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Introduction

Decision support systems (DSS) are designed to assist a decision makers in semi-structure decision making tasks and support, rather than replace, managerial judgements [Keen&Scott Morton 1978, Sprague & Carlson 1980]. Allocation of investor's assets in investment instruments (such as stocks, bonds, Tbills, etc.) is a semi-structure problem [Bolster, et al. 1995, Chow 1995]. It requires substantial knowledge about investment concepts as well as relations among them in order to be able to evaluate different asset allocation schemes (portfolios) in terms of their suitability to the investment objectives and the financial profile of the investor. Several optimization model are developed for asset allocation, but professional and individuals rarely use them without any subjective fine tuning. The lack of use suggests that the problem is not structured enough to accurately develop objective functions and some of the constraints.

We have approached this problem from the DSS point of view. We have designed and developed a prototype DSS that will provide support to the user in determining appropriate portfolio. The DSS considers unique characteristics of the investor such as investment objective, current financial conditions, financial history, level of knowledge in investments, etc. in order to develop user-specific support. Since the variables involved in asset allocations are judgmental in nature, the decision maker should be knowledgeable enough to provide necessary judgmental inputs. The DSS described in this paper provides support to the user for the judgmental inputs by guiding the user during the decision making process.

The prototype

The system has four major modules: Data, Model, Guidance and User Interface [Fazlollahi, et al. 1996].

_ Data module stores raw data or facts about user financial characteristics, investment concepts & procedures, and user investment knowledge profile.

_ Model module has models to determine risk and return of portfolios, to deliver instruction or guidance, to diagnose the user needs and to develop user investment knowledge profile.

_ Guidance module determines the support needs given the current state of the user knowledge, the financial characteristics of the portfolio and decision context.

_ User interface module supports effective communication with the user.

The figure 1 shows the task flow of the prototype DSS. A user goes through three phases: Skill/knowledge assessments, Investment profile determination, and the DSS.

In the skill/knowledge assessment, the user goes through a set of questions related to investments to diagnose the user's level of knowledge in asset allocation. A user knowledge profile is developed from the user responses. Depending on the user sophistication level, future guidance will be given at different levels for different categories of users.

The next phase is user investment characteristics profile determination. In this phase, the user is asked to submit facts about his/her present financial conditions (current income, current expenses, stability of income, age, dependents, etc.), investment objective (retirement, college fund, etc.), financial history, experience in investments, etc. The system provides guidance during this phase depending on the contents of the question (task) as well as user's investment knowledge profile. Here, purpose of the guidance is to assures that the user has sufficient knowledge about related concepts to be able to accurately provide requested information. The output of this phase is user investment characteristics profile which gives us information about the user's objectives, expectations, risk tolerance, time horizon, etc. and helps the system determine a suggested portfolio.

Figure 2 shows a typical screen from Investment profile determination phase. The screen is in three parts: question, guidance, and answer. The interface is designed to allow the user to use the guidance before he moves on to answer the question. The user is not allowed to move forward unless he answers the questions.

The next is the DSS phase, where the system first provides the user with the suggested portfolio as an approximate solution given the user investment characteristics. This gives a starting point to the user in the decision making process rather than giving a final machine-developed optimized solution as in case of optimization models. Then, the user uses the system to perform "what-if" analysis on different asset allocation schemes (portfolios). It allows the user to examine outcomes of the alternatives portfolios in terms of risk and return, and compare them with the allocation proposed by the system. During each iteration of "what-if," the system gives the user appropriate guidance about suitability of the user developed portfolio. The user also has chance to ask for more explanation and review some of the related investment concepts. This iterative trial and guidance will converge to a reasonable user-defined portfolio with which the user will feel comfortable. This will also increase user's knowledge about the problem domain (investments) and the process of decision making (asset allocation).

Figure 3 shows the DSS screen. The screen is designed to help user compare the user-defined and suggested portfolios. Everytime the user defines his portfolio and clicks on "Calculate" button, the system determines the return and the risk for the portfolio and the new guidance message. The guidance message contains information about the class of the user-defined portfolio and a brief evaluation of the suitability of the portfolio to the user.

The user is allowed to ask "Why?" question to see a detailed explanation on each dimensions of suitability.

The system is developed using Visual Basic in Windows environment.

REFERENCES

Bolster, P., Janigian, V., & Trahan, E., " Determining Investor Suitability using the Analytic Hierarchy process," Financial Analysts Journal, July- August 1995, pp. 63- 75.

Chow, G., "Portfolio selection based on return, risk, and relative performance," Financial Analysts Journal, March- April 1995, pp. 54- 60.

Dos Santos, B.L., & Hollsapple, C. W., "A Framework for Designing Adaptive DSS Interface," Decision Support Systems, V5, 1980. pp1-11.

Fazlollahi, B., Parikh, M, & Vahidov, R., "Adaptive Decision Support Systems for Asset Allocation," Working paper, 1996.

Keen, P.G.W., "Adaptive Design for DSS," DataBase, vol.12, No.1 & 2, 1980, pp.15-25.

Keen, P.G.W., & Scott Morton, M.S., Decision Support Systems: An Organizational Perspective, Addison-Wesley, Reading, MA, 1978).

Sprague, R.H., & Carlson, E.D., Building Effective Decision Support Systems, Prentice-Hall International, Englewood Cliffs, N.J., 1982. 1980, pp.1-26.