2. MULTIPLE GOALS IN CAPITAL BUDGETING AND FINANCIAL PLANNING

2.1. Introduction

In this study we consider capital budgeting and financial planning as decision problems involving multiple goals. In this chapter we will explain why. Among other things, we will argue that both the goal and the constraints used in the 'traditional' approaches to capital budgeting and financial planning should both be treated as goals, which can be traded off against each other. In the following chapters we will develop a normative framework for dealing with capital budgeting and financial planning models with multiple goals.

'*Capital budgeting* is concerned with the allocation of the firm's scarce resources among the available investment opportunities', (Philippatos [1973, p.66]). The evaluation of investment opportunities within the capital budgeting process involves the consideration of the immediate and future *cash flows* implied by the investments.

Throughout this study we assume C_{ti}, the cash flow in period $t(t=1,\ldots,T)$ associated with project $i(i=1,\ldots,n)$, to be concentrated at the end of period t. Thus we assume discrete instead of continuous time. A positive sign of C_{ti} denotes a *cash inflow*, a negative sign a *cash outflow*. All cash flows are assumed to be determined according to the '*with-or-without*' principle, implying that the cash flows represent the incremental effects of the project on the quality of the owners' income over time. This is to take account of the possible interdependency between projects. Generally, a distinction is made between *economic* and *stochastic* dependence. *Economic dependence* occurs if the mere acceptance of one project influences the cash flows of another project. A special case is offered by mutually exclusive projects, which means that the acceptance of one project

prohibits the other project's acceptance.

Two projects are said to be *stochastically dependent* if the covariance between their respective cash flows is non-zero. In reality, all conceivable combinations of economic with stochastic dependence may occur.

Given these definitions, the market value of a project can be expressed as a function of the cash flows (including the initial investment outlays) associated with the project. For example, the net present value of project i may be defined as

$$b_i = \sum_{t=o}^{T} \gamma_{t_i} . C_{ti} \tag{2.1}$$

where γ_{ti} represents the net present value of one dollar of the cash flow C_{ti}.

Financial planning can be seen as an extended capital budgeting problem. In financial planning, the investment opportunities are considered simultaneously with the financing and dividend options available to the firm (see e.g. Myers and Pogue [1974]).

An important assumption made in the literature on capital budgeting and financial planning is that the firm tries to maximize its owners' wealth. Because this wealth is co-determined by the risk-return charasteristics if the income streams generated by the firm, both 'risk' (bad: to be minimized) and 'expected return' (good: to be maximized) are often taken as separate goals in the evaluation of capital investment projects. Assuming an efficient capital market, these goals can be replaced by a single goal, i.e. the ' firm's market value' (to be maximized), which leaves a single criterion decision problem.

Goals however, other than those mentioned above, may also influence decisions concerning the selection of investment projects. As will be shown in this chapter, both the public and the private enterprise have to deal with a complex of multiple goals which

changes over time. It will not always be possible to bring these multiple goals back to one single goal. In consequence, project selection might be seen as a decision problem involving multiple goals.

In spite of these possible arguments to treat capital budgeting and financial planning as multiple criteria decision problems, they are generally discussed in the literature as being single criterion decision problems. However, the single criterion concerned (very often the firm's market value) is optimized subject to a set of constraints, part of which relates to managerial choices which might just as well be considered as separate goals. Therefore, we will discuss the nature of these constraints used in capital budgeting and financial planning in more detail in the following section. In this section, we will give a more precise meaning of the concepts of 'goal' and 'constraint', as used in this study.

The word *goal* very often denotes a more or less detailed description of a desired situation to be strived for by an individual (or group of individuals), by (or for) whom this goal has been formulated. Examples are the desire to 'maximize profits' and the desire to 'maintain the current level of employment'. In our opinion, one should distinguish between the *object* and the *nature* of a goal. By the object of a goal we mean the entity that is being strived for. Thus in the above examples the objects are 'profits' and the 'level of employment' respectively. The object of a goal is a variable, referred to as a *goal variable* (see also Section 3.1). The nature of a goal indicates what the decision maker wants with the object at hand, e.g. in the case of the goal variable 'profits', should it be maximized, minimized, or should a certain minimum level be strived for?

If goals are to be mandatory for the determination of the action to be chosen, a more or less clear relationship between the object of the goal and the alternative actions should be definable (see Section 3.1). In our opinion, if such a relationship can (in principle) not

be defined, the goal has no practical meaning.

In this study, the term *constraint* (or *restriction*) is used in the usual sense. Thus a constraint is a condition (often stated in mathematical terms) imposed on the alternatives that might be conceived of. Alternatives which do not meet the stated condition have to be disregarded. They are, in other words, *infeasible* or *inadmissible alternatives*.

In common parlance, the difference between goals and constraints is rather vague. For instance, if we say that 'we do not accept any action which yields a lower profit than last year', we formulate the goal to attain a certain amount of profit as a constraint. On the other hand, constraints that are formulated in terms of rigid conditions may often be violated to some extent. If this is the case (which may occur e.g. with capacity constraints), the desire to not violate the constraints can be seen as goals.

In this study we will distinguish between goals and constraints according to the above definitions. However, in order to take account of 'goals formulated as constraints' and of 'constraints formulated as goals' we will introduce an additional concept, viz. *goal constraints*, which will be defined more precisely in Section 3.1.

2.2. Constraints in Capital Budgeting and Financial Planning

If the solution to a decision problem has to satisfy certain constraints, the nature and the exact formulation of these constraints should be clear to the decision maker. This is because the constraints co-determine which actions are feasible. Alternatively, constraints might be viewed as goals having top priority. Let us therefore have a closer look at the constraints in the capital budgeting and financial planning problems.

Both capital budgeting and financial planning deal with constraints on the required outlays for the projects in each of the time periods of the planning horizon. This phenomenon is commonly called capital rationing. A well-known mathematical programming formulation of the capital rationing problem has been provided by Weingartner [1961].

The model can be written as

$$\text{Max} \sum_{i=1}^{n} b_i, x_i,$$

$$\text{(2.2)} \qquad \text{s.t.} \quad \sum_{i=1}^{n} e_{ti} . x_i \leq E_t \qquad \text{for } t = 1, \ldots, T;$$

$$0 \leq x_i \leq 1 \qquad \text{for } i = 1, \ldots, n;$$

where b_i denotes the net present value of project i, and e_{ti} is the outlay required for project i in period t. The maximum permissable expenditure in period t is given by E_t. The fraction of project i accepted is given by x_i. This fraction can be required to be either zero or one, by which the linear programming problem turns into an integer programming problem. Both problems have been dealt with in detail by Weingartner [1961, 1963, 1966].

It should be noted that the term 'capital rationing' has not always been used in the same way in the literature. As was clearly shown by Weingartner [1977], various authors have made different assumptions about the phenomenon of capital rationing. Not surprisingly these differences have led to series of controversies regarding the discount rate that should be used in computing present values, what this rate actually stands for, and whether it does measure the firm's opportunity cost of capital properly. According to Weingartner [Ibid], most participants in the controversies have interpreted capital rationing as a market-imposed limitation on the expenditures a firm may make. Within this interpretation, which will be denoted by external capital rationing, a further subdivision can be made. One manifestation of external capital rationing is called pure (or hard), defining the situation in which neither the firm nor its owners have access to financial markets. More often, the firm is thought to exist apart from its (possibly) many owners. In this case only the firm is supposed to be rationed by the financial markets.

One may rightly wonder whether external capital rationing, in one form or another, exists for the private enterprise in reality.

One may argue that for any project offering a future and uncertain income stream, some funds will be available. Indeed, a given option on such an income stream is being valued by the capital market. For this valuation, the expected returns and the riskiness of an option constitute important determinants. If the expected returns are low and/or the riskiness is high, the value of the option will be low, but it will have a value. The value of such an option, at the time of issuance, can be considered as the amount of funds the firm can get in exchange for the option concerned. Seemingly, no discernable reason exists for the market to deny the company any funds which according to the market itself would contribute to the company's market value. Obviously, given the market conditions, the option 'price' offered by the capital market may be too low to yield a positive net present value for the project. In that case, the funds are not acquired and the project is not undertaken. In our opinion, the reason for not attracting funds is that the project does not meet the market standards rather than that the firm is being rationed by the market.

This brings us to another interpretation of rationing: the so-called internal (or self-imposed) capital rationing. A firm may refuse to attract additional funds, because it considers the conditions offered by the market to be unfavourable. A factor causing this refusal may be that there is an important disagreement between the firm and the capital market with respect to the prospects of the firm. Another reason for a firm to impose limits on its expenditures may be that its current owners do not want to lose their control over the firm.

Capital budgeting models incorporating capital rationing constraints can also be used in situations quite different from those described above. Indeed, Weingartner [Ibid, p. 1404] states that his 'contributions have been directed at utilizing the informational content of the programming formulation as an aid to decision making and not as a positive theory of financial markets'. In the managerial process of capital budgeting within firms, limits are frequently set

on plans for expenditures on capital account. According to Weingartner [Ibid, p. 1428], this is done for planning and control purposes, and consequently, is not a proper case of capital rationing. Because the choice of these expenditure limits is subject to managerial choice, it would be better not to treat them as constraints which have to be met 'at any cost'. Instead, the decision maker should have the possibility to 'trade-off' these constraints against other goals. We will return to this point later on in this study.

As with the expenditure limits, many other 'constraints' are formulated in capital budgeting and financial planning problems. Some examples are a) *operational constraints* like manpower, capacity and liquidity constraints, b) *constraints to take account of the capital market*, e.g. to limit the risk of financial failure, to 'smooth' dividends and earnings patterns over time and to limit the amount of debt outstanding, c) *organizational constraints*, like constraints on the percentage of total investments concerning new products, constraints on employment, etc., and d) *external constraints*, for instance to take account of the environmental effects of the projects undertaken.

Clearly, many of these and other constraints are being used in practice. Some reasons for this phenomenon will be discussed in the following two sections.

2.3. The Goal of Market Value Maximization

As mentioned in the introductory section, the desirability of (a set) of capital investment project(s) - as viewed by the firm's owners - is determined by the project effects on the quality of the owners' income over time. The quality of an income stream depends on its height, riskiness, and timing. These quality effects can be translated into one measure of the project's desirability, generally called its *market value*. In most capital budgeting and financial planning models, every project's market value is assumed to be a point-estimate determined *a priori* by the decision maker. An example is provided by the Weingartner model in (2.2), in which the value of

the i'th project is represented by the net present value of the project (b_i).

The use of these *single* dimensional measures for a project's desirability can be justified theoretically through the existence of a price mechanism. The latter, being the capital market, determines 'prices' (i.e. discount factors, risk premiums, etc.) for lending and borrowing money, subject to different risks. Below, we will go into the theoretical justification of the use of a project's market value as a measure of the project's desirability.

Most theories dealing with the appropriateness of the use of the project's market value, assume *a priori* that the firm is trying to maximize its owners' (stockholders') wealth. To reach an optimal solution, both the firm and its owners can (and should) also consider the exchange opportunities as offered by the capital market.

Assuming certainty, Hirshleifer [1958] has shown 'that the present value rule for investment decisions is correct in a wide variety of cases'. One of these cases occurs when investment opportunities are independent and the capital market is 'perfect' (a perfect capital market is one in which the lending rate equals the borrowing rate, where this rate is independent of the amount of borrowing or lending, and where no capital rationing exists). However, if the lending rate is not equal to the borrowing rate, it may happen that the present value rule is only correct in a formal sense, because 'the discounting rate used is not an external opportunity but an internal shadow price which comes out of the analysis' (Ibid). Unfortunately, there are also cases for which the present value rule fails to give answers that are correct 'in the desired sense of providing an objectively calculable criterion independent of subjective preference considerations' (Hirshleifer [1970, p. 199]). This may be the case if the capital market is no longer assumed to be perfect: for example if the marginal borrowing rates increase as the scale of borrowing is expanded.

In an uncertain world the analysis becomes even more complicated. The main problem becomes the specification of the capital market model, evaluating uncertain future income streams. Some authors have tried to avoid the need for a detailed market equilibrium model (see Modigliani and Miller [1958]). Others have used a very general uncertainty model, the time-state preference approach (see e.g. Hirshleifer [1970]). For both approaches it is difficult to derive meaningful decision rules for capital budgeting within the firm. An intermediate approach is the capital asset pricing model (CAPM), as developed by Sharpe, Lintner and Mossin. The CAPM, which essentially is a one-period model [1)], has produced results which have shown empirically to be reasonably close approximations of the valuation of uncertain income streams by capital markets. This theory says, that in market equilibrium, the value of each uncertain income stream $\tilde{X}$ is determined by the riskfree interest rate, $\tilde{X}$'s covariance with the income generated by the total market and the so-called market price of risk. Because investors have the possibility to diversify their portfolios, the competitive capital market assigns no value to the *unsystematic risk* of $\tilde{X}$, which is associated with the part of $\tilde{X}$, which is stochastically independent of the market. The same kind of reasoning can be applied to the valuation of the firm's capital investment projects. Given an economically independent project, and given the firm's objective to maximize its stockholders' wealth, the firm neither has to worry about the unsystematic risk of the projects nor about the stochastic dependencies between the projects, because 'it is of no value to its owners'. Accordingly, the discount factor to be used can be expressed in terms of the riskfree interest rate, the market price of risk, and the project's

1) In order to make the CAPM-analysis suitable for multiple period capital budgeting, additional - rather restrictive and unrealistic - assumptions should be made. See e.g. Hamada [1969], Rubinstein [1973] and Stapleton [1971].

covariance with the market (its *systematic* risk) - (cf. Ballendux and Van Vliet [1978]). In consequence, different projects will require different discount factors.

So far we have dealt with the theoretical construction underlying the use of market values to measure a project's desirability. What about the fundaments, i.e. the assumptions, on which this theoretical construction itself has been built? Two very important assumptions have been made in the analysis:

(a) capital markets are efficient;

(b) firms are, and should be maximizing their owners' wealth.

As argued by Gordon [1980], the second assumption is already included in a similar but more limited assumption than (a), viz. that '<u>all</u> markets - not just capital markets - are competitive'. We do not want to make this stronger assumption here. Instead we will deal with assumptions (a) and (b) separately; (a) will be discussed in the remainder of this section, and (b) will be discussed in Section 2.5.

Are capital markets efficient? Two distinct courses may be pursued to answer this question. First, the <u>conditions</u> indicated as being necessary for capital markets to be efficient can be verified (see Diepenhorst [1974]) for a set of conditions which is sufficient for efficiency. Secondly, the <u>implications</u> of the efficiency concept might be tested empirically. The latter line of thought has been followed among others by Haley and Schall [1973], stating with respect to capital market theory in general: '... *However, we are forced to make a number of fairly restrictive assumptions in developing the theory. The assumptions may not appear realistic; but if the implications of the theory are reasonable approximations to the facts we observe, the theory will be worth-while* ...'. From a methodological point of view, the latter 'justification' of the capital market theory is rather poor. The fact that theories, based on rather unrealistic assumptions, are not falsified by their implications is in itself not sufficient to accept these theories as being worthwhile.

It is hardly necessary to repeat the assumptions which are generally considered to be unrealistic. In the real world, taxes, transaction costs and bankruptcy costs do exist. Also, managers and owners often disagree about a firm's expected performance, partly due to the imperfect diffusion of information. As a matter of fact, all of these difficulties are extensively discussed in the finance literature. Many answers have been given, telling how certain assumptions might be relaxed, while indicating how the theories' implications might be affected by the relaxations. As yet, no such answer has been given while dropping or relaxing all unrealistic assumptions (cf. also Gordon [1980]).

What remains is a number of observations, being important for the analysis of capital budgeting and financial planning problems. First, the potential income generated by a quoted company is being valuated on the capital market. The value of an income stream is positively effected by its level, and negatively by its riskiness, although part of this risk can be diversified by the investors on the capital market. Thus if the influence of capital investments on the owners' wealth has to be accounted for, the market values of the investment projects should be included in the analysis. Obviously, the estimation of these market values will be a hazardous and difficult task. Secondly, there are several capital market imperfections that cannot be ignored. Notably in the evaluation of capital investment projects, taxes, transaction costs and the possible (economic) interdependencies between the projects should be accounted for. Furthermore, situations may occur in which the managers of the firm and the investors do not have the same expectations with respect to the performance of the firm.

2.4. Assumptions with Respect to the Decision Maker and the Organization

As many empirical studies show, most spokesmen assert that in their firms, a multiplicity of goals is strived for. The goal of market value maximization is seldom mentioned. And if it is

mentioned, it is generally not considered to be the only goal to be pursued (see for an overview of empirical studies of the goal(s) of the firm e.g. (Bethe [1975] and Petty and Scott [1980]). As observed by several authors, many of the goals appearing in empirical studies have clear relationships with the goal of market value maximization. Assuming that these relationships are indeed very clear, it is surprising that they are seldom dealt with in empirical studies. Notwithstanding the many difficulties connected with empirical studies of the goals of the firm [1], sufficient evidence exists to accept the result that the firm is striving for a multiplicity of goals. As a matter of fact, this is one of the main assumptions underlying this study. Below, we will describe in more detail which assumptions are made with respect to the decision maker and with respect to the organization in which he is operating.

Assumptions with respect to the decision maker

The exclusive use of market values to select capital investment projects explicitly assumes this is in optimal agreement with the desires of the firm's owners. Implicitly, it is assumed that the desires of the firm's other participants are translated as cost factors co-determining the market values, or as constraints co-determining the set of feasible projects. Furthermore, those engaged in selecting projects have the ability to make all necessary

1) One such difficulty concerns the question on which goals the study should be concentrated: personal goals (e.g. goals of individuals within the organization); organizational goals, or both? And what about the goals of groups of individuals? Furthermore, does the study address the goals the respondent thinks he is striving for, those he says he is striving for, those he is trying to strive for or even the goals he is in fact bringing nearer?

estimates and evaluations to calculate those projects which are theoretically worthwhile. In fact, unbounded rational individuals are assumed, who know exactly what they want, know the alternative actions and their implications, and are able to translate this information into optimal actions. What is wanted is the maximization of the wealth of the firm's owners - and nothing else.

These assumptions, describing the 'economic man', who plays an important part in many micro-economic theories, are generally not considered to be useful for describing the behaviour of particular decision makers. More realistic descriptions have been developed in (social) psychology, sociology and organizational theory. Especially the contributions of Simon, who studied human behaviour within organizations (see e.g. Simon [1957,1960]), should be mentioned here. Another useful framework has been provided by Yu [1980], who summarizes a number of basic findings from psychology and sketches the importance of these findings for normative decision methods.

In this study, we assume that man is not omniscient. Although the human's information processing capacity is almost without limits, the complexity of man's environment cannot be captured completely by the human brain. Therefore, following Simon, we assume that man's rationality is bounded.

This position has several implications. People neither know exactly what their possibilities are, nor do they know exactly what they want. Nevertheless, human beings have a set of motivational needs. These needs may be assumed to be structured hierarchically, although it should be noted that these structures of needs differ from individual to individual and moreover, may change over time. It may be postulated that people's choices depend on the state of their socio-cultural environment (on the other hand, people's choices may influence their environment). An important fact to be stressed here is that human needs are certainly not unidimensional.

In order to satisfy their needs, people search for alternative solutions. It appears that man is a learning and adaptive being, reacting on new information, creating new thoughts and changing his

aspirations.

In the method developed in this study we assume that the decision maker has to choose a 'good' action from among the alternative actions available. What makes an action 'good' depends on the decision maker's desires (goals) and on his evaluation of the conditions that command the availability and outcomes of the actions (see also Section 3.2).

We assume the decision maker to be capable of specifying which goals (goal variables) are relevant in a particular decision situation, and furthermore, that he is capable of choosing between the various alternatives proposed to him. However, we take account of the possibility that the decision maker may change his mind.

Assumptions with respect to the organization

As already indicated in our discussion of the constraints used in capital budgeting and financial planning, several organizational aspects may influence the choice of capital investment projects. Capital budgeting and financial planning are usually intended to take account of at least some of these aspects. It is therefore important that we summarize a few results of organizational theory and sociology (see among others Easton [1973], March and Simon [1958], and Simon [1958].

Firms, as much as many other organizations, can be viewed as *open systems* in which a number of *participants* can be distinguished. We assume that people and other parties participate in organizations because - and as long as - they can better satisfy their needs, maybe with less risk, than without participation in the organization concerned. The participants' needs are satisfied by 'rewards' (both material and immaterial) received from the organization in exchange for goods, money and services provided by the participants. As set out above, the participants' needs depend on the individual's socio-cultural environment. Part of this environment is the economic market

in which the participant operates. From the firm's point of view, the contributions of the participants must justify the rewards to be offered. What is justified depends on the alternatives available to the firm. Thus the participants cooperate on the basis of more or less complex exchange relationships. Both sides of these exchange relationships are subject to external influences such as socio-cultural factors and market forces. All actions available to the firm are, of course, co-determined by the contributions of the participants. The contributions depend on the 'rewards' required by the participants, by which these rewards can be viewed as indirectly co-determining the available action. As such, these rewards can be viewed as goals or goal variables, defined in the first part of this section. Because the firm has to deal with a manifold of participants whose desired rewards depend on external, and thus dynamic factors, the firm has to deal with a *dynamic goal complex*.

The sketched picture of the firm may seem rather mechanistic. However, it should be clear that we live in a uncertain world in which the exchange relationships mentioned above are not always very clear. Also, the co-operation between participants cannot be assumed to be without friction. On the other hand, certain relations may also contain some 'slack'.

At this point we have to mention an important organizational assumption made in the remainder of this study, i.e. that decisions can be treated as though they are made by a single decision maker, deciding on basis of his view of the set of actions available and of the dynamic goal complex. In reality, several decision makers may take a decision together, either in a team as equivalent participants or in some hierarchical organizational structure. Neither case is irrelevant for capital budgeting and financial planning. Decisions on capital investment projects are often taken step by step, thus passing through several decision levels. Many of the decisions leading to the final choice of projects are taken by teams of decision makers. Nevertheless, we limit the scope of this study to the case in which only one decision maker is involved, facing a multiplicity of goals.

2.5. The Firm's Market Value as One of the Elements in a Dynamic Goal Complex

As argued several times in this chapter, firms in reality have to deal with several goal variables. Two main questions can be raised: What is the role of the 'owner's wealth maximization' in this dynamic goal complex, and - for the purpose of financial management - can the firm be viewed as if maximizing its owners' wealth?

One of the 'plain observations' at the end of Section 2 was that the income streams generated by a firm are being valued by the capital market. The market value of these income streams does not depend *directly* on all of the goals strived for by the firm. Generally however, all of the goals may affect the income streams. In consequence, the market value depends indirectly on these goals.

From the other point of view, the realization of goals other than wealth maximization may depend on the firm's market value. For instance, if the firm is to attract new equity, the road to the capital market should be open - and the toll to follow this road should not be too high. Normally, the entrance to the capital market, and its price, is not independent of the market value of the firm's current stock. However, where the firm is planning a number of additional, or even new activities, for which the new equity is to be attracted, the capital market will certainly form expectations about the profitability and the risk of the planned activities. Furthermore, the market evaluates how the firm normally takes care of its stockholders' interests. Thus stockholder relations are at least partly reflected in the firm's current market value.

Another reason for the firm to support its market value is to avoid the risk of being taken over, which would certainly influence the interests of most of the firm's participants. The firm's top managers keep their eye on the firm's stock prices, so as to limit the risk of being fired by the stockholders. Notwithstanding this risk, there is usually some margin for the managers to strive for other goals besides the goal of maximizing market values.

Thus several reasons to keep up the market value exist. No reason has been given as to why the firm's market value should be maximized. In our opinion, market value maximization only makes sense in the rather unrealistic situation in which all interests of all participants run parallel to the goal of value maximization. Assuming that at least some participants want to allocate the firm's means in directions other than necessary for value maximization, and assuming they have the ability to co-determine the availability and to influence the allocation of these means, the goal of value maximization has no satisfactory mathematical definition. The reason is that the realization of this goal depends on the help of participants whose goals deviate from market value maximization. The participants who strive for market value maximization thus cannot control all of the variables determining the market value. Likewise, the other participants cannot control all variables relevant for their maximization problem. As argued by von Neumann and Morgenstern [1953, p.11], these kinds of problems cannot be described as 'maximum problems, but rather as a peculiar and disconcerting mixture of several conflicting maximum problems'.

For the purpose of financial management, one might treat the firm as if maximizing its stockholders' wealth, either by ignoring the desires of the other participants or by taking these desires as given and fixed. The first, rather relentless approach by no means guarantees 'good' values for the ignored goal variables. It may even be possible that one or more of them are so poorly served that the quality of the income streams produced by the firm is seriously affected. Thus 'maximizing' the firm's market value without consideration of the other goal variables may result in surprisingly bad market values.

The other often proposed procedure is to take the desires not accounted for in the firm's market value, as given and fixed, i.e. to treat them as cost factors or constraints to be considered before considering market values. There are two main objections against

this approach. The decision maker has to determine the cost factors and the restrictions independently from the evaluation of the market values. Furthermore, goals that are dealt with implicity as cost factors or explicitly as constraints have pre-emptive priority over the maximization, subject to the constraints and given the cost factors of the market value. In reality, the decision making process is far less rigid. For instance, if the obtained maximum market value is not judged to be satisfactory, some of the restrictions may be relaxed. Likewise, if the obtainable market value appears to be very good, some of the constraints may be strengthened.

In our opinion it is better to treat all goals and constraints which are not completely fixed, as goal variables to be traded off against each other. The firm's market value could be one of these goal variables. The firm which considers capital budgeting and financial planning as decision problems with multiple goal variables should also consider the use of multiple criteria decision methods. This will be the subject of the following chapters.

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