

# The Risk Management Decision in the Total Business Setting

ROBERT I. MEHR and STEPHEN W. FORBES

## ABSTRACT

This paper attempts to (1) recast risk management theory in light of the complex objectives of modern corporations and (2) suggest that risk management theory needs to merge with traditional financial theory in order to bring added realism to the decision making process. In regard to the former, it is observed that normative risk management decision models overlook the behavioral realities and resulting complex corporate objectives involving considerations of profitability, growth, solvency, and social responsibility and such subsidiary issues as the trusteeship concept, satisficing, and the maintenance of financial mobility. In regard to the latter, the compartmentalization of the study of pure and dynamic risk behavior is inappropriate in light of modern financial theory which views the firm as an integrated unit where all of the cost and revenue aspects of a business problem are analyzed simultaneously through an appropriate model.

Traditionally, risk management has been segregated from the remainder of financial theory, the reasoning being that the analytical and statistical problems surrounding the treatment of pure risks<sup>1</sup> differ from those involving other production cost and revenue uncertainties. This isolation has implied that pure risk costs<sup>2</sup> and production costs are unique, and therefore that optimal production deci-

sions can be reached by considering these factors separately rather than in combination.

The traditional approach at best may result in nonoptimal business decisions and at worst may result in a complete disregard for the pure risk costs arising from such decisions. Such an unrealistic compartmentalization is especially inappropriate in light of modern financial theory which pictures the firm as a functioning totality.

The modern executive has become a generalist. He no longer views his business problems through the narrow window of specialization, but instead applies quantitative and qualitative approaches to decision making which consider the accounting, marketing, production and financial aspects of a problem simultaneously. His responsibilities encompass the integrated operations of the firm rather than a narrow circle of subordinates. His information systems are designed to provide accurate and relevant data rapidly as an aid in solving multi-

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Robert I. Mehr, Ph.D., is Professor of Finance in the University of Illinois. Dr. Mehr is a Past President of A.R.I.A., a founder of both the Risk Theory Seminar and of the Pacific Insurance Conference, and is a Past Director of the American Finance Association.

Stephen W. Forbes, Ph.D., is Associate Professor of Finance in the University of Illinois.

This paper was submitted in September, 1972.

<sup>1</sup> Pure risks concern those events which usually involve only financial loss to a firm. These include destruction of property, theft, credit losses, death or disability of employees, legal liability, and failure of suppliers to perform.

<sup>2</sup> Pure risk costs include insurance premiums, administrative costs involving pure risks, costs involved in loss reduction or prevention, and the difference in the present values of the firm before and after a loss not compensated by insurance or other sources such as tort recoveries.

dimensional problems. The firm operates as a totality in carrying out his objectives and he in turn possesses controls which enable him to direct its operations in an integrated, unified manner in order to achieve these objectives.

### Objectives and The Model

An appropriate starting point in developing a risk management model is to study how corporate objectives relate to risk management problems, for knowledge of the ultimate results sought is central to the procedures to be used in achieving ends.

Objectives may be stated formally in corporate financial reports, manuals, or brochures or they may simply be understood as implicit in the operations. An example of a formally stated objective is a proposed annual rate of growth in the earnings per share. An example of an implied objective is that of maintaining the solvency of the firm. It is implicit that management will not consciously be so reckless in conducting its affairs as to lead a firm to bankruptcy.

Enunciated objectives may also differ from real ones to no great surprise of those who study organizational behavior. For example, although a firm may proclaim that its primary objective is to maximize the earnings per share, in reality protection of liquidity and solvency may play the overriding role in its decision making processes. A firm facing financial difficulties is not likely to announce this to the public because, if not already known, this would have an adverse impact upon the market value of its outstanding securities.

Published reports to employees or the public are not reliable as a means of gaining an insight into the true objectives of the firm. This is especially true with large corporations affected by the divergent interests arising from the separation of ownership and management. As a par-

tial step toward understanding the firm's actual rather than professed goals, one must be intimately associated with its daily decision making. Even then one cannot be assured of clearly identifiable goals.

External and internal pressures placed upon the firm also may force it continually to reevaluate its objectives. Examples of external pressures are changes in the social, political, and legal environment in which the business operates. For one specific example, the Occupational Safety and Health Act of 1970 has required some firms to make significant changes in machinery and work processes. Another example is the alteration in the legal processes that permit successful law suits involving air pollution. Internal pressures arising from within the firm may also force it to reevaluate its objectives. For example, labor unions through successful collective bargaining may require the firm to relax its work rules and expand and improve its death, disability income, medical care, and retirement income benefits for union members.

Given these factors, any discussion of the objectives of the firm is likely to be vague. Even though executives may be acutely aware that meaningful objectives are essential in giving purpose and direction to their efforts as well as providing a specific measure of their performance, they often are not able to define objectives precisely.

A further complication is that the demands of government, the general public, shareholders, bondholders and other lenders, and the needs of internal management often seem to be in conflict. Under these circumstances, it is not surprising to find that corporate policies often appear to lack stability and direction, yet it cannot be overemphasized that clear objectives, precisely defined, are necessary to rational decision making processes. Thus, consideration of the

issues involved in setting corporate objectives is the first step in the risk management process.

### *Common Objectives*

The more common objectives of the firm emphasized in financial and economic literature are (1) profitability, (2) growth, (3) solvency, and (4) social responsibility.

*Profitability.* The maximization of the value of the firm to its shareholders represents a widely accepted objective of financial management. The market price of the firm's outstanding common stock is directly affected by financial decisions regarding the composition of assets, involving cash, inventory, plant and equipment, and other items; the capital structure involving the relative amounts of equity and debt; and policies involving the retention of earnings as opposed to the payment of dividends.

(1) Maximization of Earnings per Share. The maximization of the earnings per share is the final profitability objective, for it is at this point that the firm's performance affects shareholder interests. However, earnings per share maximization must be considered in light of both their timing and their certainty: a dollar of profit returned today is worth more than one returned in the future, and a certain dollar of profit is worth more than an uncertain one.<sup>3</sup>

Of concern to management as well as shareholders is the magnitude, timing, and certainty of the flow of funds which may be allocated on behalf of corporate interests. Other things equal, management will prefer that net fund flows be as large, as soon, and as certain as possible because

<sup>3</sup> For an interesting discussion of these problems, see Paul H. Cootner and Daniel M. Holland, *Risk and Rate of Return*, Massachusetts Institute of Technology, DSR Project No. 9565, Revised Issue, February 1964, pp. 5-36.

they provide the power to plan and carry out new actions.<sup>4</sup> Of course, the investment which recovers the initial capital most rapidly need not be the most profitable in terms of present values. However, the two objectives may enjoy compatibility once the future earnings stream is adjusted for the element of risk.<sup>5</sup>

Donaldson summarizes the overriding importance of the profit objective as follows:

To be specific (the) economic theory of the firm has consistently held to the concept that the economic objective of private enterprise in business is to maximize profit. The durability of this statement of objective is a tribute as much to its usefulness for abstraction and objective reasoning as to its validity in terms of real world behavior. It has the obvious advantage of being a single and unqualified goal: to make corporate profits as large as possible within whatever time dimension seems appropriate. Profit, being by definition quantitative, can be stated in precise terms and measured objectively . . .<sup>6</sup>

(2) Expected Return and Risk. There may be a relationship between the expected return on an investment and the uncertainty involving its receipt. A higher expected return may be associated with a higher risk which management would prefer to avoid.<sup>7</sup> In the presence of risk, the decision maker may accept something less than the maximum expected return if the degree of risk is lowered at the same time.

In making decisions, management often places alternative projects in appropriate risk categories and analyzes them separately. The amount of risk which management is willing to accept places limita-

<sup>4</sup> Gordon Donaldson, *Strategy for Financial Mobility* (Boston: Division of Research, Graduate School of Business Administration, Harvard University, 1969), p. 38.

<sup>5</sup> For a further discussion of this problem, see W. W. Haynes, *Managerial Economics* (Homewood, Ill.: Dorsey Press, 1963), p. 538.

<sup>6</sup> Donaldson, *op. cit.*, p. 25.

<sup>7</sup> Cootner and Holland, *op. cit.*, p. 10.

tions upon the categories available for analysis. The problem does not involve a simple trade off between risk minimization and return maximization. Competing goals, such as competitive rank, share of the market, size, and technological leadership, may complicate the decision making process.<sup>8</sup>

(3) The Trusteeship Concept and Satisficing. The objective of maximizing shareholder wealth may be modified by the view of the corporation as a social, political, and economic organization involved in the resolution of many conflicting interests. These interests may include labor unions, white collar workers in middle management, staff specialists, executives, and others involved in the administrative process, as well as shareholders and other suppliers of funds. This multidimensional view of corporate responsibility limits the use of the shareholder wealth maximization objective as the exclusive criterion of corporate success.

Under the trusteeship concept of management, the executive has no sense of primary allegiance to any individual or group. Rather, the corporation is viewed as a legal, economic, and human entity where the overriding considerations are economic and financial strength, continuity, and growth.<sup>9</sup> In this type of organization, management needs the continued cooperation of many divergent interests.

This concept is related in part to the older notion of satisficing, whereby an overly profitable firm may invite antitrust action if it is a member of an oligopoly, demands for rate reductions if it is in a regulated industry, or unwelcome moves on the part of competitors, including new entrants into the industry. Simon observes that

<sup>8</sup> Donaldson, *op. cit.*, p. 41.

<sup>9</sup> Gordon Donaldson, "Financial Goals: Management vs. Stockholders," *Harvard Business Review*, 41 (May-June, 1963), p. 119.

The notion of satiation plays no role in classical economic theory, while it enters rather prominently into the treatment of motivation in psychology. In most psychological theories the motive to act stems from drives, and action terminates when the drive is satisfied. Moreover, the conditions for satisfying a drive are not necessarily fixed, but may be specified by an aspiration level that itself adjusts upward or downward on the basis of experience.<sup>10</sup>

It is further observed that a designated rate of profit, share of the market, or level of sales may replace the profit maximization objective in daily decision making. The failure to meet one or more of these objectives may result in a search for new alternatives or a downward adjustment in the level of aspiration until the goals reach levels that are practically attainable.<sup>11</sup>

*Growth.* The objective of growth, in some instances, may be related to the maximization of shareholder wealth. To the extent that economies of scale result in lower average costs of production, growth and profitability are compatible goals.

A firm's sales may also affect the amount and cost of its borrowing and its flexibility in financial decision making. Observations have shown that large firms have the option of competing with smaller firms but that the reverse is not always true.<sup>12</sup> As a result, the large firm through its flexibility may be better able than the smaller firm to move into attractive markets and increase its return at the margin. A large firm may also be able to obtain more favorable underwriting terms and borrowing costs when it obtains external financing.

<sup>10</sup> Herbert A. Simon, "Theories of Decision Making in Economics and Behavioral Science," *American Economic Review*, XLIX (June, 1959), pp. 262-263.

<sup>11</sup> *Ibid.*, p. 263.

<sup>12</sup> William J. Baumol, *Business Behavior, Value, and Growth* (New York: The Macmillan Co., 1959), p. 35.

In some instances, growth may even supersede profitability as a corporate objective. With size comes recognition and prestige as a leader in the industry. The ability to diversify resources may also result in a reduction in investor risk although haphazard diversification can increase risk.

Many disadvantages are inherent in the lack of growth. One is the fear that demand for a product will fall if customers believe its popularity is waning. Banks and other components of the money market will be less receptive to the firm if sales volume is declining. Furthermore, distributors may be lost representing a major marketing setback. Personnel relationships may be made more difficult if there is firing rather than hiring. There may be a loss in market power, and such a firm may become more vulnerable to a general deterioration in business conditions.<sup>13</sup>

It has also been argued that executive salaries appear to be more closely correlated with the scale of operations than with profitability, and therefore that executives have a vested interest in expanding operations.<sup>14</sup>

Once a minimum rate of return has been achieved, a firm may place revenues above profitability as a primary objective. The minimum rate of return for these purposes may be interpreted as that amount which will supply adequate funds for dividends and reinvestment so that shareholders will be compensated adequately for their investment. This compensation involves a combination of dividends and capital gains, representing a competitive return in a market characterized by a rough parity among the earnings of the securities of all listed firms after making appropriate adjustments for financial risk.<sup>15</sup>

Risk and uncertainty provide major barriers limiting growth. The more ambitious the expansion plans, the greater will be the uncertainties involving future events.<sup>16</sup> To some extent then, plans for growth will be influenced by the risk preferences of management.

*Solvency.* The desire to maximize the probability of solvency will also be influenced by the risk preferences of management. Related to this is the desire for flexibility, measured by the ease with which assets can be converted from one use to another.

In its most basic sense, solvency can be expressed as the firm's ability to pay its bills on time. Negative net cash flows are symptomatic of a possible impending insolvency leading to the conversion of internal (and possibly external) resources to pay debt and avoid legal action.

There may be a conflict between the objectives of solvency and profitability. Working capital resources held to cover possible cash shortages ordinarily earn a lower rate of return than in their next best use, thus encouraging management to keep such balances at a minimum. Related to this are the subsidiary problems of efficient inventory, accounts receivable, and cash management.

The concept of solvency has been extended in recent years to include the concept of financial mobility, which views the firm as a system of expected and unexpected cost and revenue elements. Financial tools to enable the firm to survive in the event that fund outflows exceed inflows include the liquidation of existing assets, the use of surplus cash or negotiated bank credit, the issuance of debt or equity contracts, the restoration of financial equilibrium by increasing fund inflows from current or future period sales or by reducing fund outflows arising from

<sup>13</sup> *Ibid.*, p. 46.

<sup>14</sup> *Ibid.*

<sup>15</sup> *Ibid.*, p. 50.

<sup>16</sup> Robert A. Rennie, "The Measurement of Risk," *Journal of Risk and Insurance*, XXXVIII (March, 1961), p. 85.

volume (e.g., production), scale (e.g., investment), strategic (e.g., research), or value (e.g., overhead) related expenditures.<sup>17</sup>

The financial mobility concept forces management to view its entire operations and engage in contingency planning assuming different external conditions. This concept requires management to view the fund flows affecting the financial position of the firm in their most realistic light. For example, management may make estimates of its cash flows under the adverse conditions of a recession and try to minimize the probability of insolvency under these conditions.

Contingency planning, using management's best estimates of future behavior, represents a pragmatic approach based upon a realistic evaluation of the future of the firm. The emphasis in analyzing financial mobility is placed upon maximizing the survival potential of the firm. This departs from the profitability objective and recognizes that internal management is interested in protecting the firm from the possibility of adverse economic conditions, even at the sacrifice of shareholder profits.<sup>18</sup>

This may be related in part to a desire for the "quiet life" where respectability and security become the overriding managerial objectives.<sup>19</sup> Firms in oligopolistic industries may develop a "live and let live" attitude in this environment in an effort to make life predictable for one another, expecting their rivals to adjust to their decisions in a somewhat cooperative spirit.<sup>20</sup>

In the solvency model, a greater share of earnings than desired by shareholders may also be retained by the firm. Since

<sup>17</sup> Donaldson, *Strategy for Financial Mobility*, *op. cit.* pp. 70-72.

<sup>18</sup> For a discussion of this problem see Donaldson "Financial Goals: Management vs. Stockholders" *op. cit.*

<sup>19</sup> Baumol, *op. cit.*, p. 30.

<sup>20</sup> *Ibid.*

dividend payments erode the cash reserves required to further corporate interests, it can be expected that management will keep dividends as low as possible minimizing increases and postponing them as long as possible.<sup>21</sup>

**Social Responsibility.** A fourth and increasingly important corporate objective is social responsibility. It is not clear where this responsibility begins or ends. If the primary objective of the corporation is to maximize shareholder wealth, investments required by society which incur no revenues but produce significant costs result in a reduction in the earnings per share. The interests of the shareholder and these of society thus come directly into conflict.

Furthermore, it is not clear how this conflict should be resolved. In a capitalistic society, business is expected to earn a sufficient profit to compensate the investor for risks incurred in the market place. If sufficient profits are not produced, the system will not function effectively to produce new investment and resulting economic growth.

Social responsibility also affects the objectives of corporate growth and solvency. Expenditures for production which do not generate revenues constrain the firm's ability to expand operations. The amount of available working capital to provide protection against insolvency may also be affected. Managerial flexibility with regard to the allocation of resources within the firm will also be reduced if the government enters into an increasing proportion of these decisions.

The most direct way to encourage social responsibility is to make it profitable for the firms involved. This can be most easily accomplished by governmental fiat. For example, if there is a sufficient tax on the sulfur emissions from smokestacks, it will become more profitable for the firm to

<sup>21</sup> Donaldson, "Financial Goals: Management vs. Stockholders," *op. cit.*, p. 120.

spend money on pollution abatement equipment than to incur the tax.

The imposition of these costs upon the firm, however, will have negative consequences for shareholder wealth. Conceivably, if such costs cannot be passed on in the form of higher prices, they might be great enough to force firms in the affected industry into bankruptcy. A question of equity may also arise because firms within an industry will have varying technical processes, economies of scale, and abilities to absorb costs once a set of controls is initiated.

Thus, for example, a large automobile manufacturer may be in a better position to develop emission controls because of its ability to purchase patents, develop research talent, order equipment in large quantities, and absorb the additional overhead involved in research and development. Once the firm develops effective emission controls, it might sell these to smaller firms at a profit. Thus shareholder groups within an industry will suffer in varying degrees by the imposition of regulation.

Related to this issue is the question of the role of the firm in society. To what extent should a group of shareholders be expected to bear the cost of developments which will benefit society at large? Important to this discussion is the gradual relaxing of the distinction between public and private goods. Private goods involve the output of the free enterprise system operating in private markets. Public goods on the other hand involve the output of governmental units supported in whole or in part by taxpayers.

Private goods have an "excludability property," that is, if the consumer does not pay for the product, he can be excluded from its use.<sup>22</sup> However, a large

<sup>22</sup> William J. Baumol *et al.*, *A New Rationale for Corporate Policy*, Committee for Economic Development Supplementary Paper No. 31 (Lexington, Mass.: Heath Lexington Books, 1970), p. 14.

number of products do not have this property. For example, once a firm has installed air pollution equipment, the benefit of cleaner air is enjoyed by a wide range of individuals who contribute nothing to the firm.

Thus the fundamental nature of public goods is that their benefits cannot be provided to one purchaser without automatically providing them to many other individuals. The benefits offered to the other members of the group are called "external benefits." A firm providing these benefits bears all of the costs itself while gaining only a portion of the benefits.<sup>23</sup> The question may be raised as to whether these results are reasonable. While it might be equitable if the firm could arrange to pay its pro rata share of the costs, it may be unreasonable to force it to bear the entire expense itself.

When public goods are considered desirable, there are three ways of providing them. One is to have the government supply them and assign each of the beneficiaries a part of the cost in the form of taxation. Thus pollution control and national defense are normally handled by legislation.<sup>24</sup>

If the number of persons affected is relatively small, the supply of public services can also be handled by a consortium. This voluntary group works because it is able to "internalize the externalities."<sup>25</sup> The benefits, while in part external to any one individual, are internal to the association. The entire group that benefits is involved in paying the costs, thus the excludability property holds.

An individual firm can also voluntarily incur expenses to reduce the costs of its activities to society. As a matter of public good will for example, a corporation may reduce its level of air or water pollution in order to improve the environment of

<sup>23</sup> *Ibid.*, p. 13.

<sup>24</sup> *Ibid.*

<sup>25</sup> *Ibid.*, p. 14.

the community, without any expectation of receiving any immediate direct economic benefit.

Opinions on the subject of corporate responsibility to society are undergoing continuous change. At one extreme is the view that the sole responsibility of the firm is to earn a maximum profit for its shareholders.<sup>26</sup> At the other extreme is the view of the corporation as a vehicle for governmental planning.<sup>27</sup> Somewhere in the middle is the view that corporations should have a set of specific social goals and that progress toward achieving these goals should be measured as regularly and precisely as progress toward financial goals.

Business is a part of society and therefore is affected by societal attitudes. Social responsibility and profit maximization are interrelated because, to be socially responsible, a business must earn sufficient profits to stay in business. The moderate view is that these profits must be earned in a manner that sustains or enhances the environment rather than destroys it.

### *Objectives and Decisions*

The foregoing objectives directly affect risk management as well as other decision making functions within the firm. In this context, risk management models which assume away the complex and conflicting objectives found within corporations appear to be naive.

For example, while normative theory may prescribe a formal model for making a decision regarding the amount of the insurance deductible, such a formulation is likely to be inapplicable, for if there is a conflict between internal management and shareholder interests (as reflected in

<sup>26</sup> See for example Milton Friedman, "The Social Responsibility of Business Is to Increase Its Profits," *The New York Times Magazine*, September 13, 1970, pp. 32-36.

<sup>27</sup> See for example John Kenneth Galbraith, *The New Industrial State* (Boston: Houghton Mifflin Company, 1967).

conflicting solvency and profitability objectives), one can expect the interests of the former to call for very low deductibles which violate the model's rule of conduct. Here the decision maker simply wishes to avoid possible financial embarrassment evolving from an uninsured loss and the resulting impact of this upon the internal operations of the firm and his career. The maintenance of financial solvency and mobility will take priority in his decision making process. External shareholder interests will not play an important role in his evaluations.

Loss assumption also complicates cash and fund flow projection procedures. This encourages the utilization of insurance to reduce the element of uncertainty surrounding business decisions. It has also been observed in relation to executives that "accustomed risks may be minimized in making decisions whereas unaccustomed risks may be inflated."<sup>28</sup> This provides an additional motivation for avoiding loss assumption.

If the maintenance of funds flow equilibrium is the overriding objective of management, a convincing argument can also be made for the full application of insurance at the expense of shareholder profitability. Here insurance is viewed as part of a system of components designed to achieve a rational funds flow objective rather than as a source of funds to be drawn upon in an emergency.

Another example illustrating the effect of corporate objectives on risk management policy is that found in the application of the trusteeship concept. A management influenced by this concept might develop a more generous employee benefit plan than that required on purely economic grounds. This generosity might be rationalized by the view of the corporation as a family of interests extending beyond the shareholder.

<sup>28</sup> Donaldson, *Strategy for Financial Mobility*, *op. cit.*, p. 41.



One also cannot observe, as normative theory might, uniformity among corporate objectives. Different penalties and rewards may be imposed upon different forms of risk management conduct, depending upon the firm. For example, the corporation which emphasizes social responsibility might seek the minimization of industrial and other accidents regardless of cost whereas the firm emphasizing profitability might be willing to accept moderate frequency and severity accident rates if this policy results in lower total operating costs, including insurance premiums.

As another example, a drug manufacturer might adopt the maximization of shareholder wealth as its corporate objective subject to long term survival and the additional constraint that it owes a social responsibility to minimize (and ideally eliminate) deaths and disabilities arising from the use of its product. This latter constraint might raise its product research and development costs to a much higher level than would be necessary were the firm's goal simply to maximize the present value of its earnings per share after allowing for potential product liability costs. The manufacturer is willing to incur these additional private costs in order to reduce the social costs arising from its activities.

In viewing corporate behavior, it becomes clear that business decisions are seldom based solely upon one criterion, rather a mixture of objectives is weighed and balanced. This process complicates risk management theory.

Business decisions, if they are to apply to reality, must incorporate a wide variety of goals tailored to the dispositions of the members of management supervising the decision process. The appropriate mixture of objectives to be adopted by a firm in its decision making is a philosophical question which is continuously being debated among economists and executives.

It follows that an awareness of the objectives of the firm and their impact

upon decision making is essential to an understanding of the risk management function. Businessmen evaluate their activities in relation to a variety of goals, some competing and others complementary. Trade offs and compromises are inescapable. Thus an appropriate starting point in designing the risk management function is a study of business objectives coupled with an analysis of how these objectives affect the decision making process.

The methods to be used in achieving a particular result are dictated by the ultimate desired outcome. While profitability, growth, and solvency are important business objectives, they often conflict with each other. Furthermore, if social responsibility is introduced as an additional consideration, further modifications are needed in financial decision making models. To cloud the issue further, business objectives are often imprecisely defined by those directly and intimately involved with decision making.

### The Role of Financial Theory

Going beyond business objectives, risk management theory has been left out of the mainstream of financial theory. The mainstream can be viewed for these purposes to involve an integration of the decision making processes within the firm. Van Horne observes in this respect that originally the responsibilities of the financial manager were confined to the keeping of accurate financial records but that his influence has expanded in recent years beyond these limited functions.<sup>29</sup> Today financial theory is concerned with the administration of the overall assets and liabilities of the firm in light of the maximization of shareholder wealth or other business objectives.<sup>30</sup> Such a modification

<sup>29</sup> James C. Van Horne, *Financial Management and Policy* (2d ed. rev.; Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1971), p. 3.

<sup>30</sup> *Ibid.*, pp. 3-9.

of theory leads to an expansion of the variables to be considered in making the business decision and a need for a direct recognition of the pure risk costs in the decision.

Up to now, risk management has been segregated from the remainder of financial theory because it has developed from the field of insurance and insurance traditionally has been separated from the other business disciplines.

The absence of the consideration of pure risk in traditional financial theory and in the financial decision making process to some degree can be attributed to the narrowness in the horizon of insurance scholars. For the most part, the thinking, research, and writings of these scholars have centered upon interpretations of the legal and financial aspects of the insurance contract, the operations of insurance companies, and the public policy issues associated with the insurance industry. These preoccupations have discouraged innovation in the broader discipline of finance.

This separation of insurance from other decision making processes within the firm seems inappropriate in light of modern financial theory. Since risks arising from perils are directly related to dynamic risks which result in either gain or loss to a firm, it seems appropriate to incorporate risk management into the mainstream of financial theory.

### *The Capital Budgeting Model*

Capital budgeting (defining, planning, analyzing, implementing, and reviewing a capital investment) includes financial analysis as one of its inputs and considers the time value of money. A popular criterion in this respect is the internal rate of return which is the discount rate that equates the present value of cash receipts from the investment to the present value of the funds spent for that investment.

One example of the need for the recog-

nition and merging of pure and dynamic risk theory is provided by the internal rate of return capital budgeting model. The implicit assumptions in the model are that (1) all of the pure risk costs associated with a project are summarized in terms of premium outlays, and (2) insurance exactly replenishes the present value of the net cash flows lost because of the occurrence of a peril.

These assumptions are invalid because (1) not all pure risks are insurable and (2) when the risk is insured, insurance does not completely indemnify in the event of a loss. Indemnification assumes that the present value of the firm remains the same before and after the loss because of the presence of insurance. Insurance, however, does not usually fully replace this value.

In addition to uncompensated revenues arising from the loss of goodwill, there may be additional unanticipated and uninsurable expenses involving penalties for the cancellation of contracts. The destruction of the asset may also affect existing market shares, cost advantages over competitors, valuable creditor and supplier relationships, the reputation of the firm, and other factors important to future profitability. In viewing risk management problems in terms of the model, the financial impact of these contingencies must be recognized in corporate planning.

The internal rate of return model is unrealistic to the extent that it assumes away the relevance of these factors in determining financial outcomes. The model places the investment in an artificial climate where pure risks are assumed not to exist. Refinements of the model, to the extent that they exist, involve dynamic rather than static considerations.

### *Decision Trees*

A series of decisions about a course of action involving uncertain outcomes are not simple when each prior decision affects

the options available at later stages. A useful device for approaching a sequential decision making task is the decision tree, which requires the decision maker to eval-

uate the initial decision in relation to a series of final outcomes and their associated probabilities (e.g., Figure 1).

Decision trees usually base the probable

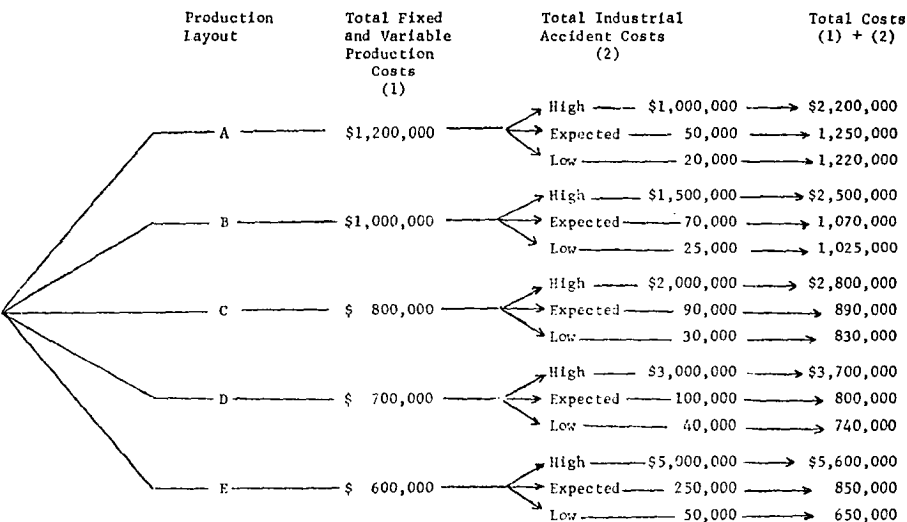


FIGURE 1 -- DECISION TREE FOR FIVE ALTERNATIVE PRODUCTION LAYOUTS CONSIDERING INDUSTRIAL ACCIDENT AS WELL AS PRODUCTION COSTS

financial outcomes of alternative actions solely upon dynamic considerations.<sup>31</sup> In developing strategies involving product lines, a drug manufacturer, in deciding the amount to spend for research, development, and quality control, should weigh the potential costs of the product liability exposure against the necessary costs to control or eliminate this exposure, in determining probable revenues. A manufacturer in designing a new plant should consider the costs of the structuring and placement of machinery in relation to potential industrial accident costs as well as other production costs. Weighing the benefits and costs when potential injury to human life is involved does not produce

an easily programmed solution and complicates the decision process portrayed by the model.

For example, assume that a firm is evaluating alternative machinery layouts in order to minimize the total cost of producing a quantity of a particular product. Its objective is to find that layout which will minimize the sum of the expected industrial accident costs and fixed and variable production costs.

In order to analyze the problem, the costs of five alternative production layouts A, B, C, D and E are evaluated in Figure 1. Information regarding the high, low, and expected industrial accident costs for each layout are gathered from the experience of firms operating similar layouts.

If the objective of management is to minimize the sum of its expected production and industrial accident costs, layout

<sup>31</sup> See for example, John F. Magee, "How to Use Decision Trees in Capital Investment," *Harvard Business Review*, 42 (September-October, 1964), pp. 79-96.

D is selected. However, if the decision is to minimize the sum of its expected production and industrial accident costs subject to the constraint of minimizing maximum potential industrial accident costs, layout A is selected. Finally, if the production decision is made ignoring these pure risk costs, layout E is selected.

The foregoing illustration demonstrates the importance of pure risk considerations in some production decisions. Decision models can be refined further in light of additional constraints. For example, if minimizing the uncertainty in funds flow projections is added to the model as a secondary objective, the values developed in the industrial accident cost column will assume the full utilization of insurance although this might result in a higher expected cost for each layout. Furthermore, if an important objective is to protect the life and limb of employees at all cost, the values in the model will assume full utilization of all known and appropriate accident prevention and protection measures.

It is evident that traditional financial theory, in ruling out the relevance of pure risks in the decision making process, has oversimplified its modeling of the world. This may be due in part to ignorance and in part to a belief that pure risks are unimportant to the outcome of a business decision or can be conveniently handled through insurance. An expansion of financial theory to include a formal recognition of pure risks and their impact upon investment outcomes alters the assumption of their irrelevance and brings added realism to the decision making process.

### Total Corporate Strategy

Given the selection of an overriding corporate objective made subject to appropriate constraints, the decision process can be carried out. If the firm is to be viewed as a totality within the risk framework, the broadest possible managerial perspective must be taken in decision

making. Management must evaluate all of the relevant pure and dynamic risks surrounding each of the economic alternatives under consideration.

Risk management, rather than involving decisions which are not rationally linked to other corporate decisions, should play a role in the development of an overall corporate strategy. One such strategy might recognize the divergence of shareholder and managerial economic interests and the resulting limitations of overall objectives in decision making. This strategy might be summarized in terms of the traditional corporate objective of maximization of shareholder wealth, subject to the constraint of the maintenance of solvency reflected in the maintenance of a continuous positive net cash flow (or, as an alternative, a continuous funds flow equilibrium). Insurance and other risk management alternatives might be developed within such a framework as tools which contribute to the survival potential of the firm.

Here risk management is incorporated directly into the corporate decision process rather than following in its trail as a residual consideration. The result is that corporate surprises are minimized and more intelligent decisions are made. All risks are recognized at their point of potential impact upon the firm as a bundle of contingencies to be dealt with in total.

This behavior can also be modeled in terms of a time dimension. Here the situation to be avoided in decision making is that where the risk management decision follows in the trail of and thus is governed by the financial decision. The importance of the simultaneous consideration of pure and dynamic risks in decision making is demonstrated by the following experiences related in interviews with corporate insurance officers:

(1) Firms with overseas investments often fail to examine relevant regulations. For example, many countries have labor legis-

lation which requires the continuation of the payment of wages after a plant has been shut down following the occurrence of a peril. In the United States and Canada, some collective bargaining agreements also call for similar wage continuation plans.

(2) A decision to purchase a plant was cancelled when the risk manager found excessive hidden past service benefit costs in the firm's pension plan. These costs were not originally disclosed in the bargaining process.

(3) The Federal Occupational Safety and Health Act of 1970 has a considerable cost impact upon existing and new investments. Many firms have failed to meet the requirements of the legislation in their plant and equipment designs.

(4) A decision was made to build a plant using only marketing and transportation considerations. The problem of adequate water protection was not examined. This latter question became an engineering and legal problem requiring an examination of water pressure and zoning requirements, where it was found that the plant could not be built because an adequate water supply was not available.<sup>32</sup>

In order to model decisions appropriately, each peril must be evaluated in relation to the particular decision and its overall impact upon the financial structure of the firm. This will involve a continuous evaluation and monitoring process as new decisions come on line.

### Summary

This paper has attempted to (1) recast risk management theory in light of the complex objectives of modern corporations and (2) suggest that risk management theory needs to merge with traditional financial theory in order to bring added realism to the decision making process.

In regard to the former, it is observed

<sup>32</sup> Interview conducted in Chicago on August 17, 1971 with the following insurance managers: Paul Kipp, United States Gypsum Company; Sven Thomsen, Tribune Company; James R. Mascarella, The Quaker Oats Company; Thomas Frank, Allied Van Lines; and P. B. Gehrke, Joslyn Manufacturing and Supply Company.

that normative risk management decision models overlook the behavioral realities and resulting complex objectives found in corporations. These objectives may involve considerations of profitability, growth, solvency, and social responsibility and such subsidiary issues as the trusteeship concept, satisficing, and the maintenance of financial mobility. Related to this, normative theory overlooks the conflict found between internal management and shareholders, where the former give priority to the long term survival of the firm in contrast to the wealth maximization objectives of the latter. The essay suggests that these complex relationships may explain why risk management behavior does not always conform to normative theory.

In regard to the latter, in insurance theory pure risk costs were originally thought of only in connection with premiums. The thought at this stage of development centered primarily upon the legal and financial aspects of the insurance contract and the economic and social implications of the insurance enterprise.

Realizing the limitations inherent in this approach to analysis, the field of risk management developed with its concern centering upon the four alternatives of assumption, reduction, transfer and avoidance in handling risk.

It is the thesis of this paper that the time has arrived for a third stage of development, namely the incorporation of risk management into the mainstream of financial theory. The authors believe that the compartmentalization of the study of pure and dynamic risk behavior is inappropriate in light of modern financial theory which views the firm as an integrated unit. All of the cost and revenue aspects of a business problem should be analyzed simultaneously through an appropriate model in order to mirror the conditions in business where pure and dynamic risks are interdependent.