

Risk analysis in managerial economics

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Managerial economics is a branch of microeconomics that uses analysis techniques of Microeconomics in decision making for business and other management units. It applies the microeconomic theories pertaining to pricing and cost into practice. It uses statistical and econometric calculations to provide optimal decisions. Due to constraints in resources, firms and households try to maximize their objectives subject to budget constraints. Business management adopts usage of managerial economics when dealing with critical decisions making policies. These include; (Hirschey, M. and J. L. Pappas 1998)

- Risk analysis – optimal decisions have to be made to minimize the variability of expected returns from the actual returns. It may also involve minimizing loss on capital and delay in receiving the returns.
- Pricing analysis – adopts the microeconomic theory of demand and supply to get optimal and feasible price levels. It also incorporates pricediscrimination behaviors for monopolists and the price elasticity of demand. Multinational corporations also use Transfer Pricing to lower the outstanding tax payable.
- Capital budgeting – involves corporate financed decisions geared towards asset investments and valuations of investment expenditures. Project analysis is also a vital part of decision making that management adopts by using tools like the Net Present Value, and Capital Asset Pricing Model.
- Production analysis. Optimal production decisions are paramount to minimize wastage and excess output. Production analysis is centered on

allocation of factors of production like capital and labor, production efficiency and cost minimization.

Every investment decision carries the element of return and risk associated with it. Returns can be earned from capital gain or yield from equities and other fixed income investments. Variability and deviation of returns from the expected level is the risk associated with the investment. The risk- return trade off is the fact that those investments that offer high returns have a higher associated level of risk and vice versa. Risk analysis is therefore an integral part of business decision-making process.

Risk analysis lies in the everyday volatilities and uncertainty of investments. According to Cornelius Keating, risk analysis is the study of “ the unwanted subset of a set of uncertain outcomes” (2010). Hence, in determine the associated risk, probability calculations are used to measure it. Probability of an even is the likeliness that a certain event will occur. By analyzing risks through probability, various possible outcomes are listed and a probability assigned to each likely outcome. Probability distribution is then used to calculate expected outcome. If a manager wants to calculate expected profit from a certain project, the weighted average, which is the expected return from the project, is got by summation of the product of possible profit and the probability distribution. If the project has a higher probability distribution, then its actual profit is more highly chanced to be close to the expected value. Any variations might be stochastic risk that is not explained by the probability model.

There are several risks that managements face every day and such it is important for such risks to be minimized. The most common form of risk is the political risk associated with changing political environments.

Political authorities change with time but stability in market environment changes with every change. Markets are highly sensitive to new policies that might be adopted by new governments therefore eroding expected returns to investments. Radical changes in tax structure, currency reforms, and restrictions in capital transfer possess a risk premium to returns.

The second risk investors' face is the exchange rate risk. Fluctuations in exchange rates cause changes in earnings for foreign holding and trade, and profitability of foreign firms. Since trade involves import and export, any sudden change in the exchange rates is a risk to investors. Thus, variability in exchange rates causes variability in returns.

Liquidity risk is another risk associated with investment. Management is interested in easiness with which a certain investment can be converted into cash without concession of the price. When significant amount of capital is invested, there should not be a problem when the investment is to be liquidated. When such a problem occurs, the investment is said to possess a liquidity problem. Equities and fixed income investments like bonds are more liquidity than fixed assets like machinery. Various secondary markets have their different liquidity risks.

For investments like fixed deposit in banks, when the rate on return is lower than the prevailing market inflation, then there exists a risk. Inflationary risk

is goes hand in hand with interest rate risk. When an investment's return is affected by interest rate, it is also most likely to be affected by inflation risk. Interest rates generally tend to rise when inflation rises.

When returns falls or fluctuates due to forces affecting the entire markets like exogenously like recession, war, structural changes in the economy, change in consumer tastes and preferences, there exists market risk in the underlying investment (Phillips, 2010).

The primary utility of an analysis of risks faced by projects lies not in enabling

choice among competing projects but in the information this provides about the proposed project and its particular environment—such that consideration can be given as to how the project may be redesigned to reduce risks to an acceptable level. Ideally, the same level of expected benefits

may be found to be achievable with less risk or, if risk reduction also reduces, expected

benefits, then the extent of that trade-off can be made clear to planners and/or beneficiaries.

When an operation has been identified to possess uncertainty that borders on risk, implementation of risk analysis lies in three basic steps.

The first step involves identification of possible opportunity where the risk analysis tools can be used. It involves identification of all possible sources of risks. The second step involves quantification of various possible outcomes. It involves quantifying associated risk. The last stage is concerned with assessing, within the possible outcomes, the estimated best economic or
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operational result. The third and second stages involve data collection, cost analysis, probability, and economic determination.

When embarking on capital budgeting and investments, management always wants to know the chance that its long term projects like research and development projects, acquisition of new machinery, construction of a premise e. t. c. are worthy the resources.

Each potential capital expenditure project is discounted to find the Net Present Value. Each project's incremental cash flow expected during a certain period is discounted and valued at the present time. A decision then has to be made on which project to adopt or if it is worthy implementing. Project valuation that results in positive net present value is adopted.

Project valuation under NPV involves estimation of possible cash flow and forecasting possible risks. Asset financing stems from un accounted for variable risks that make the final cost differ from the budgeted outlay.

One fundamental success aspect of Capital budgeting is sensitivity analysis. According to Saltelli et al, sensitivity analysis involves study of how variations and uncertainty in planned model can be apportioned qualitatively and quantitatively to different elements in the model. It involves changes done to the measured parameters of a model and seeing how these changes affects the entire model. When there are more parameters at hand, sensitivity analysis is used to measure what parameter has the biggest weight effect. When a project cost under consideration is a function of interest rates and time, with the provision that costs increases with time, the management might try to change different values of projected interest rate

and time p . In addition, see what effect each changes has on the project cost. Sensitivity analysis answers questions like, suppose the interest rate rises in future, how will this affect the project? Alternatively, suppose the budgeted time is overshoot, how will this affect the project?

It uses the techniques of calculus to derive the change in total project cost associated with each of the exogenous variables, i. e. interest rates and time. The process of sensitivity analysis involves procedures like;

- Specification of the model function. Mathematical relationship between the dependent and independent variables of the model
- Identification of model parameters
- Running correlation analysis for the entire total variables and separate two variable analysis to determine the effect each independent variable has on the endogenous variable (Breierova, and Choudhari, 1996)

The slope of the model will give the relevant parameters that are to be used in evaluating the strength of the correlation between the variables. This will also give the multiplier of each model that can be used to estimate the individual effect of interest rates and time on total project cost.

Managers use sensitivity analysis to gauge the strength and reliabilities of constructed models, estimate source of model variability, optimum allocation of resources, form basis for future collection of data.

The “ what if” analysis can also be used to effect of changes in projected cash flow will have on an entire project.

In pricing decisions, managements can also adopts various models to estimate effect of a change in supply or cost of an input will have on the total unit cost of production. Estimation of such an effect aids management in fixing fair prices and separate production total and variable costs. In estimation of price elasticity of demand, sensitivity analysis can be used to estimate how revenue will be affected whenever there is a change in prices of goods and services, change in consumer tastes and preferences, competition and purchasing power of customers.

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