures	Gold Purchase	Investment in Property	Weights
Fixed Income Schemes	1	1/6	1/12	1/2	0.048619
Market Based Ventures	6	1	1/2	3	0.286714
Gold Purchase	12	2	1	6	0.569429
Investment in Property	2	1/3	1/6	1	0.095238
λmax = 4, C.I. = 0					

Table 6 : Prioritized weights with respect to liquidity

Liquidity	Fixed Income Schemes	Market Based Ventures	Gold Purchase	Investment in Property	Weights
Fixed Income Schemes	1	1/4	1/8	2	0.075074
Market Based Ventures	4	1	1/2	8	0.298296
Gold Purchase	8	2	1	16	0.589593
Investment in Property	1/2	1/8	1/16	1	0.037037
λmax = 4, C.I. = 0					

Table 7 shows normalized weights to all criteria and investment options

Table 7: Prioritized normalized weights

	Returns 0.545455	Risk Factors 0.272727	Tenure 0.454545	Liquidity 0.136364
Fixed Income Schemes	0.0434787	0.0952381	0.048619	0.075074
Market Based Ventures	0.0869565	0.047619	0.286714	0.298296
Gold Purchase	0.173913	0.285714	0.569429	0.589593
Investment in Property	0.695652	0.571429	0.095238	0.037037

Now ranking for each investment option can be easily obtained using SAW (Simple Additive Weighting) as explained in section 3.2.

W_1=[(.545455)(.0434787)]+[(.272727)(.0952381)]+ [(.0454545)(.048619)]+ [(.136364)(.0750741)]
= 0.0659507

W_2=[(.545455)(.0869565)]+[(.272727)(.047619)]+ [(.0454545)(.286714)]+[(.136364)(.298296)]
= 0.1168039

W_3=[(.545455)(.173913)]+[(.272727)(.285714)]+ [(.0454545)(.569429)]+ [(.136364)(.589593)]
= 0.2725660

W_4=[(.545455)(.695652)]+[(.272727)(.571429)]+ [(.0454545)(.0952381)]+ [(.136364)(.037037)]
= 0.5446705

Here W_1, W_2, W_3 and W_4 respectively depict weights of the four investment options viz. fixed income schemes, market based ventures, gold purchase and investment in property. Results clearly establish the ratio of investments as 7:12:27:54, which may be fruitful for middle class investors in terms of mentioned criteria of which most prioritized are returns and risk factors.

*It is to be noted that it is a general investment advice for middle class investors presuming they are having sufficient funds to choose and invest in said investments options. But suggestions may vary as per individual needs, wishes and availability of funds.

4. Concluding Remarks

Selecting the appropriate investment strategy has never been a easy task and it has a dramatic conceptions on the go or no-go decisions. Technical analysis using optimization techniques pacifies the uncertainty and can authenticate return on investment decisions as shown in above estimations. Also it is stressed out that investing is not one size fits all. Different strategies work distinctly for different investors in different situations. It is advised an investor should employ more than one strategy or choose a variety of investment vehicles depending upon their goals. It is important that investors have a plan and a target in mind before investing their money and also the capping on tolerance for risk factors. Additionally one should diversify his investments so that some do well when the rest of your portfolio might not. This approach allows an investor to construct a portfolio that is in line with their risk tolerance and that balances potential returns with some depreciatory risk protection. This research article is pioneered to set up an exemplary investment plan for middle class investors which may be extended to diversified and huge class of investors.

Acknowledgement

I wish to acknowledge all the financial advisors and contributors whom I have consulted for investment advices which helped in planning my personal investment portfolio as well as writing this article on investment strategies. I am also thankful for online support from CGI software on which I carried out pair wise comparisons and calculated prioritised weights.

References

[1] B.I. Jacobs and K.N. Levy, 1988a, *Disentangling Equity Return Irregularities: New Insights and Investment Opportunities*, Financial Analysts Journal, Vol 44, 18-44.

[2] B.S. Black and R.J. Gilson, 1998, *Venture Capital and the Structure of Capital Markets: Banks versus Stock Markets*, Journal of Financial Markets, v47, 243-277.

[3] C. Ackermann, R. McEnally and D. Ravenscraft (1999), *The Performance of Hedge Funds: Risk,*

Return and Incentives, Journal of Finance, v54, 833-874.

[4] E.L.Thorndike (1920), A constant error in psychological ratings. Journal of Applied Psychology. vol. 4. p. 25 - 29.

[5] F. Lunging (1992), Analytical hierarchy in transportation problems: an application for Istanbul, Urban Transportation Congress of Istanbul. vol. 2. p. 16-18.

[6] J. Borda (1781), Mmoire sur les lections au scrutiny. Histoire de lAcademie Royale des Sciences.

[7] L.L.Thurstone (1927), The method of paired comparisons for social values, Journal of Abnormal and Social Psychology. vol. 21. p. 384-400.

[8] N. Bryson and A. Mobolurin (1994), An approach to using the analytic hierarchy process for solving multiple criteria decision making problems. European Journal of Operational Research. vol. 76. p. 440-454.

[9] P.Lynch (1997), *How to invest a million*, Worth Magazine, March issue.

[10] T.L.Saaty (1980), The Analytic Hierarchy Process, McGraw Hill, New York.

[11] V.Bagla, A. Gupta and A. Mehra(2013), Improving Consistency of Comparison Matrices in Analytical Hierarchy Process. International Journal of Current Engineering and Technology. 3(2). p. 316 – 321, 2013.

[12] V.C. Ball., J. Noel and Srinivasan (1994), Using the analytic hierarchy process in house selection, Journal of Real Estate Finance And Economics. vol. 9. p. 69-85.

[13] V.Condorcet (1785), Essai sur lapplication de lanalyse la probabilit des dcisions rendues la pluralit des voix, Paris.