
AN ASSESSMENT OF RISK ANALYSIS TECHNIQUES AND INVESTMENT PERFORMANCE AMONG NIGERIAN FIRMS

Ayodele Thomas D.
*Department of Accounting and Finance,
Ajayi Crowther University, Oyo, Oyo State, Nigeria
ayodeleconcept@yahoo.com*

ABSTRACT

The trust of this paper is to assess how far the Nigerian firms' managers make use of risk analytical techniques in their project evaluation and management, and the effect of such analytical techniques on the investment performance of their firms. The population of the study comprise Nigerian manufacturing companies out of which a random sample of 22 were selected from Lagos State being the most industrialized state in Nigeria. Simple percentage was used to classify responses of respondents supported by ranking of the various risk analytical techniques in terms of their popularity among the firm's managers. The findings of the study indicate that Nigerian firms' managers make use of risk analytical techniques, though the use of payback period method is more popular than others. It was also discovered that the use of analysis cuts across all categories (sizes) of firms operating in Nigeria and positively affect their performance. It is thus recommended that economic and political factors should always be taken into consideration when appraising investment by any to create a conducive environment for firms to operate efficiently.

Keywords: Risk averse, Risk Premium, Variance, Certainty Equivalent, Systematic Risk

INTRODUCTION

The typical characteristic of nearly all business decision is that their precise outcome cannot be known with certainty. This occurs because in capital investment decision, when all is said and done, the future is still the future. Therefore however we forecast, we are still left with the certain knowledge that we cannot eliminate all uncertainties. A businessman can adopt a number of approaches when faced with risk or in certainties, one of which is to adopt an explicit rational approach by reducing the risk as far as possible to mathematical values and evaluating them in the light of stated business objective. When we are faced with risky situations, the decisions we take are not dependent solely on the information given to us. They are at time dependent on our attitudes towards risk taking. Some people are natural risk takers while others natural risk averters. David B. Hertz (1964) states that "of all the decisions that business executives must make, none is more challenging and none has received more attention than choosing among alternative capital investment opportunities". What makes this kind of decision so demanding, of course, is not the problem of projecting returns on investment under any give kind of assumptions. The difficulty is in the assumptions and their impact. Each assumption involves its own degree of uncertainty and taking together, they involve uncertainty of critical proportions. This is where the elements of risk that the executive has been able to get little help from currently available tools and techniques.

Risk in relation to project appraisal is an uncertainty or probability of realizing the future returns or values of a project. The riskiness of an investment project is indicated by the level of an investment decision a risk will adverse investor, who wants more returns and less risk will embark on risk reduction through a well diversified portfolio. The research work is therefore a contribution to the various discussions that have been made on the topic. It attempts to examine the various risk evaluation techniques from literature in relation to their application in Nigeria firms.

THEORETICAL FRAMEWORK

Installing risk analysis throughout a company could be a difficult, time consuming, and expensive operation. Some companies may have an easier time of it than others. Some schools of thought for example, believe that, a strongly decentralized organization may be able to bend risk analysis to its purpose more easily (other things being equal) than a strongly centralized organization can. Today risk analysis is one of the oldest techniques of management science. Many companies have now experimented with and used the techniques that an observer can draw certain conclusion about the why a company should approach it and the kind of considerations management ought to keep in mind if it wants to use it successfully.

CERTAINTY AND UNCERTAINTY IN PROJECT EVALUATION

Project evaluation involves, the estimation of the consequences of the proposals on the particular project, as such they are ranked according to their profitability to enable the firm selects the proposals which maximizes its objective criterion under project selection. Project evaluation technique under certainty makes use of the traditional or non discounted cash flow criteria and/or the discounted cash flow (DCF) criteria while project evaluation technique under uncertainty also makes use of these methods earlier mentioned but only with a slight modification by incorporating risk in its evaluation of investment projects. Project evaluation technique under certainty does not take risk into consideration.

GENERAL PRINCIPLES OF RISK MANAGEMENT

Risk management is a process that involves step by step approach. The various steps involved could be classified as follows:

Risk identification- this involves the full explanation of the operations of the business and in some cases physical inspection (Pamdey, 2004).

Risk Assessment- this deal with estimating the probability of the occurrence, the frequency and severity. it is very important to assess the degree of the risk in terms of the maximum loss and the amount that is recoverable.

Minimization of risk – after the risk has been properly identified and the degree assessed; its characteristics will be determined. There are some risks that are inherent in the nature of a business, they cannot be diversified away. These are called the systematic risk. Other risk can be diversified away and are called the unsystematic risk (olowe 1998).

Absorption of risk- after all possible methods of legitimately reducing the risk have been employed, the reduced risk must be absorbed by somebody or some person. The last step in risk management is therefore the critical decision on who will absorb the residual loss.

RISK MANAGEMENT TECHNIQUES

In the real business world there is a wide range of factors which give rise to risk in fixed investment. Consequently, the length of the economic, the cost and revenues of any investment proposal is uncertain. The longer the expected life of an investment, the greater its risk, since we have to forecast costs and revenue in more distant periods. There are two approaches that have been identified in evaluating projects under risk and uncertainty; namely; the "Traditional" and 'modern'.

THE TRADITIONAL APPROACH

Under this approach, each investment proposal is evaluated on the basis of its own total risk and expected return, in isolation from other existing or prospective investments. (Markowitz, 1952). The expected return of a project is given by the probability distribution of a project is the set of all possible earnings of the project with their respective probabilities.

$$E(x) = \sum_{i=1}^n x_i p_i$$

Where x_i = i th possible earnings
 p_i = probability of i earning,
 $E(x)$ = Expected value of x .

The probability distribution serves two functions. It gives a measure of the average expected earnings of the project and it provides a measure of risk. Measures of risk- The risk of an investment project is measured by the variability of its cash flows (Weston and Copeland 1989.). The most common measures of variability are the variance, standard deviation and coefficient of variation. The variance- this is the average of the squared deviations from the expected value i.e.

$$d^2 = \sum_{i=1}^n (x_i - E(x))^2 p_i$$

The standard deviation (S.D) is the square root of the variances while the coefficient of variation measures the risk per naira of expected cash flows. The formula is given as $C.V = \frac{d}{E(x)}$

THE MODERN APPROACH

This approach uses the portfolio theory which considers each risky investment in the light of its combination with other investments. The expected return of a portfolio investment is the weighted average of the expected returns of the assets (i.e securities) making up the portfolio with the weight being the proportion of funds invested in each asset

n

That is: $E(R_p) = \sum_{j=1}^n x_j E(R_j)$

Where $E(R_p)$ = expected returns of a portfolio
 $E(R_j)$ = expected return of the jth securities in a portfolio.
 X_j = proportion of funds invested in jth security.
 N = number of securities in the portfolio.

The risk of portfolio is measured by the standard deviation of the returns of the portfolio. The probability distribution serves two functions it gives a measured by the standard deviation of the returns of the portfolio. The major contribution made by Harry Markowitz (1952) was the derivation of the standard deviation (S.D). according to him, the S.D of a portfolio is the square root of the sum of two sets of terms given as;

$$dp = \left(\sum_{j=1}^n x_j^2 d_j^2 + 2 \sum_{j=1}^{n-1} \sum_{i=j+1}^n x_i x_j \text{cov}(R_i, R_j) \right)^2$$

where d_j^2 = variance of the returns of the jth security.
 x_j = proportion of funds invested in the jth security.
 x_i = proportion of funds invested in the ith security.
 $\text{cov}(R_i, R_j)$ = covariance of the returns of the ith and jth securities.
 dp = the risk of the portfolio.

Other risk management techniques include;

THE PAY BACK PERIOD- this is one of the oldest and commonly used method for clearly recognizing and reducing risk associated with an investment project. It involves fixing a predetermined payback period then the projects pay computed and compared with the predetermined period. The project is accepted if the payback period is less than the predetermined period

THE EXPECTED VALUE OF NPV- This is the discounted stream of expected cash flows less the initial outlay.

$$E_{NPV} = \sum_{t=1}^n \frac{E_t(x)}{(1+i)^t} - C$$

where $E(x)$ = expected cash flow in period t.
 i = riskless rate of interest.
 C = initial outlay.

The funds are discounted to take care of inflation and alternative uses to which the funds can be invested.

RISK ADJUSTED DISCOUNT RATE- Under this method, the uncertain cash flows are discounted at a risk-adjusted discount rate. This is done by adding a certain percentage

(called risk premium) to the rate of return on riskless assets (i.e. to the risk free rate). This addition will allow for time preference towards risk.

$$NPV_{RAD} = E \sum_{t=1}^n \frac{c_t}{(I+K)^t} - C$$

where K = risk free rate (i) plus risk premium (-θ)

CERTAINTY EQUIVALENT APPROACH – This method requires that the uncertain cash flows be adjusted in order to reduce them to certainty. To do this, we multiply the estimated cash flow by a factor which is known as certainty equivalent coefficient. The certainty equivalent approach is defined as

$$NPV_{cev} = E \sum_{t=1}^n \frac{a_t C_t}{(1+i)^t} - C$$

Where c_t = the forecast of cash flow without risk adjustment

a_t = certainty equivalent coefficient which assumes a value between 0 and 1 and varies inversely with risk.

i = risk free rate, assumed to be constant for all periods.

METHODOLOGY

The data used for this study were collected through the use of questionnaire from various companies selected randomly across industries in Lagos metropolis. The questionnaire were designed and structured to access the views of firms as regards risk analysis in their various industries. The approach employed in the analysis of the data collected is largely descriptive in nature. Simple percentages and rankings were used. The approach employed in the analysis of the data collected is largely descriptive in nature. Simple percentages and rankings were used.

DATA PRESENTATION AND ANALYSIS

OPTIONS	NO RESPONDENT	OF	PERCENTAGE (%)
YES	22		100
NO	0		0
TOTAL	22		100

Sources- field survey, 2011

Out of thirty (30) questionnaires distributed to respondents, only twenty-two (22) were answered and returned. Therefore the analysis was based on the 22 returned questionnaire.

Table 1 : Whether Nigerian companies formally take risk analysis into consideration for investment appraisal.

The analysis above clearly indicates that all the all the 22 respondents who filled and returned their questionnaire agreed that their companies take risk analysis into consideration when appraising investment. These numbers represent 100% of the total respondents.

Table 2: To know which risk analysis techniques is being employed by the companies.

OPTIONS	NO OF RESPONDENTS	PERCENTAGE (%)
Payback period	13	59.1
Risk Adjusted discount rate	3	13.63
Certainty equivalent	5	22.7
Expected value method	1	4.5
TOTAL	22	100

Sources- field survey, 2011

From the table above, out of the 22 respondent firms, 13(representing 59.1%) 13 choose payback period as the method they normally employ when analyzing risk for investment purpose . risk adjusted discount rate, certainly equivalent and expected value method had 3,5 and 1 respondent firms respondent firms respectively representing 13.63,22.7 and 4.5 respectively of the total respondents. This indicates that payback period is one of the oldest and commonly used by firms in Nigeria and this may stem from the fact that payback period is one of the oldest and commonly used method for clearly recognizing risk associated with investment project.

Table 3: Whether risk analytical method affects the level of expected profit from market inefficiencies.

OPTIONS	NO OF RESPONDENT	PERCENTAGE
YES	18	81.81
NO	4	18.18
TOTAL	20	100

Source:- Field survey,2011.

Judging from the table above, 18 respondents out of the 22 that returned the questionnaires (forming 81.81%) agreed that risk analytical method being used by firms affects the level of expected profit while the rest disagreed.

Table 4: Whether managers are faced with more risk than owner of the firm, like losing their jobs in case of failure.

options	No of respondents	Percentage (%)
Yes	20	90.91
No	2	9.09
total	22	100

Source- Field survey, 2011.

Exposition from table 4 shows that 20 out of the 22 respondent agreed that managers are faced with more risk than the shareholders in terms of failure. This indicates that 90.91% of those who returned questionnaire agreed that Nigerian managers are risked-averse.

Table 5: Types of risk analytical methods employed.

SIZE OF FIRM	NO OF FIRMS	PAYBACK PERIOD	CERTANITY EQUIVALENT METHOD	RISK ADJUSTED METHOD	EXPECTED VALVE METHOD
LARGE	3	2	0	0	1
MEDIUM	7	5	1	1	0
SMALL	7	4	3	0	0
NON-RESPONSE	5	-	-	-	-
TOTAL	22	11	4	1	1

Source: - Field survey, 2011

It can be deduced from the table above that 5 Of the respondent firms fall under the category- non-response group. These are the firms that refused to give the size they belong to in the questionnaire returned. For the rest of firms, 3 of them fall under the category of large firms while 7 firms each fall under the categories of medium and small scale firms respectively. Out of the 3 firms that fall under the large scale group, 2 of them used payback period while the remaining 1 used the expected value of NPV method of analysis. For the medium scale group, 5 of them used payback period while the remaining 2 made use of certainty equivalent and risk adjusted discount rate one each. In the small scale group, there are 7 firms in this group as well and 4 out of them used the payback period while the rest 3 the certainty equivalent factor method. From the table, it is evidently clear that the size of the firm does not determine the type of the risk analytical a particular group of firms.

CONCLUSION

From all the analysis that has been made, it is evidently clear that the risk analysis is not new to firms in Nigeria. That is Nigeria firms recognize the use of risk analysis in their investment appraisal and management. It shows further that managers of Nigerian firms are risk averse. However, the findings show that most of the Nigerian firms use payback period methods of analyzing risk while other methods of risk analysis fellow. That is the payback period is more popular than other methods as supported by the literature. The study shows further that effective risk management can enhance production and sales increase leading to higher profit. Based on the conclusion above, the following recommendations are given.

1. Managers of firms should always recognize the conditions of risk and uncertainty when appraising their investment.
2. Nigeria corporate managers should be more resourceful in making adequate use of more sophisticated analytical methods than the pay back methods than the pay back method in incorporating risk in their project appraisal.

3. Government should strive to make the political and economic environments more stable and favorable for investment in order to reduce the degree of uncertainty in the country's economy.

REFERENCES

- Bond, G. D.(1974). *Corporate Finance for Management- Management and Financial Consultant*. Butterworth & Co Publisher Ltd
- David B.H .(1964). *Risk Analysis in Capital Investment*, Harvard Business Review. January-February.
- Dwivedi D.N. (2002). *Managerial Economics* (6th edition), New Delhi: Vikas Publishing House PVT Ltd
- Eugene C. (1972). "What are the Risks in Risk Analysis": Harvard Business Review July-August.
- Markowitz H. (1952): "Portfolio Selection", *Journal of Finance*, March.
- Joe Anum (1995). "Risk Management in Corporate Finance", Lecture Delivered at The Debt Management and Recovery Strategies Seminar. F.I.T.C Lagos (10th-12th April).
- Osula E.C. (1985). *Introduction to Research Methodology*, Onitsha African BEP publishers.
- Pandey I. M.(2004). *Financial Management* (9th edition), New Delhi: Vikas Publishing House PVT Ltd
- Van Horne J.C(2002). *Financial Management Policy* (12th edition), New Delhi: Pearson Education Ltd.
- Weston J.F and Copeland T.E (1989). *Management Finance*, The Dryden Press.