

AN INVESTIGATION INTO THE INVESTMENT DECISIONS OF SMALL  
MANUFACTURING FIRMS IN THE DURBAN-PINETOWN-PIETERMARITZBURG  
METROPOLITAN AREAS

by

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 INTRODUCTION

The general concept of 'investment' has many facets. It can inter alia refer to placing money into debentures, treasury bills, ordinary shares, oil ventures, cattle or paintings by investors, pensioners, speculators or government agencies. It is indeed diversity which characterizes 'investment' (Cohen, Zinberg and Zeikel 1977:3).

Since this study confines itself in particular to business or economic investment, the 'investment' concept in this context needs a more precise definition. Business or economic investment refers to the purchase and operation of business assets by firms with a view to generating net income. The envisaged income ought to be commensurate with the risks<sup>1</sup> involved in the venture. The profit motive provides the incentive for the operation: any businessman who leases a building and invests in fixed and current assets believes that these assets will produce profits when combined with good management and adequate labour. In the opinion of the businessman it should be possible to eventually earn a profit on the investment (Amling 1974:5).

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1. Risk can be divided into two components viz. business risk and financial risk. Business risk is inherent in the firms operations and is influenced by management policies, economic conditions and consumer demands. Such factors create the possibility that actual earnings before interest and taxes will deviate from expected earnings. Financial risk on the other hand describes a firms ability to meet its financial obligations such as interest or repayment of borrowed funds (Gup 1983:70).



The concept of business or economic investment is synonymous with the concept of capital budgeting in financial literature and is also given a time dimension by Weston and Copeland (1986:99). They describe it as a process that involves the entire operation of planning expenditures whose returns are expected to extend beyond one year. They regard as obvious examples of capital outlays, expenditures for land, building and equipment, and for permanent additions to working capital associated with plant expansion. An advertising or promotion campaign or a research and development program having an impact beyond one year should consequently also be classified as a capital budgeting expenditure. Weston and Copeland (1986:99) further observe that individual proposals dealing with asset acquisitions, are frequently grouped under the headings, 'replacements' and 'expansion' (additional capacity for existing or new product lines).

Amling (1974:5) regard a business investment as an investment in real assets which facilitates the production of goods and services. Such investment he suggests, should be made only after a thorough economic and financial analysis has been undertaken to determine the likely pattern of the income to be generated and the risks involved. Business investment accordingly calls for the careful and rational selection of business assets. Random or emotional responses to circumstances should be avoided.

Economic investment is thus rendered distinctive by the following features:

- a) it involves the planning by business organizations of expenditures, the returns on which are expected to extend beyond one year;
- b) economic and financial analysis precedes action in order to determine the net income which can be expected and the risks involved and
- c) the results of the economic and financial analysis are compared against some norm so that a rational decision may be taken as a prelude to action.

## 1.2 PURPOSE OF STUDY

In this study, investment is examined from the perspective of small business units : the applicability of traditional theory is probed from a theoretical point of view and a derived conceptual model is tested empirically in the Durban-Pinetown-Pietermaritzburg area.

The importance of the small business unit is highlighted by Conradie (1982:2) who observes that the small business sector supplies 80 per cent of job opportunities in Japan. Equivalent percentages for West Germany, the United States of America (USA), Korea and Canada, he notes, are respectively 66 per cent, 58 per cent, 46 per cent and 30 per cent. In Korea 96 per cent of all business firms are regarded as small.

Nearly 75 per cent of all business enterprises in the USA are sole traders and 80 per cent of the total number of business enterprises (excluding the agricultural sector) have an employment of less than 10.

In West Germany the small trader sector is responsible for 61 per cent of total retail turnover, 59 per cent of total wholesale turnover and 47 per cent of total turnover of the manufacturing sectors. In the USA the small business sector contributes nearly 43 per cent of the Gross National Product. The small business sector in Japan is responsible for 57 per cent of the gross added value of the total manufacturing sector.

Smith (1980:58-68) is of the opinion that the magnitude of competition generated by small businesses is so great that they form an important cornerstone of any free market economy.

Around the world, the small business unit clearly plays an important role in employment creation, the supply of goods and services at competitive prices and economic well being in general. In order to optimally realize its economic potential, the small business unit therefore needs to manage the resources at its disposal in the most efficient way possible. The capital goods it chooses to use in this process are undoubtedly of central importance. It might accordingly disturb the reader to note that studies of small manufacturing enterprises, in the USA and elsewhere have revealed that they are generally unsophisticated in financial management and employ practices which are in many cases regarded as inappropriate by researchers. It will, however, be

suggested in this study, that the practices traditionally considered 'appropriate' are in fact, not appropriate at all for small businesses and that a different approach toward investment decision making is called for.

### 1.3 OUTLINE OF STUDY

Because decision making is the central issue in this thesis, decision making in general is first placed under the microscope in chapter two. Decision making is then placed within the context of the firm where, it is found, that objectives fulfil the critical function of providing decision criteria. The normative rationality of the 'economic man' forms the basis of the theoretically sound objectives for the purpose of investment decision making. However, cognizance is also given to the behavioural adaptations which human decision makers bring to bear in the situation.

It is noted in chapter three that at the top of the organizational objective hierarchy there needs to be one central long-range objective which can integrate the structure into a consistent set of logically interrelated decision criteria. The nature of this objective is of importance, particularly for investment decision making, as a firm's strategic stance is determined by those decisions. Several theories concerning the nature of this central long range objective are reviewed.

Part of the investment decision process consists of projecting expected cash flows from investments which might be undertaken. It is argued that these flows have a time value and that they accordingly need to be discounted to a present value for objective decision making. The fact that they are also uncertain needs also to be accounted for.

In chapter four, the attitude of the decision maker towards risk is found to be relevant and attention is given to an approach toward the measurement of the riskiness of expected cash flows and adjustment thereof.

The relationship between 'cost of capital' and the normative objective of the firm, which will have crystalized as 'shareholder wealth maximization,' will be explored in chapter five. A discussion will follow, concerning the cost of different sources of long term funds as well as different methods utilized for the calculation of the cost of equity capital.

Although short term debt is not considered to be an ingredient of permanent financing of a firm and should consequently not normally be used as a financing source for long term investment decision making, literature suggest that small businessmen in South Africa in fact make extensive use of this source to finance investment. A review will consequently also be conducted of the cost of short term sources of funds as a point of reference for later discussions.

The 'cost of capital' to be used as criterion for investment decision making is finally identified as the weighted average of the different component costs of capital.

A survey is undertaken in chapter six of studies concerning the cost of capital in the United States of America, the United Kingdom and the Republic of South Africa. These studies focus attention on large stock exchange listed firms as well as their smaller unlisted counterparts.

Approaches toward capital budgeting are examined in chapter seven with the particular attention given to the contrast between time related and non time related methods. It is noted that investment must usually be undertaken against a background of limited availability of funds and evaluation methods to cope with this phenomenon are discussed. Inflation in the capital budgeting equation is also considered.

The results of surveys of the capital budgeting practices of listed and unlisted firms in the United States of America, the United Kingdom and the Republic of South Africa are then reviewed in chapter eight.

In chapter nine, two primary problems in the utilization of the classic profit maximization objective for the unlisted small firm emerge. From a practical point of view they are found to be insurmountable and objectives which might directly or indirectly contribute to the normative ideal are re-examined. In chapter ten efforts to overcome the problems involved are examined but are

ultimately found to be wanting. In particular, it is concluded that the existence of certain 'behavioural satisfactions' which can be secured in the small business unit profoundly affect the discount rate which might truly optimize owners' returns on investment.

In chapter eleven, a normative model for investment decision making in the unlisted small firm is constructed. The elements for such a model are derived from material considered in previous chapters. Against this normative model will be compared certain aspects of the investment decision making of small businesses in the Durban-Pinetown-Pietermaritzburg area.

Chapter twelve is devoted to the research methodology to be used in the study. The congruency between the unlisted and small firm in South Africa is noted and a 'small firm' is in fact operationally defined as one which will not qualify for a listing even on the Development Capital Market of the Johannesburg Stock Exchange.

The administration and structure of the questionnaire to be employed is discussed against the background of a number of hypotheses which will need to be tested empirically.

In chapter thirteen the research results will be recorded. An analysis and interpretation of the results follows and where appropriate, a statistical test will be applied in order to verify or reject hypotheses.

In chapter fourteen, conclusions are drawn from the study and recommendations are made. These conclusions and recommendations are focussed toward the normative investment decision making model previously enunciated.

#### 1.4 LIMITATIONS OF THE STUDY

It is clear that the findings of the study will not address the investment practices of small business units generally. However, the overall results might be used as an indicator for small business units in other areas and even in other countries as to issues of importance in investment decision making.

#### 1.5 CONCLUSION

The small business unit is of vital importance in the health of any economy. The resources they use therefore need to be optimally allocated in terms of objective criteria. Some of the satisfactions they generate for owners are, however, non-financial and can not be expressed easily in terms of traditional approaches.

Resources are allocated in terms of decisions and the process of those decisions must of necessity conform to the requirements of decision making in general. Attention thus needs to be focussed initially on the decision making process.



## CHAPTER TWO

### THE PROCESS OF DECISION MAKING

#### 2.1 INTRODUCTION

Stated simply, a decision is the choice of a particular course of action from a set of alternative possibilities. The process of decision making, however, involves, in addition, all the steps which lead to such choice (Certo 1983:109). A proper understanding of the process of decision making thus requires a careful consideration of these steps, which sequentially, are diagnoses, specification of alternative courses of action, analyzing the consequences of each, comparing such consequences against desired ends and finally, making the choice.

#### 2.2 STEPS IN THE DECISION MAKING PROCESS

##### 2.2.1 DIAGNOSIS

Diagnosing means identifying and clarifying the problem, supplying the requirements for a satisfactory solution and indicating the limits within which a solution must function (Webber 1981:111).

Ansoff (1965:25) describes a problem as a 'gap' or difference which exists between the current position of a decision maker and objectives. Should circumstances change, the potential for at-

taining objectives might be enhanced or diminished. Should the former be the case, objectives might be revised upward and the resultant gap described as an opportunity.

Sound diagnosis should thus address three basic elements, namely:

- a) the nature of the existing 'gap' between the results we desire and the current state of affairs;
- b) the cause of the gap and
- c) whether the situation imposes limits within which we must find a satisfactory solution (Newman, Summer and Warren 1967:319).

#### 2.2.1.1 FINDING THE ROOT CAUSE

Once the problem or opportunity is identified in terms of a 'gap' that exists many decision makers move immediately to seeking alternative means of closing the gap. However an effective solution can usually be found if an analysis is first undertaken of the cause of the gap.

This point is often critical since what at first sight may seem to be the cause of the 'gap' can actually be merely a symptom of the real root or underlying cause. If however, the root cause is elusive temporary symptomatic relief may be sought by dealing directly with the symptoms. In a case like this the question of what is causing the symptom should continued to be asked until eventually the root cause is exposed (Newman et al. 1967 : 322).

#### 2.2.1.2 LIMITING FACTORS

It is imperative that the 'gap' be defined not only in terms of the relevant and proximate objectives but also placed within the context of possible higher level objectives or constraints. This perspective will reveal whether a particular course of action will in some way be inhibited. Koontz, O'Donnel and Weirich (1982:114-115) emphasize that before the decision making process can proceed, limiting factors need to be identified. In a business enterprise, for example, the availability of funds might inhibit a promotional campaign designed to improve market share. They furthermore note that the limiting factor can change from one problem solving situation to another. Constraints imposed by higher level goals should therefore be stated specifically. Without this a satisfactory solution is impossible (Newman, et al. 1967:330-331).

Only when all the aspects of diagnoses have been fully considered should the decision making process proceed to the next step : the search for alternative solutions.

#### 2.2.2 GENERATION OF ALTERNATIVE POSSIBLE COURSES OF ACTION

Rarely does a decision maker immediately find the one perfect way to solve a problem. There are usually several different and valid approaches to the solution of a problem, each with its own particular advantages and disadvantages. The two most common sources of alternatives are the past experiences of decision makers them-

selves and the practices followed by others in similar circumstances (Newman, et al. 1967:335). They warn however that imitation should be considered on a selective basis only as a source of possible alternatives. Indeed the generation of alternatives relies a great extent on the creativity of the decision maker.

Newman, et al. (1967:336) point out that any alternative that adds some new and useful element is creative. These authors identify the following stages in the 'creative' process:

- a) saturation - becoming thoroughly familiar with a problem, with its setting, and also with ideas and activities which are integral to the problem;
- b) deliberation - analyzing ideas, viewing them from different viewpoints and challenging them;
- c) incubation - letting the subconscious take over by retiring and attempting not to concentrate on purposeful search;
- d) illumination - getting 'bright' ideas: sometimes unconventional and even fanciful ideas but promising and with the potential of providing an answer;
- e) accommodation - classification of ideas, evaluating its relevance to the problem, reframing and adapting it, putting it on paper and getting other peoples opinion on it.

Seen thus, it is understandable that creativity is seldom as spontaneous as one would take it to be. An individual can however try to be alert for obstacles that can hamper creative thought. Cultural blocks, for example, impose social conformity: most

people, consciously or unconsciously try to fit in with the modes of living and attitudes of their associates. Until decision-makers break with current fashions of thought, really creative ideas will be scarce. On the other hand perceptual blocks may occur because of barriers arising from past experience: the mere transfer of past ways of thinking to new situations may block out any fresh perception of possible alternative courses of action. A popular puzzle which illustrates this concept is the demand that an individual construct four triangles using six match sticks. Most people will think only of arranging the sticks on a flat surface. If the problem is conceived in three dimensional terms, a pyramid solves the problem.

Serendipity is a further aid to individual decision making. This concept is defined as the art of finding things we are not looking for. The search for a bright idea to solve one problem could turn up some interesting perspective on quite a different issue. The art is to recognize how these by products can be put to good use (Newman, et al. 1967:345-350).

Groups are invariably better able to generate creative ideas than individuals for the simple reason that 'two heads are better than one.' Various techniques have been developed for stimulating the creative potential of groups. One of these, brainstorming, involves the following procedures (Newman, et al. 1967 : 352):

- \* the listing of all the solutions group members can possibly think of, however wild or impossible they might seem. An hour of brainstorming is likely to produce anything from sixty to one hundred and fifty ideas;
- \* only when the combined reservoir of ideas has been exhausted will any critical examination of the list commence;
- \* proposed solutions which are not feasible will systematically be eliminated during this by the group;
- \* better solutions might emerge as a result of critical examination, refinements or adaptations of original ideas by the other members of the group. Some ideas which are impractical when considered in isolation might become feasible when combined;
- \* a final 'short-list' of feasible solutions is prepared.

Newman, et al. (1967: 352) note that brainstorming has proved itself to be useful in a variety of problem situations including the treatment of glass for new motor vehicle designs, development of new tyremaking machines, improvement of highway signs and improvement of newspaper production processes.

Another approach to group involvement in generating alternatives is known as synectics.

This word means ' the fitting together of diverse elements' by group interaction (Newman, et al. 1967 : 353). It differs from brainstorming in that the leader of a group will select a key aspect of the problem and pose it as a general issue for discussion. A technical expert within the group also assists in appraising the feasibility of each idea as it crystalizes. Consequently, instead of producing a number of random ideas as in brainstorming, ideas are screened or elaborated as soon as they are generated.

Once a decision maker is satisfied that he has generated and short listed all feasible alternatives, his next step is to analyze each alternative in terms of the projected consequences of implementation.

### 2.2.3 ANALYZING ALTERNATIVE COURSES OF ACTION

The consequences of each alternative are likely to be both desirable and undesirable, both immediate and long range, tangible and intangible. In short, all possibilities should be taken into account (Newman, et al. 1967:363). Koontz, O'Donnel and Weihrich (1982:115-116) warn that when projecting consequences of alternative plans decision makers should think not only of quantitative factors but also of qualitative ones.

Quantitative factors are those which can be measured numerically. A military strategist might quantify projected consequences in terms of casualties suffered or inflicted. A businessman might project the consequences of his alternatives in terms of positive or negative cash flows.

Qualitative factors are those which are intangible and cannot be measured numerically. One example could be the militancy of trade unions, a factor which in recent times has become important in the Republic of South Africa (RSA). A militant climate might well manifest itself in a costly unexpected labour dispute precipitated by a decision in an apparently unrelated matter.

Qualitative factors can thus impact on the projected quantitative consequences.

The projection of consequences necessarily deals with the future and the future is uncertain. Certo (1983:111) understates the case when he observes that environments and organizations are forever changing and accordingly the future consequences of decision alternatives are not perfectly predictable.

On reflection, Certo was able to conceptualize the predictability of conditions facing the decision maker in terms of a continuum. This continuum, which is presented in table 2.1, ranges from the completely certain condition to the completely uncertain across a range of risk.



FIGURE 2.1

CONTINUUM OF DECISION MAKING CONDITIONS

Complete Certainty Condition	Risk Conditions			Complete Uncertainty Condition
	Low Risk	Intermediate Risk	High Risk	

Source: Certo (1983:112)

The complete certainty condition is deemed to exist when decision makers know precisely what the consequences of a prospective alternative will be: A precise forecast can be made, assigning a probability of occurrence of 1.

The complete uncertainty condition exists when decision makers have no idea of what the consequences of an implemented decision will be. Predicted consequences would consequently be merely a matter of conjecture (Certo, 1983:112).

In between these extremes lies a range of risk. The primary characteristic of the risk condition is that decision makers have only enough information about the outcome of each alternative to estimate how probable the consequences will be if the specific alternative is implemented. Obviously degrees of risk consist in that the poorer the quality of information related to the outcome of an alternative, the closer the situation is to uncertainty and the higher the risk associated with choosing the alternative.

In many practical decision situations where the consequences under consideration are of considerable importance, decision makers will attempt to assign probabilities of occurrence to each set of

consequences projected. Once the consequences of each alternative have been noted, quantified where applicable, and placed somewhere on Certo's continuum, it is possible to proceed to the next stage of decision making: the evaluation of alternatives.

#### 2.2.4 EVALUATION OF ALTERNATIVE COURSES OF ACTION

The need for decision making was discovered in the diagnosis stage by comparing current or expected experience against a desired end or objective. Only if a 'gap' existed was there a need for a decision. Alternative courses of action were generated with a view of closing that gap. The probable consequences were projected and quantified where applicable, hopefully on the same basis of measurement used for the expression of the original objective because a comparison now needs to be undertaken. The projected consequences must be compared against the desired end or objective and each alternative is evaluated in terms of its capacity to 'close the gap.'

In many decision situations the alternatives can be ranked on the basis of the extent to which they will potentially contribute to the attainment of the relevant objectives. Sometimes none will satisfy the principal objective. In other cases more than one alternative will satisfy requirements and additional decision criteria might then be brought to bear.

In the evaluation of alternatives, the attainment of the original relevant objectives is of prime importance. They are the decision criteria to be employed in the final step of choice.

## 2.2.5 CHOICE

### 2.2.5.1 INTRODUCTION

Making a choice can be a very simple step for an individual. If only one alternative satisfies his decision criteria, that alternative is chosen for implementation. If all fall short, the alternative which comes closest to the ideal might be chosen and the gap closed by lowering the objectives. He might, of course, delay his choice and attempt to generate more effective alternatives. Should more than one alternative meet the decision criteria and they are mutually exclusive, the alternative which offers the prospect of exceeding the objectives by the greatest margin might be chosen. Alternatively if more than one objective is involved, the objectives themselves might be weighted or additional objectives might be brought to bear as a further screening device. If the alternatives are not mutually exclusive, all of the alternatives which satisfy the criteria can be chosen for implementation.

Choice becomes more complex when an organizational decision situation pertains. In theory, the decision maker should subordinate his personal goals to those of the organisation. In practice this does not always happen. The decision maker might not deliberately misuse the organization : he might simply confuse personal desires with sound company values when 'choosing' (Newman, et al. 1967 : 338).

To illustrate the impact of personal goals on choice, a survey was conducted amongst 469 business managers in the United States and Europe by Megginson, Mosley and Pietri (1983 : 190). The survey revealed the following:

- a) Managerial decision making at the senior executive level tends to be dominated by individual preferences when the decision maker concerned has a strong personal preference.

One executive for example decided to locate company headquarters near his home in spite of the fact that extensive research indicated that it should be located elsewhere.

- b) Managers tend to make personal decisions in terms of personal goals and then try to convince others that they are appropriate for the organization.

Newman, et al. (1967:381) notes that in order to decide on a specific alternative, the decision criteria be applied in a business organization ought to be found among the firm's official objectives. They give the example of a conservatively owned company with limited capital, seeking an objective of a stable operation with assured profits. As result of this the company placed high value in its marketing on the low risk of using a respectable outside sales agency. Had the shareholders been less conservative the dominant objective of the company might have been growth. Clearly a different set of values would have prevailed and a more risky but potentially more profitable sales branch might have

been the choice. In either case, the prerogative for establishing the official objectives would vest with the shareholders and in economics shareholders are deemed to be rational beings.

#### 2.2.5.2 THE CONCEPT OF RATIONALITY

March and Simon (1959:137) indicate that the 'rational man' of economics and statistical theory makes 'optimal' choices in a specified and clearly defined environment. The economic 'choice' theory professes the following:

- a) to each alternative course of action is attached a set of consequences that will ensue if a particular alternative is chosen;
- b) The decision maker has a 'utility'<sup>1</sup> function or "preference ordering' that ranks all sets of consequences from the most preferred to the least preferred;
- c) the decision maker is now going to select the alternative that leads to the preferred set of consequences and

---

1. Utility is a function of personal satisfaction. Something that provides more feeling of pleasure than something else, is said to have greater utility (Herbst 1985:238).

- d) the decision maker must choose along a continuum consisting of conditions of complete uncertainty, risk and complete certainty.
- i) In the case of complete certainty his choice will be unambiguous.
  - ii) In the case of risk he will be rational if he chooses that alternative for which the expected utility is greatest. Expected utility being defined here as the average, weighted by the probabilities<sup>2</sup> of occurrence attached to all possible consequences.
  - iii) In the case of uncertainty the definition of "rationality" becomes problematic. The economic theory leans toward the rule of 'mini max' (minimize the maximum loss). This means in effect that the decision maker should consider the 'worst set of consequences' that may follow from each alternative. He would then select that alternative which will minimize the worst effects.

The rationality of the 'economic man' is contrasted by Simon (1982) with 'administrative man'. The administrative man he claims cannot be aware of all possible alternatives and cannot project all the consequences of choosing one alternative

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2. Probability theory is a decision making tool used in risk situations or wherein decision makers are not sure of the actual outcome of an implemented alternative. Probability refers to the percentage chance of a given outcome. This allows decision makers to calculate expected values for alternatives. The expected value (EV) for an alternative is the income (I) it would produce multiplied by its probability of making that income (P) :  $EV = I \times P$  (Certo 1983:114).

over another. "Administrative man" therefore reduces his problem complexity to the point where within his knowledge and limitations he can make a choice. The typical decision maker is therefore subject to 'bounded rationality'. Additionally the decision maker will make a choice on the basis of his perception of the situation and this may or may not be what the situation really is.

In support of the concept of bounded rationality the 'economic' theory of utility of the rational man is also placed within limits by McGuigan and Moyer (1975 : 36-37). They agree that it is extremely difficult to measure individual utility functions. They furthermore question the identity of the individuals whose utility functions are made relevant to decision making in large organizations. While economic theory points to those of shareholders, de facto experience points to those of management. But which managers? It is suggested that in fact official objectives are often a set of highly ambiguous statements which permit individual decision makers to apply 'convenient' interpretations at the moment of choice.

Despite its shortcomings in practice, the rationality of the 'economic man' does provide a sound normative model and it will be used as a point of departure in this study. The issue will be considered further in chapter 3. However another matter raised by March and Simon (1959:139) needs to be reviewed briefly in relation to the question of organizational choice.

They distinguish between satisficing decisions and optimizing decisions.

#### 2.2.5.3 OPTIMIZING CHOICE

According to March and Simon (1959:139) choice is optimal if a set of criteria is available that permits all alternatives to be compared and the chosen alternative is preferred in terms of such criteria to all other alternatives.

In economic terms, firms will seek to maximize their profits at a given level of risk.

#### 2.2.5.4 SATISFICING CHOICE

An alternative is satisficing if a set of criteria exists that describe minimally satisfactory alternatives and the chosen alternative meets or exceeds all these criteria.

Business firms, March and Simon (1959:141) allege, in fact pursue satisficing such alternatives. In other words they seek satisficing profits. They hardly ever aspire to optimize or maximize as required by rational economists.

In this respect Carlisle (1982 : 101) points out that a common goal in the long range plans of business organizations is to earn a relative 'moderate' return on invested capital. If this goal is reached performance is deemed satisfactory and shareholders are



assumed to be content. Once again this is contrary to the normative model and the implications will be considered further in due course.

## 2.3 TYPES OF DECISIONS

It is necessary to distinguish between two polar types of decisions as indicated by Simon (1977 : 44-62). He differentiates between programmed and non-programmed decisions as being on different poles of a continuum.

### 2.3.1 PROGRAMMED DECISIONS

Decisions are programmable to the extent that they are repetitive and routine. These decisions therefore need not be treated 'anew' each time they occur since a repetitive decision routine can be worked out for them in advance. The problem is repetitive, the ideal alternative pre-selected and applied automatically each time the problem occurs. Once the decision routine becomes operational, the programmable decisions become programmed decisions.

Figure 2.2 contrasts programmed decision making situations against those which are non-programmed. Also reflected are the traditional and modern ways of dealing with the two categories. In the case of programmed decisions, the traditional modes of habit and clerical standards have given way to computer assisted applications. The principles however are identical.

**FIGURE 2.2**  
**TRADITIONAL AND MODERN TECHNIQUES OF DECISION MAKING**

<u>TYPES OF DECISIONS</u>	<u>DECISION MAKING TECHNIQUES</u>	
<b>PROGRAMMED</b>  Routine repetitive decisions. Organization develops specific processes of handling them every time they occur	<b>TRADITIONAL</b> 1. Habit  2. <b>CLERICAL ROUTINE</b> Standard operating procedures	<b>MODERN</b> 1. <b>OPERATIONS RESEARCH</b> i) Mathematical analysis ii) Models iii) Computer simulations 2. Electronic data processing
<b>NON-PROGRAMMED</b> One shot, ill structured novel, policy decisions handled by general problem solving processes	1. Judgement, intuition and creativity 2. Rules of thumb 3. Selection and training of executives	Heuristic problem solving techniques applied to: i) training human decision makers ii) constructing heuristic computer programs

Adapted from Simon (1977:48)

### 2.3.2 NON-PROGRAMMED DECISIONS

Simon (1977:46) states that these decisions are usually novel, unstructured and consequential and that there are no cut and dried methods for handling them. The reasons for this being that:

- a) these problems haven't arisen before;
- b) the precise nature and structure are elusive and complex or
- c) because of the magnitude of the consequences concerned, they deserve custom tailored treatment.

According to Simon (1977: 46) the problem solving activities characterizing these activities, can also be identified by the extent to which they involve search aimed at discovering alternatives of action or consequences of action. Discovering alternatives may involve inventing and elaborating entire performance programs where these are not available in the problem solvers repertory (March and Simon 1959:140).

Examples of these types of decisions could be the decision to add a new product line to an existing product mix, to acquire a new business or to solve a materials handling problem.

Simon (1977:46) very effectively integrates problem solving, programmed decisions and non-programmed decisions when he states:

"Problem-solving proceeds by erecting goals, detecting differences between present situation and goal, finding in memory or by search some tools or processes that are relevant to reducing differences of these particular kinds, and by applying these tools or processes. Each problem generates sub-problems until we find a sub-problem we can solve, for which we already have a program stored in memory. We proceed until by successive solution of such sub problems we eventually achieve our overall goal, or give up. Problem solving

may be viewed as a way of reaching non programmed decisions by reducing them to a series of programmed decisions!"

#### 2.4 SUMMARY

The decision making process comprises a series of steps starting with the identification and clear definition of a problem or opportunity. In solving the problem or dealing with the opportunity various alternative courses of action need to be generated.

Each of the generated courses must then be rigorously analyzed, particularly with regard to the consequences of each. This analysis is especially difficult in that future consequences have to be placed within a continuum of different degrees of uncertainty. The next step in the decision making process comprises a comparison of projected consequences against the original objectives concerned. This has to be subject where applicable to higher order organizational objectives and constraints.

In the final step, namely choice, the theory on the 'economic man' was explored against that of the 'administrative man'. The former will optimize because of complete knowledge of alternatives and outcomes, whereas the latter, will satisfice because of 'bounded rationality.' It was noted that in a business organizational context, the normative model, which follows the pattern of the economic

man, places the interests and objectives of shareholders at the apex of the decision structure. It is their prerogative to determine the objectives of the organization and in decision making objectives are of overriding importance. Objectives are the alpha and the omega of decision making and they now need to be made relevant to investment decisions in business organizations.

## CHAPTER THREE

### OBJECTIVES AND INVESTMENT DECISIONS

#### 3.1 INTRODUCTION

The importance of objectives cannot be overstated and yet managers in business organizations often make decisions and initiate action without taking the time to establish a framework of objectives with which to guide the decisions made by those in the organization (Megginson, et al. 1983:150-155). The result is a lack of decision harmony and a somewhat disjointed, sporadic and apparently aimless wandering of the organization through time and space. The pursuit of individual rather than organizational goals would be the norm.

An organization is only successful if it survives and meets its objectives (Glueck 1977:44). Accordingly a spastic firm can hardly be regarded as successful : it does not meet whatever objectives might legitimately prevail and if it survives at all it can but thank fate, certainly not its management.

## 3.2 ORGANIZATIONAL OBJECTIVES

### 3.2.1 INTRODUCTION

Organizational objectives are the targets towards which human groups strive in their quest for survival in an environment which is sometimes friendly, sometimes hostile. The inputs of the organization, its processes and its outputs are structured so as to reach organizational objectives. If properly enunciated these objectives should reflect the purpose of the organization.

A hospital may for example have the primary purpose of providing medical services to the community. On the other hand, the primary objective of a business organization in a capitalistic society is deemed to be the making of a profit (Certo 1983:53). However, these statements of primary purpose as they stand are very broad and imprecise. They need elaboration if they are to serve practically as organizational goals and effective decision criteria.

### 3.2.2 SETS OF OBJECTIVES

Hodgetts (1985:93) reports that an inter industry investigation in the USA of organization objectives conducted by G.K. Shetty showed that the dominant goals of enterprises are steadfastly orientated toward profitability, growth and market share. Drucker (1981 :82-83) however, asserts that the survival of an organizational system may in fact be en-

dangered if management emphasizes only a profit objective. Such emphasis he claims tends to encourage managers to focus on the short term and to lose perspective of the long term. He suggests that managers should rather attempt to develop a variety of objectives in all management system areas where activity is critical to the operation and success of the system.

Drucker (1981 : 82-108) identifies eight key areas where management should set objectives:

1. Market standing: Managers should set objectives that will indicate where they would like to be, relative to their competitors.
2. Innovation: Managers should set objectives outlining their commitment to the development of new methods of operation.
3. Productivity: Managers should set objectives outlining target levels of production relative to given resources.
4. Physical and Financial Resources: Managers should set objectives with regard to use, acquisition and maintenance of capital and monetary resources.
5. Profitability: Managers should set objectives regarding the profitability the company would realistically like to generate within a specified period.
6. Managers performance and development: Managers should set objectives specifying rates and levels of managerial productivity and growth.



7. Worker performance and attitude: Managers should set objectives regarding worker productivity and attitudes.
8. Public Responsibility: Managers should set objectives outlining their responsibilities to customers and society and how they aim to execute it.

While these insights of Drucker may well be valid they do not easily facilitate an integrated approach to the specification of sets of objectives. Another approach which may well provide a suitable framework involves the structuring of a hierarchy of objectives.

### 3.2.3

#### DEVELOPING A HIERARCHY OF OBJECTIVES

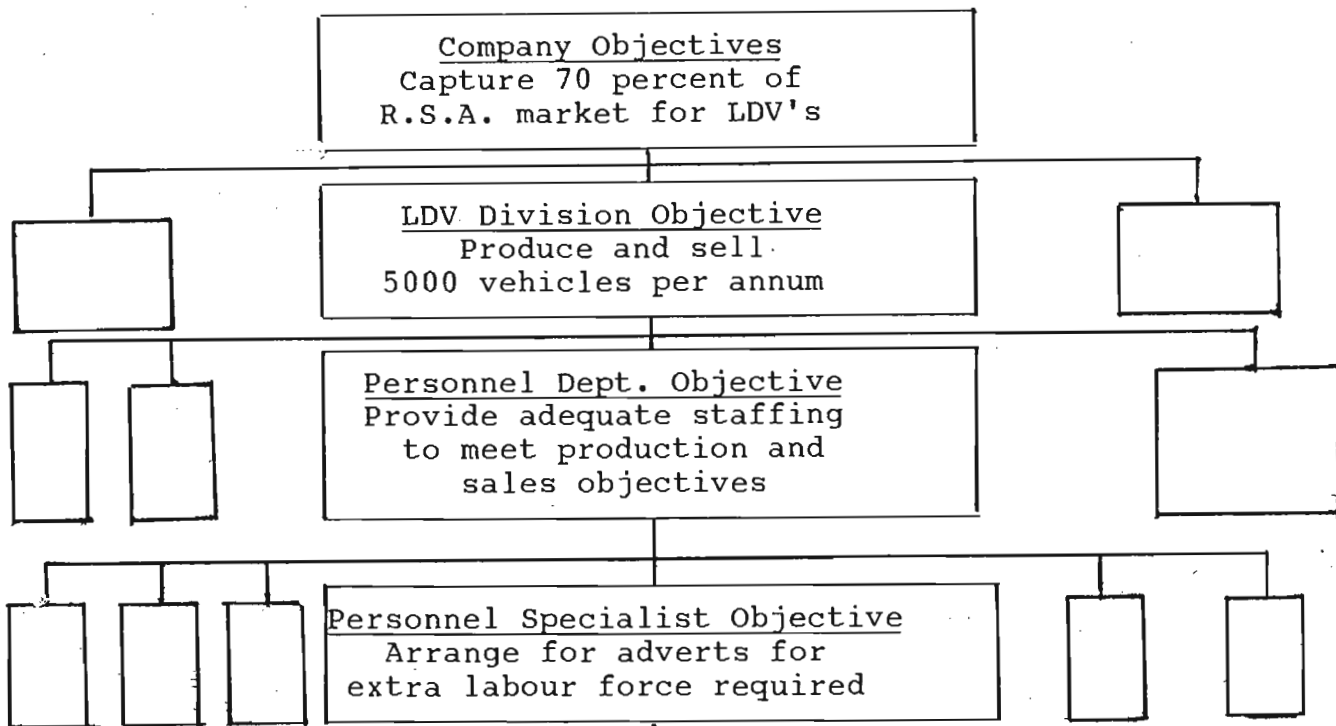
Hampton (1981:157-158) relates the goals of a business firm to those of an individual. Just as a person's basic goals incorporate more detailed subgoals that contribute to the basic goals, so do an organizations: goals break down into a network, or hierarchy of objectives.

From a time perspective, long range objectives can be translated into short range objectives which serve as a basis for day to day operational plans (Hodgetts 1985:95). If Drucker's organizational objectives are taken as an example, each one will need to be broken down into sub objectives, eventually forming a hierarchy of objectives. Figure 3.1, an adapted model from Hampton (1985:143), depicts a possible

objective for market standing of the light delivery vehicle (LDV) division of a South African vehicle manufacturer. Should the company desire to capture 70 per cent of the LDV market of the Republic of South Africa (RSA) for the said vehicle, the relative objectives could form the following hierarchy:

FIGURE 3.1

OBJECTIVE FOR MARKET STANDING



Adapted from Hampton (1985:143)

Apart from the network formed above this company objective will also form sub-objectives in other functional areas such as finance, marketing and production. Hampton (1985:42) also points out that the concept of a hierarchy of objectives implies that objectives should be established for every department and every individual and that such subsidiary objectives should contribute to meeting the basic objectives of the total organization. Such a hierarchy adapted from Hodgetts (1985:96), is depicted in figure 3.2.

FIGURE 3.2

HIERARCHY OF OBJECTIVES

TOP MANAGEMENT

Obtain a return on total investment of 22 per cent p.a. or more.

Increase sales by 25 per cent annually.

Maintain the 12 per cent current share of the market of the RSA.

Continue to develop a favourable public image

PRODUCTION

Increase labour productivity by 2 per cent p.a.  
Maintain cost of goods sold as a percentage of sales of 65 per cent or lower.  
Keep scrap level to 1 per cent of inventory expenses.  
Purchase and effectively use the most up to date machinery and equipment.

MARKETING

Increase sales by 25 per cent p.a.  
Introduce new products so that over the next 5 years, 75 per cent in value will be new.  
Keep advertising costs to within 10 per cent of total sales.  
Have at least two sales people in each of 125 national sale regions.

FINANCE

Maximize tax write offs.  
Maintain an adequate cash flow for operation.  
Pay dividends at a rate of 60 per cent of net earnings.  
Ensure that all departments are operating within their budgets

SUPERVISORS

Meet assigned production quotas.  
Resolve human relations conflict between workers.

DISTRICT SALES MANAGERS

Meet monthly sales quotas  
Provide advice and support to sales people.

OFFICE MANAGERS

Provide monthly cost control reports to all departments.  
Report financial problems to upper management for follow up action

Source: Hodgetts (1985:96)

It is interesting to note that one of the objectives of top management is to maintain a market share in the R.S.A. of 12 percent. This kind of objective has been shown in figure 3.1 to have its own network of sub-objectives. Likewise each objective will create its own cascade of sub-objectives.

#### 3.2.4 THE PRINCIPLE OF THE OBJECTIVE

The necessity of predetermining appropriate organizational objectives has led, to what is called 'the principle of the objective.' This means that before managers initiate any action, organizational objectives should be clearly determined, understood and stated (Certo 1983:60).

The practical responsibility for developing strategic goals lies with top executive management in conjunction with the board of directors who represent shareholders. Once these objectives are developed, functional goals in respect of production, marketing, finance and personnel should be stated. Once they have been developed, they should be communicated to the next lower management levels. This might happen by means of a series of cascading meetings between superiors and their subgroups continuing from top management down to the lowest point of supervision. The nature of organizations is generally such that lowest level managers operate within tighter constraints than managers at higher levels; the latter formulate the goals of the organization and the former translate them into work (Tosi and Carrol 1982: 241-242).

Fulmer (1974:159) even suggests that if an objective is not on the tip of a man's tongue it is not controlling many of his actions.

### 3.2.5 CONCLUSION

It is clear that while organizational objectives might well be focused on profitability, growth and market share, they require hierarchical specification and effective downward communication, if cohesive organizational activity is to materialize.

A major aspect of an organization's activity and position relative to its environment, is revealed in the capital goods it acquires. It is accordingly essential that here too, the 'principle of the objective', be applied. Organizational objectives should be made explicitly relevant to investment decisions and they need to be communicated from top management to the point of acquisition.

## 3.3 OBJECTIVES RELEVANT TO INVESTMENT DECISIONS

### 3.3.1 INTRODUCTION

Peter Drucker (1981:95), it has been noted, (section 3.2.2) suggests that one of the key areas in which objectives should be set regards physical and financial resources and in particular the use, acquisition and maintenance of capital and monetary resources. Drucker further observes

(1981:95) that objectives in this area do not usually concern managers throughout the enterprise as do objectives of most other areas. Planning for an adequate supply of physical and financial resources is primarily the task of top management and execution of the plans is most often in the hands of functional specialists.

Dean (1954:20) supports this view, inter alia, by quoting the president of a large oil company who stated that the very last thing he would delegate would be decisions regarding capital expenditure.

### 3.3.2 TIME PERSPECTIVE

Capital expenditure decisions must clearly remain the prerogative of top management particularly as they cumulatively express a commitment to the future which is seldom easily reversible or changable in the short term. Capital expenditure commits an organization to a specific strategic stance which will persist for several years into the future. Objectives which relate to such decisions must accordingly be placed within the framework of the organization's overall development plans, its efficiency and competitive position (Dean 1954:20).

A dynamic balance will also need to be maintained between technological advance and anticipated developments in labour relations. In particular, probable union reaction to the in-

roduction of more advanced, but labour saving equipment will need evaluation with some emphasis on long term consequences.

The firm's long term capacity to survive requires that income be generated which is at least sufficient to replace the resources consumed in the conversion process (Ansoff 1965 :49). Maintenance and enhancement of real productive capacity must accordingly not be neglected in capital expenditure decisions. However, the firm must continually renew itself, not only in respect to capital equipment but in terms of its capacity to compete effectively.

New products and markets must be developed and an investment must be made in research and development as well as management training. Investments of this nature need the perspective of a time horizon which lies well beyond next year's budget. It is thus imperative that long term objectives be formulated and made relevant to investment decisions.

### 3.3.3 RETURN ON INVESTMENT (ROI)

ROI is a measure which relates profit to the investment of funds. It is a measure which might at first sight, seem most appropriate for the formulation of objectives relating to investment. However, as Ansoff (1965 :50) correctly points out ROI measures cannot do justice to the long term perspective required.

ROI is frequently 'loosely' referred to in financial and management literature. Whenever it is used, it needs to be properly defined. It could mean profit after interest and taxes divided by total assets or profit after taxes before interest divided by total assets. It could also mean profit after interest and taxes divided by owners equity.

Typically, assets and owners equity are measured as figures on a company's balance sheet. These may however not be representative of market values of total investment and owners investment in the firm. Also, accounting profit may not coincide with true return to the owners.

These return on investment measures, also suffer from the defect, that as fractions, the results may be increased by reducing their denominators as well as by increasing their numerators. It is moreover possible to increase profit after taxes and reduce return on investment if the denominator grows more rapidly than the numerator. (Porterfield 1965:15-16).

Another serious drawback of the ROI objective is the fact that it does not take cognizance of the time value of money. The process of translating future Rands to todays equivalent is necessary because of the opportunity to earn interest on money. In return for his current sacrifice a shareholder expects some future benefit, either as dividends or an increased share price or both. This benefit lies in the future while the sacrifice is current. This leads to a study of the rate of return of waiting: the time value of money (Joy



1980:47). This principle consequently necessitates a time related long term objective relevant to investment decisions.

ROI as company objective, comes under heavy fire from Drucker (1981 :103), who states that return on invested capital makes sense but it represents the worst of all yardsticks. He describes it as pure rubber of almost infinite elasticity. He also questions the concept of 'invested capital' and puts forward the question as to whether a Rand invested thirty years ago is the same thing as a Rand invested now? He furthermore asks the question as to whether invested capital is to be defined as an accounting difference between the original cash value and subsequent depreciation written off. In the logically extreme case, furthermore, returns can be maximized in percentage terms by reducing investment in the firm until all that remained is the single highest yielding project. This is clearly an absurd outcome which would inhibit any form of multidimensional strategic stance in product markets.

Ansoff (1965 :50) suggests that in order to overcome these obstacles, efforts to measure long term profitability should be abandoned. Instead, the characteristics of the firm which contribute to long term profitability should be identified and deliberately pursued.

#### 3.3.4 CONTRIBUTING CHARACTERISTICS

Ansoff (1965 :50) suggests several characteristics which contribute significantly to long term profitability. He expresses these characteristics in the form of generalized sub objectives under the ROI banner as follows:

- i) continuing growth of sales at least at the pace of the industry to enable the firm to maintain its share of the market;
- ii) increase the relative market share in order to increase relative efficiency;
- iii) growth in earnings to provide resources for reinvestment;
- iv) growth in earnings per share to enable attraction of new capital;
- v) continuing addition of new products and new product lines;
- vi) continuing expansion of the firm's customer population and
- vii) absence of excessive seasonal or cyclical fluctuations in sales and earnings and of consequent loss of competitive position through externally forced inefficiency in the use of the firm's resources.

### 3.3.5 INTERNAL EFFICIENCY

Ansoff (1965 :51) is also of the opinion that in order to maintain long-term profitability, internal efficiency is of considerable importance. Pointers to internal efficiency include the following:

i) Turnover ratios to be compared with those of competitors. A key ratio in this regard is considered to be inventory turnover. It is, however, essential that valuation methods for the firms inventory be consistent with those used by the firms whose records are used in the compilation of industry averages. Other important ratios are also regarded to be turnover of working capital, net worth and debt to equity.

Net worth, however, is a number which taken by itself fails to disclose the unique composition of a firms assets and liabilities. To compare returns on depreciated and technically obsolete plant against an industry return based on the installation of new generation plant, for example, can yield an entirely misleading picture.

ii) Ansoff (1965 :51) also regards depth of critical skills as a key indicator of future profitability. This is measured by depth of management, skilled personnel and research and development talent.

iii) Human and organizational assets must be complemented by physical assets and the age of plant and machinery and inventory are particularly important here.

### 3.3.6 HIERARCHY OF PROXY OBJECTIVES

Ansoff (1965 :53) evolves a hierarchy of proxy yardsticks for investment objectives which relate to the overall objective in the manner shown in figure 3.3 on page 47.

The master list in figure 3.3 consist of constraints and objectives (Ansoff 1965 :67). Of these, the economic objectives exert the primary influence on the firm's behaviour and form the main body of explicit goals used by management for guidance and control of the firm. Social objectives on the other hand, exert a secondary, modifying and constraining influence on management behaviour.

Constraints are decision rules which exclude certain options from the firm's freedom of actions. (Ansoff 1965 :38).

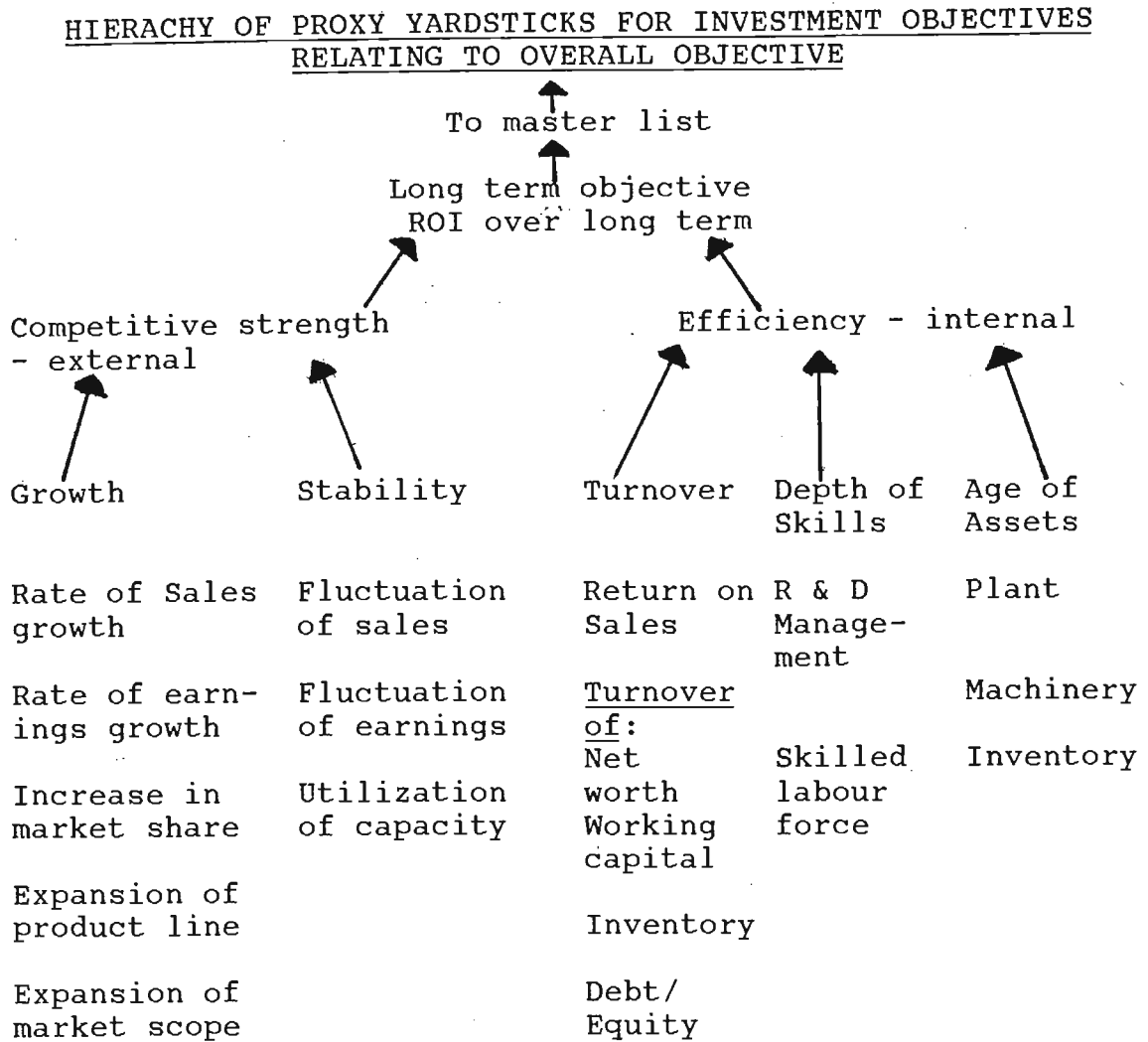
Ansoff (1965 :58) adds the flexibility objective to his master list. This objective can be measured by two proxy objectives namely external flexibility and internal flexibility. External flexibility is achieved through a product\market posture which is sufficiently diversified to minimize the effect of a catastrophe. Internal flexibility on the other hand denotes liquidity of the firm's resources. A firm with high internal liquidity should have a low debt ratio to provide it with reserve borrowing power. By con-

trast to a small debt to equity ratio, a large one is a measure of management's use of leverage<sup>1</sup> to increase efficiency of the firm and hence maximize the return to shareholders. These conflicting objectives must be resolved by management.

Ansoff (1965 :53) defines his overall objective as a long-term measure of efficiency of the resource conversion process. This objective contains these elements viz. an attribute that measures efficiency; a yardstick by which the attribute is measured; and the goal, the particular value on the scale which the firm seeks to attain. As attribute he selects return on the firm's equity over a specified time horizon.

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1. Financial leverage occurs when a firm uses debt to finance a portion of its assets. If the firm earns more on the borrowed funds than it pays in interest, the return to the ordinary shareholders are magnified.

FIGURE 3.3



Source: Ansoff (1965 :53)

Ansoff (1965 :40) mentions that business literature has reflected a lively controversy over whether the owner's equity or total assets or working capital plus fixed assets is the appropriate denominator for ROI computations. His view, however, is that equity provides an all inclusive measure of top management's performance, including skill in the use of outside funding. He regards denominators other than owners equity, appropriate for appraisal of performance on management levels charged primarily with operating responsibilities.

As yardstick Ansoff (1965 :41-42) selects the average rate of return on equity over an infinite time horizon. The goal is to optimize this return.

Ansoff observes that proxy measurements below ROI level are particularly helpful for diagnostic analysis of the firms performance. Using them the cause of a sub-standard ROI can more easily be identified. A system for such diagnosis has in fact been developed in the so-called 'Du Pont' system of financial control.<sup>2</sup> It should be noted however that the Du Pont method can not be used without reservations as it utilizes accounting statements which are based on book values.

### 3.3.7 Conclusion

It is apparent that the principal objections to ROI as the key long term objective of the firm can substantially be overcome by focusing on proxy objectives which reflect on those characteristics which contribute significantly to long-term ROI of the firm. However more fundamental criticism of ROI itself has emerged from numerous quarters. Much of this criticism relates to the requirement that ROI be optimized.

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2. See Weston and Brigham (1978 : 40-43).

Just as traditional economists who raised 'maximization of profit' as the objective of the firm, were hard put to respond definitively to questions such as, 'what is maximum?'; 'over what period?'; 'how is profit to be measured?'; modern defenders of the ROI banner are unable to quantify their objectives in such a way that formal decision theory can be applied in the investment arena. Such absolute objectives are too abstract and elusive for practical decision making.

Additional and telling criticism of the ROI approach, observes that the true value of money is not adequately recognized: a Rand available for spending today is unquestionably of greater value to the individual than the promise of a Rand to spend one year hence, even in circumstances of zero inflation.

Objectives for use as criteria for investment decisions are thus needed which may be explicitly stated and quantified, have an extended time horizon and recognize the time value of money. Theorists in the field of business finance believe that an overall objective has been identified which will enable the required decision criteria to crystalize. That objective is 'maximization of shareholder wealth.'



### 3.4 MAXIMIZATION OF SHAREHOLDER WEALTH

#### 3.4.1 INTRODUCTION

Weston and Brigham are amongst the most prominent theorists who have explored 'maximization of shareholders wealth' as the objective which ought to be central to any rationally managed business enterprise in a capitalist society. They, and others like them<sup>3</sup> cast all business decisions into a dichotomy : those which contribute to owner's welfare and those which do not. They assert that decision criteria ought to be oriented toward the former. Indeed, decision-makers should seek to maximize that welfare (Weston and Brigham 1978 : 8-13).

These theorists needed to demonstrate that this 'maximizing' does not impose an elusive absolute on the firm: that it can be translated into practical decision criteria which will facilitate satisfaction of the optimizing requirements in the choice phase of investment decision making. There was the further need to show that 'owners welfare' can be expressed in measurable and communicatable terms.

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3. This view is shared inter alia by Joy (1980 : 10-13); Solomon (1967 : 22-23); van Horne (1983 : 6-8) and Schall and Haley (1986 : 1-7).

Before examining the results of the efforts of these theorists, however, a brief review will be undertaken of some cherished but often mistaken beliefs regarding some objectives which are expressed by those who think that they subscribe to the maximization of shareholder wealth school. It is necessary to place the shortcomings of these objectives in immediate perspective lest they be raised as valid alternatives to the concept of owners welfare.

#### 3.4.2 INVALID OR INADEQUATE MEASURES

##### 3.4.2.1 MAXIMIZATION OF EARNINGS PER SHARE (EPS)

Application of 'maximization of EPS' as the key investment objective will not allow for choice between earnings streams of different time shapes and degrees of risk. Furthermore like profit after tax, earnings per share is an accounting figure subject to all the defects and conventions of income reporting. (Porterfield 1965:15).

##### 3.4.2.2 PERPETUATION OF THE ENTERPRISE

Although this objective might well be advantageous to the firm's employees it does not always coincide with the interests of the owners.

Some firms are worth more dead than alive : a favourable opportunity for liquidation or unhappy operational prospects may be circumstances in which perpetuation of the enterprise will not be to the owners economic advantage (Porterfield 1965: 13).

And in a capitalistic economic system the shareholders' interests must be of paramount importance if optimum resource allocation is to prevail in the macro sense.

#### 3.4.2.3 PROFIT MAXIMIZATION

Profit maximization is central to traditional economic theory and at macro level it is an objective which is difficult to fault. Some business financial writers, however, try to apply the concept directly to investment decision making.

Superficially, it appears to have the benefit of being a simple and straightforward statement of purpose. It is also seemingly easy to understand as a rational goal for business and should focus the firms efforts toward making a profit. This objective is furthermore widely professed in practice. Nonetheless several weaknesses materialize under scrutiny (Hampton 1976:7).

The first of these is vagueness. What is meant by profit maximization? Does it mean net income or profit after taxes? Is it referring to operating profits or profits per share or

net current profits or perhaps future profits? Does it denote profits in the short term or in the long term? This brings forward the question of when the short term ends and the long term begins. The question can also be posed as to whether a steady long term profit is to be preferred to a large 'immediate gain'?

The second weakness relates to the question of risk. Expected income streams from investment alternatives possess differing degrees of certainty and uncertainty. The possibility exists that owners of a firm would prefer smaller but more certain profits to a potentially substantial but less secure income stream. The profit maximization approach does not distinguish between the two.

The following example is adapted from a model by Martin, Petty, Keown and Scott (1979 :5-6) to further illustrate the weakness of this objective regarding risk.

The first of two mutually exclusive investment projects involves the use of existing plant to produce plastic combs, a project with an extremely stable demand. The second project uses existing plant to produce electric vibrating combs. This latter product may become popular but could also fail. Three possible outcomes, are shown in Table 3.1 : an optimistic outcome, the expected result and a pessimistic outcome.

TABLE 3.1

PERCEIVED PROBABLE OUTCOMES

	Incremental Profits	
	Plastic Comb	Electric Comb
Optimistic prediction	R10,000	R20,000
Expected outcome	R10,000	R10,000
Pessimistic outcome	R10,000	-

No variability is associated with the outcome of the plastic comb project. With the electric comb, however, the possible profit outcomes range from R20 000 if sales go well, to R10 000 if the sales go as expected, to zero if they go poorly.

These expected outcomes clearly reveal that the projected returns associated with the electric comb involve a much greater degree of uncertainty or risk than the plastic comb alternative. The goal of profit maximization, however, ignores uncertainty<sup>4</sup> and would consider these projects equivalent in terms of desirability on the basis of expected returns. This conclusion must be rejected.

Most investment decisions involve a 'trade off' between risk and expected returns. Characteristically, opportunities promising the possibility of higher expected yields are associated with greater risk.

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 4. For the classical distinction between risk and uncertainty see (Porterfield 1965 : 107-108).

Another objection to using the goal of profit maximization as investment criterion is that it ignores the timing of project returns. This shortcoming is illustrated in an adaptation of an example by Martin, et al. (1979:6) which calls for a re-examination of the plastic comb versus electric comb decision. In this instance risk is ignored and it is assumed that each of these products will return a profit of R10 000 for one year. However, it will be one year before the electric comb can go into production, while production of the plastic comb can begin immediately.

TABLE 3.2  
TIMING OF PROFITS

	Incremental Profits	
	Plastic Comb	Electric Comb
Year 1	R10,000	-
Year 2		R10,000

The timing of the profits from these projects is illustrated in table 3.2. In this case total profits from each project are the same but the timing of the returns differ. However, money has a definite time value: money received in the future is not as valuable as money received today. A process of rendering money 'time equivalent' is necessary because of the opportunity to earn interest thereon. The plastic comb project is therefore the better of the two. After 1 year the R10 000 profit from the plastic combs could, at worst, be invested in a savings account earning say 5 per cent interest for the year. At the end of the second year

the return would have grown to R10 500. Since investment opportunities are always available for money in hand, an enterprise should not be indifferent to the timing of the returns. To ignore the timing of the return, as profit maximization implies, can result in inappropriate investment decisions being taken.

Putting aside the problems of accounting, timing and risk, it is sometimes assumed that maximizing profit means maximizing absolute profit after taxes, in the sense of net income as reported in the income statement of the firm.

It is in the opinion of Porterfield (1965:14) that maximization of this figure may not serve in the owner's best interests. He points out that it is possible for a firm to increase absolute profits before and after taxes by simply selling additional ordinary shares and investing the proceeds in traditionally low yielding assets such as Post Office savings certificates. Profits before and after taxes would certainly increase, but earnings per share would in all probability decline.

For example, assume that a company has 1 million ordinary shares in issue, profits after taxes of R10 million, and earnings per share of R10. If a million additional shares were issued at a price that would net the company R100 per share and the proceeds were invested at 4 per cent per annum after taxes, the absolute profit after taxes would rise to R14 million (the initial R10 million plus R4 million in

earnings from the incremental investment). However earnings per share would fall to R7 (R14 million profit after taxes divided by the 2 million shares finally in issue). The 40 per cent increase in absolute profit after taxes would be small comfort to the holder of 100 shares who would have watched his share of the profit fall from R1000 to R700.

#### 3.4.2.4. SOCIAL RESPONSIBILITY

Whether firms should operate strictly in the shareholder's best interests or whether they should assume a responsibility for the welfare of society at large remains a debatable point. Some writers suggest that such an objective can actually contribute to owner's wealth.

On Drucker's list, (section 3.2.2) social responsibility features as one of the 8 objectives he considers essential for any firm. Drucker (1969 :77) asserts that modern society demands that business and businessmen be concerned about the quality of social life and that that concern be central to the conduct of business itself: the quality of life becomes the quality of business. In this respect he suggests that in financial terms the only truly successful business in the years ahead will be the one that not only offers quality products at competitive prices but also succeeds in matching its resources to society's changing demands: that business which is able to give creative response to the social aspirations of the people it serves. On the other hand, the business that fails in the years



ahead will be the one that fails to understand how it is related to society around it and will, therefore overlook opportunities for service, growth and profits.

Uliana, Correia, Wormald and Flynn (1985:5) assert that in South Africa the objectives of social responsibility and wealth maximization are indeed very compatible. They provide examples of consumer boycotts and strikes in the RSA in the case of companies who have neglected their social responsibilities. They observe too that these events had a depressing effect on share prices and consequently shareholder wealth.

By contrast Brigham (1977:6) focuses attention on firms achieving rates of return on investment which are close to the average of all firms in the industry. He points out that if some such firms are socially responsible, disbursements would rise. If the other similar businesses do not follow suit, the socially oriented firm will eventually be forced to abandon its efforts. It appears that this author regards socially responsible actions as so expensive that it can cause a significant erosion of the particular firms' ROI. Consequently, any socially responsible acts that raise costs will be difficult, if not impossible to implement in industries subject to keen competition.

Brigham further states that firms with above normal profits can and do devote resources to social projects, however, they are severely constrained in such actions by capital

market factors. He uses the example of an investor who considers two alternate firms for investment. One firm devotes a considerable part of its resources to social actions while the other concentrates on profits and share prices. He concludes that most investors will shun the socially oriented firm which will put it at a disadvantage in the capital market. The question would be posed, as to why shareholders of one company should subsidize society to a greater extent than shareholders of another company. Thus, even highly profitable firms are generally constrained against taking unilateral cost increasing actions.

Brigham suggests that most cost increasing social actions may have to be put on a mandatory rather than a voluntary basis initially to ensure that such actions fall uniformly across all business. He concludes that fair hiring and firing practices, minority training programs, product safety, pollution abatement and antitrust actions are more likely to be affected if realistic rules are established initially and enforced by government agencies. The rules of the game would then become constraints which would inhibit all firms equally in their quest for profits.

Such an approach would however be politically and economically contrary to principle of freedom of choice which characterizes a capitalistic and democratic society. Reynders (1975:441-442) does not regard social responsibility as a goal of the firm at all, but rather as an aspect to be observed in formulating policies for achieving

satisfactory profits. His argument is that those social responsibilities concerned with employees (wages, job security and satisfaction) as well as aspects imposed on business by state like pollution control and minimum wages be regarded as costs of running the business and should therefore be passed on to the consumer. Although Reynders' view would at first sight appear to exempt the business from the costs of any social responsibility, his approach might be criticized on two counts. Firstly, if costs can be passed on to the consumer, it would seem that the firm was not previously charging a full market related price. In the pursuit of profit the firm ought to pitch prices at levels which optimize profits, given a particular marketing mix and cost structure. Should 'costs be passed on to the consumer', therefore, the firm is in fact taking a price it should have reaped in the first place.

The second point on which issue may be taken with Reynder's approach, is the adoption of 'satisfactory' goals. Such goals would be even more elastic, elusive and inappropriate to investment decision making than ROI objectives. Thus instead of finding in Reynders' work, some support for the camp opposed to the social objective, we find a red herring.

Friedman on the other hand, outspoken disciple of free enterprise as the key to a better life for all states unequivocally that profit goals cannot be sacrificed for social goals. Friedman (1962:133) emphasizes that the only social responsibility of business is to use its resources and

engage in activities designed to increase its profits so long as it engages in free competition without deception or fraud. He adds that few trends could so thoroughly undermine the very foundations of free society as the acceptance by company officials for a social responsibility other than to make as much money as possible for their shareholders. He argues, that if funds are diverted to social programs without shareholder's approval the effect in essence is taxation without representation. Also, if business pursues too much social activity, its performance may eventually be measured by social rather than economic criteria. This in effect may lead to less economic efficiency and produce consequences to the disadvantage of all society. He concludes that business responsibility lies in economic and not social programs, the latter being government's responsibility.

It thus remains a debatable question as to whether the goal of social responsibility is in all cases incompatible with the profit goal. A social deed ostensibly aimed at the alleviation of stress on the consumer's household budget as in the case of the slogan 'we will keep the bread price at the old level for the next three months' can very well lead to an increased turnover in the overall product mix of the firm. So much so that the social deed could prove to be a worthwhile investment.

### 3.4.3 OWNERS WELFARE

It is suggested that in order to make a valid formulation of the objective of firms, it is helpful to revert to the objective of the individual. In this regard it is pointed out that the objective of the rational individual in making his financial decisions should be to maximize the utility of his consumption over time. In other words he should strive to consume goods and services in the amounts and patterns and at the times that will yield him the greatest satisfaction. To do so, he will seek to maximize the economic wealth which can be derived from any investment (Porterfield 1965:16). This, according to the author, forms the touchstone by which the objective of the firm may be formulated. The firm's response to the investor or owner/s' aspirations ought to be to aid owners in reaching their objective. It is the owners welfare which is of paramount importance. The question that now becomes relevant is the manner in which the firm may aid its owners in achieving their objectives. The answer can be found through a consideration of risk and profitability in the following example:

Consider two hypothetical firms A and B. The firms have identical expected profits (R1 per ordinary share). If it is assumed that firm B expects to earn its profit by investing in a riskier venture than A [viz. financing a textbook on investment] the market price of the ordinary shares of firm A will, ceteris paribus, tend to be higher than that of firm B (both offer investors the same expected earnings but B has

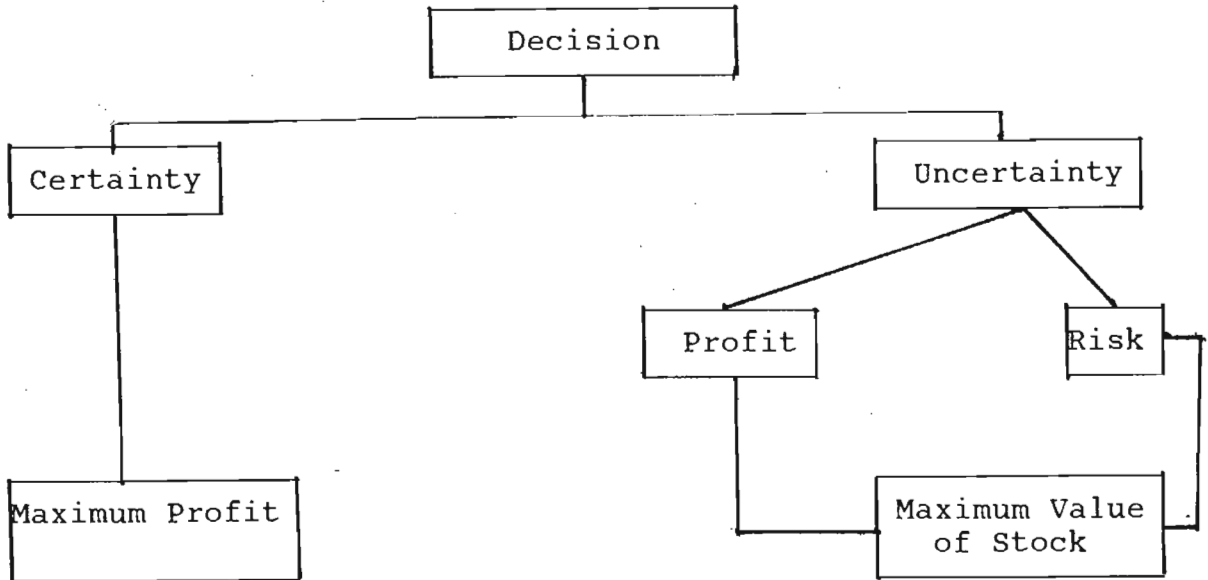
a much higher risk). The situation gets more complex if it is assumed that the risky venture undertaken by B, offers higher expected earnings. Suppose that firm B can earn R1 with certainty or, alternatively, R2 with a 90 per cent probability, but there is also a 10 per cent probability that the firm could go bankrupt. The decision situation is complex. Is the possible additional R1 of profit sufficient to offset the 10 per cent chance of going bankrupt?

The answer is dependent upon the share market's evaluation of the risk/return tradeoff implicit in the venture. If the greater expectation of return outweighs the increase in risk the share price will be expected to rise if the project is undertaken. Conversely if the riskiness outweighs the increase in expected returns the share price will be expected to drop.

If the goal of the firm is defined in terms of the market value of its ordinary shares, this calls for an effort on the part of management to seek an optimum balance between risk and profitability. The general decision problem faced by the firm is summarized in figure 3.4.

FIGURE 3.4

DECISION INVOLVING RISK/RETURN TRADE OFF



Levy and Sarnat (1982:10-11).

The unrealistic alternative A where the results of all decisions are known in advance with certainty should have as objective the maximization of the firm's long run profit. However, when uncertainty prevails, as it does in the real world, risks as well as profits must be considered, and the choice will hinge around that combination of risk and profit which maximizes the value of the firms' ordinary shares (Levy and Sarnat 1982:100). Maximization of the firm's value to its shareholders is represented by the market price of the firm's ordinary shares (van Horne, 1983:6).

Wealth maximization of the shareholders/owners of the firm is thus effectively bound to the maximization of the market value of its ordinary shares.

Owners can, with their wealth maximized, adjust their fund flows in such a way as to optimize their consumption by buying and selling or borrowing and lending shares in the market. For instance, if a shareholder finds that the cash flowing to him from his investment, is greater than that required for his preferred level of current consumption, he would reinvest the excess funds by lending them out or buying investment assets. On the other hand, if the cash flows to him were insufficient for his consumption purposes, he would borrow funds or sell assets to redress the balance (Porterfield 1965:16).

Financial theorists have favoured the wealth maximization objective because it serves as a focal point for all the considerations in operating the firm and it is a measure that is often easily observed. Theoretically, if the firm is not making the right investment or financial decision, the share price will drop, and when making the right decision the share price will rise (Bolten 1976:16). The reason for this is that marginal shareholders, those tempted to either buy or sell at the prevailing price, will have their decisions triggered by their estimation of the future stream of cash to be expected from investment in the shares in question. The present value<sup>5</sup> of that future stream will need to be positive to trigger purchase orders or to

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5. The current worth of a future sum considering the time value of money



avert selling orders, and calculation of the present value can be made only by referral to the investor's own required rate of return. His expected cash flows from the investment depends on his perception of the company's capacity to generate profits and to pay dividends. Should he consider that the company is utilizing shareholders funds in projects which should yield returns which are greater than his own required rate (given an equal risk rating), his assessment of the situation will trigger a buying order. When many marginal investors reach the same conclusion, their combined pressure of demand will cause an increase in the share price concerned.

A share price maximizing framework thus has the advantage of looking beyond the short run. It explicitly seeks to incorporate into the firm's planning a consciousness of the entire future stream of earnings that it will generate, with the time value of money fully appreciated. It also requires information about the discount rate that marginal shareholders use to convert a firm's expected earnings into present value (Lerner 1971:343).

Reynder's views (1975:428-429) which have already been touched on but rejected, acquire new meaning when examined from the perspective of wealth maximization. Reynders regards the objective of the firm as a 'target rate of return'. Instead of regarding Reynder's target rate of return as a simple satisficing objective of the firm, it can conceptually be adopted for use as a 'cut off rate': an in-

vestment made at such rate would neither increase nor decrease the market value of the equity of the firm. Any investment by the firm that yields a rate which is higher than the 'cut off rate' will tend to increase the market value of the equity or net worth<sup>6</sup> and any investment that yields a lower rate will lower that value'. Reynders also suggested that the 'target rate' should be measured in terms of the 'lending rate' or opportunity cost of capital.<sup>7</sup> This suggestion will be further explored in relation to the investors required rate of return in a later chapter.

However it should at the outset be noted that the observability of a proper market related share price is of prime importance for the determination of the marginal investor's required rate of return. Shares which are listed on stock exchanges around the world generally satisfy this requirement. But unlisted shares face valuation difficulties. This problem will be addressed in a later chapter. It is at this stage advisable not to lose sight of the practical problem of a possible conflict between the personal goals of managers and maximization of shareholder's wealth.

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6. Henderson, Trennepohl and Wert (1984 : 609) defines 'net worth' as the book value of owner's claims on a company, equal to assets minus total liabilities.
  7. Opportunity cost is defined by Weston and Brigham (1978 : 1016) as the rate of return on the best alternative investment available. 'Lending rate' is generally synonymous with opportunity cost and is encountered as such in Dutch literature. See Scheffer (1968 : 107).

In this regard, Weston and Brigham (1978:10) observe that there are some large, well entrenched companies whose managers attempt to keep shareholder's returns at a merely fair or reasonable level. Thereafter, they devote their attention and company resources to public service activities, to employer benefits, or to higher management salaries. Similarly, well entrenched managements sometimes try to avoid risky ventures, even when the possible gains to shareholders are high enough to warrant the gamble. These managers would argue that shareholders are usually well diversified; holding portfolios of many different shares, so if any company takes a chance and loses, the shareholders lose only a small part of their wealth. Managers, however, would be affected more seriously because they are not diversified and would lose their jobs. Accordingly it is not surprising that managers of such firms will prefer to play safe, rather than aggressively seeking to maximize the prices of their firms' shares. Managers behaving in this manner can indeed place investment theory in jeopardy through their understandable but counterproductive attitude.

Weston and Brigham (1978:10) refer to Lewellen who states that top managers of large firms have most of their personal wealth tied to their firm's fortunes. Hence they are likely to behave more like owners than literature would suggest.

In South Africa, enthusiastic support has been given to share incentive schemes by both shareholders and management in recent years. Properly structured, such schemes should substantially reduce the risk of 'deviant' behaviour by top management.

### 3.5 PROBLEMS IN THE IMPLEMENTATION OF THE WEALTH MAXIMIZATION OBJECTIVE

As a measure of performance the wealth maximization objective presents a problem in that share prices are also subject to influences beyond managements' control. A slump in the economy can depress share prices, and management has no control over the economy in general. Management can also feel frustrated and dissillusioned if share prices do not respond positively to superior performance. Furthermore, share prices are often highly volatile and this can have a disruptive effect on the firm's capital budgeting. Bolten (1976:16) concludes that wealth maximization may be something more to strive for than to achieve.

In spite of what Bolten says the wealth maximization objective is rational and takes cognizance of the risk/return tradeoff. Unfortunately the utility functions of the decision maker will inevitably constrain the wealth maximizing objective. When such decisions involve a board of directors, a diversity of these utility functions could impact on the choice involved. For this reason some people argue that a committee decision can never be consistently rational.

However, where a 'choice' has to be made in a small business where fewer decisionmakers are involved, the theory has a greater chance of being used fully. This situation will be explored more fully in later chapters.

### 3.6 SUMMARY

Every firm has a number of different objective areas, whether or not expressly stated. Most of these objectives are supported by contributing sub-objectives.

Organizational objectives therefore cascade down into a network or hierarchy of objectives. Long range objectives are translated into short range objectives which serve as bases for day to day operation plans.

At the top of the hierarchy, however, there needs to be one central long range objective which integrates the structure into a consistent set of logically interrelated decision criteria. The exact nature of this objective is of considerable importance, particularly for investment decision making, as a firm's strategic stance is substantially determined by those decisions.

Some writers contend that the firm should strive to maximize owners wealth. Others claim that this central objective should incorporate a broader perspective. Profit maximization is frequently cited as an objective which will do justice to such perspectives. However a review of these

writer's claims exposes some severe difficulties and the balance of logic indicates that maximization of owners welfare should justifiably be the main objective of the firm. This objective is attained through maximization of the market price of the equity of the firm.

In this study it is assumed that the market price of the ordinary shares will depend directly on expectations of future dividends to be paid on the share including the final liquidation dividend and the certainty thereof. The price of a share on the market should accordingly reflect the expected cumulative results of a series of investment decisions that have been taken by the firm. These investment decisions can only increase the market price of the shares if marginal investors on balance, expect that the earnings to be generated by those investments will exceed their own target rates of return. Investment decisions should thus take cognizance of the factors on which the market price depends and operates. Part of the valuation process consists of projecting the expected cash flows from investments undertaken and in recognition of the fact that these flows have a time value, they need to be discounted to a present value. The fact that they are uncertain must also be accounted for. These concepts will now be pursued in detail.

## CHAPTER FOUR

### PROJECTED CONSEQUENCES OF INVESTMENT DECISION ALTERNATIVES

#### 4.1 INTRODUCTION

Investment decisions involve the long term commitment of scarce financial resources. Their commitment to one course of action prevents their commitment to another. Accordingly a great deal of effort can legitimately be expended on generating alternative investment opportunities. Once a set of such alternatives has been assembled (usually part of the preparation for a firm's annual budget discussions), a common base will need to be specified in terms of which each alternative can be considered on an equal footing. Some alternatives may be technically mutually exclusive, as in the case of different machines being available for the same functional requirement. Others may be independent of one another, such as the proposed purchase of a new office block, as opposed to the launching of a new Research and Development programme. Whatever the case may be, all are subject to the financial constraints of the firm and accordingly all alternatives need to have their consequences projected on a basis which will permit valid comparisons.

Each alternative can be expected to yield positive and negative cash flows and it is the resulting net cash flows which will ultimately contribute positively or negatively to company profits. The common base must thus be grounded in the

amounts of each cash flow and the timing thereof. In view of the time value of money the timing of the cash flows concerned can be of critical importance in this exercise.

These issues will be dealt with in this chapter beginning with a review of the rationale for projecting cash flows.

## 4.2 THE RATIONALE FOR PROJECTING CASH FLOWS

### 4.2.1 CASH FLOWS VERSUS ACCOUNTING 'EARNINGS'

It has been suggested that the consequences of alternative investment proposals should be projected in terms of the net or incremental cash flows of each project under consideration. Another possibility is that they be projected in terms of accounting profits. However only cash can be reinvested! Only cash can be used to pay dividends and interest and to repay debt. Only cash can be used to pay suppliers, workers, management and tax authorities.

Over the long run, a firm's total net cash flows and total accounting profits will be equal. However, in the short run the two will generally not be highly correlated. Measured by general accounting principles the firm may have a very profitable year and yet have no cash available to meet its obligations since profits are not yet realized in cash but are tied up in accounts receivable that may or may not be eventually be collected (Herbst 1982:26).



Henderson et al. (1984 :122) extend this discussion by adding that cash flows include every aspect of profit on investments and return of capital. An accounting approach on the other hand is more restrictive where for example a fixed capital investment is recovered by making an annual provision for depreciation. To explain the implication of this distinction more comprehensively the authors furnish the following example:

A firm invests in a machine costing R1 000 which has a one year economic life and is depreciated accordingly.

In this case there is initially a cash outflow of R1 000. During the year R400 is spent on materials and R500 on labour. The project produces and sells R2000 worth of goods for cash. The accounting profit after taxes is depicted in Table 4.1.

TABLE 4.1

DEPRECIATION ACCOUNTING AND CASH FLOW

INCOME STATEMENT

<u>Revenues</u>		R2 000
<u>less:</u>		
direct labour	R 500	
direct materials	400	
depreciation	<u>1 000</u>	
Cost of goods sold		<u>1 900</u>
<u>less</u> taxes		100
Net Income		R <u>60</u>

This illustrates the purpose of depreciation accounting, it is the process of writing off the cost of the means of production. This prevents the company from confusing return of capital with income. The distinction is important from a tax standpoint, in that income is taxable whilst return on capital is not. With return of capital investors are only getting their own money back. The fact that capital return is not taxable (depreciation is deductible) preserves the definition of cash flow.

However in addition to net income and depreciation there could be off-income statement cash flows. These are flows that involve the investment or the return of capital in ways other than through depreciation. In the cash outflow resulting from the original investment two other cash flow items are frequently encountered. Inventory and receivables must increase to accommodate the increased turnover. This investment in working capital does not affect accounting income but does affect the more fundamental return on investment. In order to properly appreciate exactly how this return is affected by the fact of such investment and the timing thereof, it is necessary to consider the time value of money and the corresponding need to use discounted cash flow techniques.

The time value of money recognizes that the timing of cash flows is very important: a Rand received today is superior to a Rand to be received in one year and the latter is superior to a Rand to be received four years later. The sooner money is received the sooner it can be reinvested.

Time value of money is fundamentally related to the principle of compound interest. When compounding, the earlier cash flows will grow relatively more in value than later cash flows because they benefit from compounding (Hartl 1986 :75).

Due to the time value of money, projected future cash flows are not directly comparable as they stand. Later cash receipts are overvalued relative to the initial investment. To correct the time factor, it is necessary to adjust all of the projected net cash flows by some discount rate that gives recognition to the time value of money.

The preferred method is to translate all projected cash flows to the present value of money (the time the decision is being made) by 'discounting' them. Discounting is the reciprocal of compounding. In so doing cash receipts are reduced by some discount rate, the later receipts reduced more than the earlier ones. By converting all of the net cash receipts into present values the element of time is no longer an obstacle and the decision maker can now proceed to

compare the adjusted projected cash flows to the initial investment (which is naturally a present value) (Hartl 1986 :228).

What the discount rate should be is of considerable importance in investment decision making. It is a matter which will enjoy considerable attention in due course.

#### 4.4 RISK ADJUSTMENT

##### 4.4.1 INTRODUCTION

In capital budgeting the decision maker acts under conditions of uncertainty. Nothing is completely certain and projected future outcomes can at best only be educated estimates. The projected cash flows used in capital budgeting are estimated cash flows and they are subject to error. Consequently the risk of a project is represented by the possibility that actual cash flows will deviate from forecasted cash flows (Moyer, McGuigan and Kretlow 1981:19-25).

Moreover, the assessment of a projects' risk is directly related to the decision makers perception of the degree to which the cash flows might deviate from the projected amount in any future time period. The analysis of projects is furthermore dependant upon the decision makers preference for risk. Preference for risk deals with an aspect of utility whereas characteristics of cash flows include probable returns and the standard deviation characteristics of the

relative probability distributions. These concepts will be explored in order to provide a basis for the discussion of risky projects (Mathur 1979:209).

#### 4.4.2 UTILITY

Bierman and Smidt (1986:276-277) indicate that different investors have different risk preferences. A description of an investors risk preferences is called a utility function. Just as subjective probabilities can be used to describe a persons attitude about the likelihood that some outcome will occur, so a utility function may describe risk preferences. Hence, a utility function of a person can be used to evaluate his decision problems involving uncertain outcomes.

In order to facilitate this discussion consider the following three choice situations put forward by Mathur (1979:210).

In each case an alternative is offered to an individual:

1. Rx or a toss of a coin: heads the individual gets nothing, tails he gets R1.
2. Rx or a toss of a coin: heads the individual gets nothing, tails he gets R5 000.
3. Rx or a toss of a coin: heads the individual gets nothing, tails he gets R1 000 000.

In the example cited the coin toss will result in two possible outcomes, heads or tails, each with a probability of 0,5.

According to Solomon and Pringle (1980:381) the expected value of the second alternative in each of the above three choice situations can be used to identify the utility preferences of individuals. The expected value of the toss of the coin is obtained by multiplying each outcome by the associated probability and summing all the resulting values.

For each coin toss:

expected value = probability of heads and payoff for heads  
and probability of tails and payoff for tails

In case 1 the expected value proves to be 50 c; in case two R2500 and in case three R500 000.

It is consequently clear that case three has the highest expected value followed by case two and case one respectively.

#### 4.4.2.1 CERTAINTY EQUIVALENT

The choice which the individual in the above example is going to exercise depends on the value of  $R_x$  in each of the three cases and is termed his certainty equivalent.

Under the subjective certainty equivalent approach the decision-maker must specify how much money is required with certainty to make him or her indifferent between this certain sum and the expected value of the risky alternative. In other words he must derive the same utility from the certain amount as from the expected value of the risky sum. This choice will indicate the individuals risk/return trade off at each of the three levels (Weston and Brigham 1978:438).

The certainty equivalent could also be considered as the minimum amount one would be willing to accept for selling a desirable risk (Bierman, Bonini and Hausman 1973:327); or the minimum amount one would be willing to pay for buying into a risky situation.

#### 4.4.2.2 RISK AVERSITY

An unwillingness to pay an amount as great as the expected value of an uncertain investment opportunity indicates risk averse behaviour. Weston and Copeland (1987:388) describe the risk averter as an investor who has a decreasing marginal utility for wealth. This type of investor is also described as one who would experience more dismay from a Rand lost than joy from a Rand gained.

In the above example the risk averter would prefer an amount less than the expected value in each case, rather than the toss of the coin because the marginal return for the toss

carries with it the risk of not getting anything and therefore possess lower utility for this decision maker (Mathur 1979 :210).

Weston and Copeland (1986:388) allege that most business and shareholders are risk averters. They add that risk aversion is reflected in the capitalization rate investors apply when determining the value of the firm. This statement is of paramount importance for the study at hand and it will be imperative to revisit these aspects when the position of the small businessman is placed under the microscope at a later stage.

Solomon and Pringle (1980:381) shed more light on the utility question by indicating that it is quite possible for a person to exhibit risk aversity in business financial decisions but risk preference in entertainment situations, viz. gambling.

#### 4.4.2.3 RISK INDIFFERENCE

The risk indifferent individual is one who is willing to pay exactly the expected value of a risky investment. For the three choices in our example the risk indifferent individual will be willing to pay 50 c, R5 000 and R1 000 000 respectively.

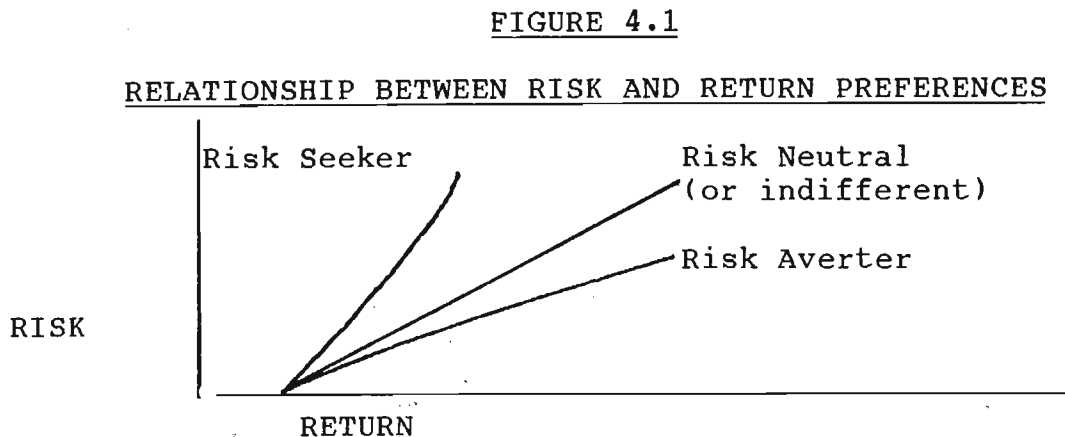


#### 4.4.2.4 RISK SEEKING

A risk seeker according to Solomon and Pringle (1980:381) will be willing to pay more for a risky investment than its expected value. In the example cited the risk seeker will gladly select the gamble in the place of the expected value. Such a person has an increasing marginal utility for money (Weston and Copeland 1987:388).

#### 4.4.2.5 UTILITY CURVES

Figure 4.1 depicts the utility curves of the risk averter, the risk indifferent person and the risk seeker.



Source: Mathur (1979:211)

The utility curve of the risk averter shows that as the risk of an investment project increases the risk averse manager imposes a proportionately higher required rate of return for the project to be deemed desirable. This shows that marginal increases in risk requires proportionally larger increases in return. The curves intercept the horizontal axis, in-

dicating that some minimum returns are preferred by all in the absence of risk. Mathur (1979:211) presumes that this indicates that financial managers know that they can invest in risk free government securities.

#### 4.4.3 EXPECTED VALUE

The concept of expected value or expected return may be applied to evaluate capital expenditures (Mathur 1979:212). Table 4.2 depicts a hypothetical firm that is considering three risky projects for which expected net cash flows for the coming year are dependent on the state of the economy. The economy could move into a recession, continue its present moderate growth rate or expand more rapidly. In terms of the perceptions of the decision makers the following probabilities can be ascribed to the different states of the economy: a recession 0,1; moderate growth 0,7 and expansion 0,2.

TABLE 4.2  
EXPECTED VALUES OF THREE INVESTMENT PROJECTS (RANDS IN '000S)

PROJECT	STATE OF ECONOMY	PROBABILITY OF OCCURRENCE	OUTCOME NET CASH FLOWS	PROBABILITY OF OCCURRENCE X OUTCOME OF NET CASH FLOWS
Novelty item	Recession	0,1	400	R 40
	Moderate	0,7	700	R 490
	Expansion	0,2	950	R 190
			<u>Expected Value</u>	<u>R 720</u>
Auto-motive Part	Recession	0,1	1000	R 100
	Moderate	0,7	800	R 560
	Expansion	0,2	300	R 60
			<u>Expected Value</u>	<u>R 720</u>
Chain Saw	Recession	0,1	900	R 90
	Moderate	0,7	1100	R 770
	Expansion	0,2	1400	R 280
			<u>Expected Value</u>	<u>R1140</u>

Source: Mathur (1979:212)

The first project considered by the firm is the production of a novelty item. Sales are expected to vary depending on the state of the economy. Expected net cash flows associated with each state of the economy are shown in the fourth column in Table 4.2. The second project involves manufacturing an automotive replacement part. If the economy moves toward a recession, this project is expected to do well in that more people would be forced to repair their own cars. The third project involves the production of a petrol driven chain saw. Sales would be particularly good in an expansion.

Expected values are shown in the third column of table 4.2. According to calculations, the expected values of the novelty item and the automotive part are the same. Mathur (1979:213) asks whether, if it is assumed that these two projects have identical lives and require equal investments, the investor would deem them to be equally desirable? In order to answer this question the riskiness of the projects need to be measured. One way of doing this is by means of the standard deviation.

#### 4.4.4 THE STANDARD DEVIATION

It is noticed from table 4.2 that the 'range' between the minimum and maximum net cash flows for the novelty item is R550 000 (R950 000 - R400 000). The difference for the automotive part, however, is R700 000. This 'range' can be

interpreted as an indication of risk. The larger the range in this instance the more risky the project (Mathur 1979 :213).

Weston and Brigham (1978 :346-347) describes the 'range' as a probability distribution and point out that the risk of a project is indicated by the 'tightness' of the distribution. In other words the more peaked the probability distribution the less risky the project and vice versa. According to this measure, the project involving the manufacture of the automotive part is more risky than that of the novelty item.

A formal method of measuring this range is through calculation of the standard deviation: the 'tighter' the probability distribution, the less variable the expected returns, which means the less risky the project and this is reflected in a smaller standard deviation (Weston and Brigham 1978:346-347). 'The standard deviation is defined as the square root of the weighted average squared deviation of individual observations from the mean' (Moyer et al., 1981 :248-249). It is calculated using the formula:

$$\sigma = \sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 P_i}$$

Where:  $\sigma$  = standard deviation

$x_i$  = possible cash flow;

$\bar{x}$  = mean value of the cash flow

$P_i$  = probability associated with return  $i$ .

In the above example the standard deviation for the novelty item project proves to be R145 260 and that of the automotive part project R218 170.

The standard deviation is an appropriate measure of risk when projects being compared are approximately equal in size and the cash flows are expected to have symmetrical probability distributions (Moyer, et al. 1981 :248-249). However, it is an absolute measure of variability, and accordingly it is not suitable for comparing projects of different sizes.

The rationale for this statement is that two projects of different sizes and the same standard deviation have different amounts of risk per Rand of investment. We consequently need a relative measure for risk in such a case. An example will serve to clarify such a case.

Consider two projects from an example provided by Moyer, et al. (1981 :251): project T has an expected value of R500 000 and project S an expected value of R4 000. Both these projects, however, have standard deviations of R2 000. Project T clearly has a far lower risk profile but some form of measurement is needed in order to quantify the difference. The co-efficient of variation provides the answer.

#### 4.4.5 CO-EFFICIENT OF VARIATION

The co-efficient of variation is a relative measure of risk and it is defined by Moyer, et al. (1981 :251) to be the ratio of the standard deviation to the expected value, which proves to be 0,004 for project T and 0,5 for project S. This shows in clearly defined relative terms, that project S has more risk per Rand of expected value than project T even though both projects have the same standard deviations.

Standard deviation and co-efficient of variation can be used as risk indicators to rank investment proposals. However, the firm must still decide as to whether certain projects, promising specified expected values and containing a certain amount of risk are acceptable at all. The net cash flows shown in the example reflected in table 4.2 are in fact intended to represent the net present values (NPV's) of the relative streams of cash flows extending perhaps some years into the future. However as noted in section 4.3 the discount rate used in determining the NPV's is of critical importance : by using a much higher discount rate in the example, the NPV's of all alternatives could be negative and accordingly, none of them would be acceptable.

#### 4.4.6 ADJUSTMENT OF DISCOUNT RATES

In section 4.4.2.5 it was noted that a risk averter would tend to impose a proportionately higher required rate of return. It is this required rate of return which is in fact used as the discount rate in the calculation of NPV's.<sup>1</sup>

However before one can apply an adjustment to the discount rate to accommodate risk aversion or risk seeking, one first needs to establish what the appropriate rate would be for a 'risk indifferent' investor. In this regard Mathur (1979:215) provides two points of reference. The first is the discount rate that would discount the risk free future cash flows associated with government securities back to the price at which they are currently trading in the capital market. Any discount rate which is higher than this risk free rate would thus contain a 'premium' to take account of risk. The risk free rate accordingly establishes a 'floor' for discount rates. The second point of reference provided by Mathur (1979:215) is the rate which applies to the firms 'average risky' project.

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1. The following equation is used for calculating the NPV of a project:

$$NPV = \frac{F_1}{(1+k)^1} + \frac{F_2}{(1+k)^2} + \dots + \frac{F_N}{(1+k)^N} - I$$

Here  $F_1$ ,  $F_2$ , and so forth represent the net cash flows;  $k$  is the discount rate;  $I$  is the initial cost of the project and  $N$  is the project's expected life.  
(Weston and Brigham 1978 : 295)

The 'average risky' project for any specific firm would be a project that is homogeneous in respect of risk to the aggregation of assets in that particular firm (van Horne 1983:212).

In the case of evaluating the 'average risky project',  $k$  in the NPV equation is identified as the firm's marginal cost of capital (see section 5.5.1.4). This is the minimum rate of return expected by the firm's suppliers of capital (Mathur 1979 :215).

From the firm's viewpoint the marginal cost of capital can be defined as the rate of return on new investments which would leave the price of the firm's ordinary shares unchanged (Martin, et al. 1979:648). This assumes that potential investors in the shares of the firm would be prepared to pay a higher than the prevailing price for the shares if the firm embarks on a project which promises the yield of a positive expected value.

From this definition it follows logically, that the marginal cost of capital will act as a cut off rate (acceptance or rejection) of proposed investments.

If a proposed investment project is now more risky than the firm's average project, the appropriate discount rate to use is the marginal cost of capital plus an excess risk premium. This 'add on' risk is the function of financial managers' perceptions and preferences for risk, the firm's attitude toward risk as exemplified by its long term objectives and



the capital market's trade off for risk and return. If the proposed investment for the novelty item in the example cited is viewed as average for the firm a risk premium should be added to the discount rate when discounting the expected net cash flows of the proposed automotive part investment (Mathur 1979:215).

#### 4.4.7 ADJUSTMENT OF NET CASH FLOWS

This method concerns adjustments to the numerator of the NPV equation to accommodate risk. The expected net cash flow of the proposed investment is evaluated in terms of its certainty equivalent. The decision maker identifies the risk free net cash flows that he or she considers to be equivalent to the expected risky net cash flow. These certainty equivalent net cash flows are then substituted for the expected risky cash flows. It is however important to note that since risk free cash flows are discounted, the risk free rate of return should be used (Mathur 1979:216).

It is pointed out by Oysteryoung and McCarty (1980:183) that although this is a conceptually sound method, its primary deficiency lies in the fact that the determination of the certainty equivalent is an art without any real quantitative basis of calculation. It is therefore subjective and related to risk attitudes of decision makers.

Nonetheless, the decision maker's subjective assessment must enter the equation as a material factor.

This chapter has dealt with the fourth step in the decision-making process, namely the projected consequences of decision alternatives and the measurement thereof.

A rationale for projecting cash flows as opposed to accounting profits is provided. This rationale mainly hinges around the importance of cash in the sense that it can be reinvested, used to pay dividends, taxes and interest whereas accounting income can be tied up in various asset accounts. Expected cash flows furthermore, not only include profit on investments, but also return on capital. In addition it also takes cognizance of the time value of money whilst accounting profits do not.

Time differentials of expected cash flows render them non comparable as they stand and they consequently must be adjusted by a discount rate. By doing this the projected cash flows can be converted to present values which make them comparable to the initial investment which is also a present value.

Cash flows, however, are uncertain and projections depend on the decision makers risk preferences. Since risk preferences concern utility functions, the latter can be comprehended as representing the attitude of a decision maker toward risk. It can consequently be used to evaluate the decision makers' decision problems involving uncertain outcomes.

Expected values are furthermore used in order to identify the utility preferences of individuals.

Attention is finally given to the measurement of the riskiness of expected cash flows and adjustment thereof. Risk adjustment is necessary whenever a firm contemplates a proposed investment project of which the riskiness varies from that of the 'average investment project' of the firm.

Adjustment for risk can be applied to either the cash flows or the discount rate in the net present value equation. The logical neatness of the adjustment is unfortunately marred by the subjective perceptions and preferences of the decision maker.

The next chapter probes the identification of the decision criterion.

## CHAPTER FIVE

### THE SELECTION CRITERION

#### 5.1 INTRODUCTION

It has been noted that the objective of wealth maximization has a time perspective involving future streams of cash flows. The principle of the time value of money must accordingly be applied to the expected cash flows projected for each investment opportunity. These prospective future benefits then need to be discounted by an appropriate discount rate in order to translate them to a present value. The appropriate rate is the 'cost of capital'.

#### 5.2 COST OF CAPITAL AND WEALTH MAXIMIZATION

The cost of capital has assumed growing importance because of the need to make rational investment decisions in an increasingly complex world. Indeed in current literature, application of the cost of capital as the discount rate is considered to be of critical importance in the making of optimal investment decisions. The reasoning underlying this stance is straightforward: If the return from a proposed investment promises to exceed the cost of the funds that are required to undertake it, the investment would be eligible for acceptance (there may be the need to compare it still further against the prospects for other mutually exclusive opportunities). If the estimated return from the project is

however less than the cost of the funds required to undertake it, it should be rejected. This cost is usually referred to as the 'cost of capital.' More correctly, it should be referred to as the 'marginal cost of capital.'

In this way the firm will accept desirable projects which enhance its value and reject all that are undesirable. This approach is conceptually consistent with Reynders 'cut off' rate discussed in section 3.4.3.

The marginal cost of capital therefore acts as the rejection criterion to be applied to proposed investments (Porterfield 1965:43). Through application of this criterion it will be possible to gauge whether a proposed investment is likely to increase the value of the firm and thereby the market value of the ordinary shares of the firm which is the measure of owner's wealth.

The cost of capital is of course a cost, and just like any other cost, it needs to be managed effectively. This perspective is underlined by Brigham who states 'maximizing the value of the firm requires that the cost of all inputs including capital be minimized and to minimize the cost of capital we must be able to calculate it.' (Brigham 1977 :399).

Calculation of the cost of capital is thus a necessary prerequisite for the effective management thereof. Accordingly attention will now need to be given to the composition and calculation of the cost of capital.

### 5.3 EXPLICIT AND IMPLICIT COSTS OF CAPITAL

#### 5.3.1 EXPLICIT COSTS OF CAPITAL

'The explicit cost of any source of capital is the discount rate that equates the present value of the cash inflows that are incremental to the taking of the financing opportunity with the present value of its incremental outflows' (Porterfield 1965:45). The cash inflows reflect receipt of the capital obtained and the cash outflows involve the servicing of that capital and perhaps, repayment thereof.

The general formula for this explicit cost of capital of any financing opportunity is as follows:

$$I = \frac{F_1}{1+C} + \frac{F_2}{1+C} + \frac{F_3}{1+C} + \dots + \frac{F_n}{(1+C)^n}$$

Where : C = explicit cost of capital

I = initial cash inflow

F1, F2, F3, Fn = cash flows of times 1, 2, 3, ..... n

(Porterfield 1965:45).

### 5.3.2 IMPLICIT COSTS OF CAPITAL

Implicit cost of capital can be defined as the rate of return of the best company project, shareholder investment opportunity or shareholder consumption opportunity that would be foregone if the project presently under consideration by the firm was accepted (Porterfield 1965:61).

Explicit costs arise when funds are raised. Implicit capital costs do not arise until the funds concerned have been invested and accordingly not applied to alternative uses.

The implicit cost of retained earnings<sup>1</sup> is perhaps the most obvious. Porterfield (1965:61) describes it as the rate of return at which a shareholder could have invested these funds had they been distributed to him.

In terms of Porterfield's exposition of capital costs, forms of capital with an explicit cost also have an implicit cost. Debt capital for example when raised from a bank has an explicit cost based on the contractual price (interest rate) and arrangements for repayment of the principal sum, between the bank and the borrower. However the moment that the funds received are invested, alternative investment opportunities are foregone and an implicit cost arises.

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1. Retained earnings is equivalent to profit after taxes less dividends paid (Porterfield 1965 :54).

Implicit costs of capital are therefore opportunity costs.

Martin, et al. (1979:383) provide a very apt description of the implication of such opportunity costs. They assert that when managers are considering the retention of earnings as a means of financing an investment, they are serving in a trustee capacity. That is, the ordinary shareholders have entrusted the company assets to management. If the company's objective is wealth maximization for its ordinary shareholders, management should retain the profits only if the company's investments within the firm are at least as attractive as the shareholder's next best investment opportunity. Otherwise, the profits should be paid out in dividends, thereby permitting the investor to invest more profitably elsewhere.

The concept of opportunity costs in the determination of the cost of equity of the small business is particularly important and will be further reviewed in chapter ten.

It is at this stage necessary to take a closer look at the costs of each of a number of different capital components.

#### 5.4 COMPONENT CAPITAL COSTS

It is important to note when studying the 'cost of capital' that in principle it denotes a long term concept. Joy (1980:170) stresses that we are concerned with long term capital sources. While the firm might also use short term



sources of capital, our concern is here with how the firm finances its long term investments. Normally this is done primarily with long term capital.<sup>2</sup> Basically this means that an attempt should be made to secure capital with repayment terms that match the duration of the relative asset's economic life.

This clearly excludes short term debt since by convention the latter has a time horizon of less than one year. Short term debt is usually utilized for working capital requirements which are self liquidating and revolving in nature.

The danger of using short term funds for long term investments is considerable. The firm could experience financial distress if it is unable to renegotiate or renew a short term repayment commitment which has been utilized to fund an investment which is both non liquid and essential for the ongoing viability of the firm as a business unit. Short term funds are notoriously fickle and in macro terms, expand and contract as a function of the business cycle and monetary policy. Notwithstanding these comments, evidence will in due course be presented which shows that a considerable number

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2. The distinction is often drawn between long term, medium term and short term finance. Uliana, et al. (1987 :398) points out that the exact lines of demarcation are hazy. A guide would be that medium term finance would be for periods of not less than 1 to 3 years and up to between 5 and 10 years while long term finance would be for longer periods.

of South African firms, particularly small firms, deviate from this norm and in fact use short term funds, not only to finance working capital but also to finance fixed investments. In these circumstances, the cost of short term capital becomes pertinent to the capital budgeting situation and accordingly, some short term sources of funds and their costs will be considered under this heading.

In considering long term debt one can distinguish between new debt and existing debt. These will be examined in turn.

#### 5.4.1 THE COST OF LONG TERM DEBT

##### 5.4.1.1 COST OF NEW DEBT

Debt for the purpose of determining the cost of capital of a company refers to interest bearing loans. Such loans may be made on various terms according to Uliana, et al. (1987:422). These include debentures which may be issued on a wide variety of terms, and fixed term loans which may specify fixed interest rates or rates fluctuating with some base rate such as the prime overdraft rate, or the 90 days banker's acceptance rate or the Reserve Bank discount rate. (Uliana, et al. 1987:9)

Uliana, et al. (1987:422) suggest that in both cases the interest will be market related at the date of the issue. In the case of debentures issued at a discount or premium, the

effective interest can be established by relating the coupon rate (which determines the interest actually payable) to the issue price.

From the standpoint of the firm raising the finance, the before tax cost of debt is:

$$k_d = I/P$$

where :  $k_d$  = before tax cost of debt

I = interest paid

P = the net principal amount raised

The real cost however is usually lower than  $k_d$  as the firm does not normally expect to incur losses and an existing assessed loss for tax purposes is the exception rather than the rule. Accordingly interest is normally a deductible expense in the calculation of taxable income. In a sense therefore the Receiver of Revenue is subsidising the interest payment to the extent of the marginal tax rate of the firm. In these circumstances, the relevant component cost of debt is calculated as follows:

$$CC_d = k_d (1 - t)$$

Where :  $CC_d$  = the component cost of debt

$k_d$  = before tax cost of debt

t = marginal tax rate

(Uliana, et al. 1987 :422-424)

The authors also mention that the task of raising money from a debenture issue may well be placed in the hands of an intermediary such as a merchant bank. In such a case there is likely to be a raising fee and possible underwriters fees. As these costs will reduce the amount received, the debt to be issued must therefore be sufficient to cover both the funds required and the costs involved.

#### 5.4.1.2 THE COST OF EXISTING LONG TERM DEBT

Bierman and Smidt (1986:321-350) state that the effective rate of interest for an outstanding issue can be determined by comparing the current market price for the security concerned with the remaining payment obligations. The effective interest rate for an outstanding debenture will then be the rate of interest which equates the current market price to the present value of the amount due at maturity, plus the present value of the series of interest payments to be made. In order to compile the effective cost, the interest payments must be adjusted to compensate for the fact that interest is normally tax deductible.

Should the market price of the loan stock or debentures be unobtainable because the stock is not listed on a stock exchange, or seldom trades, it may be possible to estimate the current cost by reference to current yields on listed stock with an approximately equivalent term and risk profile.

#### 5.4.2 THE COST OF SHORT TERM DEBT

Gup (1983:531) defines short term debt as debt with a maturity of up to one year. This is consistent with the accounting concept of short term debt but the dividing line is really somewhat arbitrary. The banking sector for example regards paper with a maturity of less than three years as short term, merely because relevant legislation in the RSA permits them to do so. Reekie and Lingard (1986:34) distinguish between short and medium term debt and define the latter as funding for any period between short term and long term, long term being funds provided for anything up to the entire life span of the business.

It should be noted that the cost of short term debt is analogous to that of long term debt in that there may be an explicit cost.

##### 5.4.2.1 'FREE' SHORT TERM DEBT

Uliana, et al. (1987 :336) discuss short term liabilities that have no explicit costs. Among these are accrued wages, accrued taxes and accrued interest.

They mention however that under certain circumstances certain types of apparently free credit will have a very real explicit cost. One such an example is given by Freear (1980:300) as follows:

"A trade creditor<sup>3</sup> specifying maximum terms of 30 days may offer say 2 percent discount if the amount due is paid within 10 days of invoice. Suppose the invoice amount is R2 000. By failing to pay within the 10 day discount period the customer forfeits 2 percent of R2 000 which is R40 and his further 20 days of credit will effectively cost him:

$$\begin{array}{r} \text{R } 40 \\ \text{R1 960} \end{array} \quad \times \quad \begin{array}{r} \text{365 days} \\ \text{20 days} \end{array} = 37,24 \text{ per cent p.a.}$$

Having lost the discount, he may even decide to delay payment beyond the thirty day period. In this case a penalty interest rate might be charged by the supplier, increasing still further, the costs concerned."

'Non free' short term debt on the other hand has an expressly stated cost. It is therefore necessary to take a closer look at the costs of these forms of financing.

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3. Miller, Roome and Staude (1985 :128) point out that 'trade credit' can take the form of an open account i.e. there are no formal evidences of debt, the seller having merely a copy of the invoice sent to his customer.

## 5.4.2.2 'NON FREE' SHORT TO MEDIUM TERM DEBT

### 5.4.2.2.1 BANKING FACILITIES

The explicit cost of short to medium term bank facilities will vary depending on the specific conditions involved. Some of the more common conditions employed are reviewed below.

#### i) 'Regular Interest' on Loans

Weston and Brigham (1978:228-229) state that if the interest charge is paid in full on the maturity of a 1 year loan, the stated rate of interest is equal to the effective rate of interest e.g. a R10 000 loan for 1 year at 7 per cent p.a.

$$\frac{\text{Interest}}{\text{Borrowed Amount}} = \frac{700}{10\ 000} = 7 \text{ per cent p.a.}$$

#### ii) Discounted Interest on Loans

If the bank discounts the interest in advance (discounts the loan), the effective rate is increased. In this example the borrower will be committed for a R10 000 repayment amount at the end of one year but obtains only R9 300. The effective rate of interest therefore amounts to:

$$\frac{\text{Interest}}{\text{Borrowed amount-interest}} = \frac{700}{9\ 300} = 7,5 \text{ per cent p.a.}$$

iii) Installment Loan

In this case the loan is repaid by say 12 equal monthly installments inclusive of interest. However, 'flat' interest (7 per cent in the example) is calculated on the original balance. This has the consequence that the effective rate of interest is considerably higher as a result of the fact that the borrower has the full amount of money only during the first month. By the last month he has already repaid eleven twelfths of the loan. This means the borrower, at 7 per cent flat, would have paid R700 for the use of about half the money he received. In the example the amount received is R10 000 but the average capital amount outstanding during the year is really only R5 000. On the basis of this perspective, the effective interest rate would be:

$$\frac{700}{5000} \times \frac{100}{1} = 14 \text{ per cent}$$

Should the instalment loan idea be combined with that of discounted interest the effective rate is even higher : only R9 300 would be received and half of that would be used as a denominator.

$$\frac{700}{4650} \times \frac{100}{1} = 15,05 \text{ per cent}$$

The authorities in the RSA recognize the difference between a 'flat rate' and an 'effective' rate and now require installment credit contracts to specifically disclose the effective rate.



iv) Bank Overdraft

Reynders (1971: 230-231) considers bank overdrafts to be the most popular and widely used form of short term credit used amongst business firms in the Republic of South Africa. This opinion was verified by Conradie (1982:223-227) in a survey focussing on the financing of small businesses (section 9.1.4.3).

In granting an overdraft a bank agrees to pay cheques issued by the account holder in excess of the funds held in the relative current account up to an agreed limit. Although the bank might agree to note an overdraft limit for a specific period or on a continuing basis, such an agreement will always be 'subject to normal banking reservations.' This means that overdrafts can at any time be 'called up' for immediate repayment.

Miller, et al. (1985:129) observe that South African commercial banks recognize three general categories of borrowers:

- a) Local authorities or parastatal bodies which are usually charged the 'prime overdraft rate.'<sup>4</sup>

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4. Uliana, et al. (1987 :340) describes the 'prime rate' as the lowest rate which is the rate commercial banks would charge very large and financially strong companies. Interest rates on smaller loans or more risky loans are scaled up from the 'prime rate'.

- b) First class business risks who can usually also negotiate the 'prime' overdraft rate.
  
- c) Other who are charged higher rates up to the maximum permissible,<sup>5</sup> depending on the risk factor and ancillary transactions conducted through the bank. The precise rate charged to an individual customer is, of course always open to negotiation.

A significant feature of this form of financing is the fact that interest is calculated on actual daily balances and not on the full sum that can be utilized.

However, an annual 'facility fee' of perhaps 1/4 per cent might be charged by a bank for large overdraft facilities. This would be calculated on the overdraft limit arranged.

Interest is automatically debited to customer's accounts on a monthly basis. Monthly compounding is thus operative.

5. In terms of the Limitations and Disclosure of Financial Charges Act of 1989 the maximum interest rates banks can charge on overdrawn accounts are as follows : 31 per cent for amounts up to and including R6 000; 28 per cent for amounts above R6 000 up to and including R500 000. After this no maximum applies.

v) Commercial Paper

When there is a 'hard core' usage of an overdraft it may be possible to convert that portion to commercial paper, usually in the form of a banker's acceptance.

In such circumstances the customer would draw a bill on the bank. Once accepted by the bank, it can be sold on the money market with the proceeds used to reduce the overdraft. On maturity the bank will pay the holder and debit the account of the customer. The rate applicable on such acceptances will be determined by the money market conditions prevailing at the time of acceptance and the bank will charge a negotiable commission over and above the bankers acceptance rate.

The 'all in' cost might at times be lower than the prevailing prime overdraft rate or might become lower during the currency of the acceptance (usually 30, 60 or 90 days) should the overdraft rate climb in the interim. Under such circumstances it would be in the interest of the borrower to convert from overdraft to bankers acceptance.

However, if the banker's acceptance rate together with commission is higher than the existing or expected prime overdraft rate during the currency of the acceptance a borrower would rationally prefer to remain in overdraft.

Bankers acceptances which can be directly linked to a specific purchase of goods rank as 'liquid' for purposes of rediscounting with the South African Reserve Bank. 'Non liquid' bankers acceptances fail this test, are not eligible for automatic rediscount and accordingly attract a higher rate of interest.

#### 5.4.2.2.2 HIRE PURCHASE FINANCE

Hire purchase describes the sale of goods on instalment, where the ownership of the goods is only transferred to the buyer when the final payment has been made.

An agreement is signed by the customer whereby he undertakes to pay a deposit and thereafter make a series of payments (including finance charges) in return for the use of the asset which becomes his upon payment of the last instalment. Under the credit agreements act of 1980 the seller is empowered, under certain conditions to repossess the goods if the instalments are not paid. The sale proceeds of such repossessed goods would be applied against the amount then outstanding. Hire purchase therefore involves the extension of credit to customers with the underlying goods themselves serving as security. A primary consideration therefore is that the goods that are sold under this type of agreement be durable. Hire purchase contracts may extend for two years or even longer (Miller, et al. 1985:132).

The conditions pertaining to hire purchase agreements are amended periodically.

The rates of interest and the duration of the contracts on this type of finance are to a great extent a function of the prevailing state of the economy.

Reynders (1971:230-231) suggests that this form of financing, although relatively expensive compared to other forms of finance, remains an important source of financing for the small business.

Specialist banks will often discount hire purchase paper from traders or provide hire purchase finance directly to the purchaser.

#### 5.4.2.2.3 LEASING

According to Uliana, et al. (1987:449) a lease is a contract that provides a right to the use of assets, legally owned by the lessor, in exchange for a specified rental paid by the lessee. The lease payment is normally paid at the beginning of each lease period and is included in the gross taxable income of the lessor. On the other hand, the lessee would be allowed to deduct the lease payment in calculating his gross taxable income.

Reekie and Lingard (1986:38) categorize leases into operating leases and financial leases.

i) Operating Leases

An operating lease is an arrangement which provides an alternative means of obtaining the use of an asset that management has no intention of purchasing (Uliana, et al. 1987:450).

These leases are cancellable, do not fully cover the cost of the asset and often include maintenance clauses. They are very popular in circumstances where equipment might rapidly become obsolete (Reekie and Lingard 1986:38). Office machines and computers are often leased on this basis. Firms, for example, often acquire the use of photocopier machines through the use of an operating lease which is renegotiated every three years.

A firm can however renegotiate before the current three years have expired, by 'trading' the old photocopier machine for a new one. Included in these operating lease payments are the costs of all services to be provided by the equipment supplier (Uliana, et al. 1987:450).

The authors also mention that in the RSA there are some equipment suppliers who do not ever sell their equipment: the only way the user firm can acquire the use of such equipment is by entering into an operating lease.

ii) Financial Leases

A financial lease differs from an operating lease in several ways. Firstly the lease payments specifically provide the lessor with reimbursement for the cost of the leased asset plus interest. The agreement often allows the lessee the option of purchasing the asset at the termination of the lease. Maintenance and insurance of the asset are usually the responsibility of the lessee. This type of lease is most commonly used to finance the acquisition of motor vehicles, equipment and plant.

The major difference between the operating lease and the financial lease is that the lessee intends to acquire the use of the asset for its useful life. Normally financial leases are structured in a manner that is similar to installment loans.

The lease is made up of the cost of the asset to which is added flat interest. A financial lease is usually non-cancellable. Should the lessee however be permitted to cancel, he would usually have to forfeit some of the interest built into the unexpired portion of the lease. This occurs because the lessor will allow the lessee interest at a lower rate than that which was included in the original contract for the period that the lessor will not be using the funds. Hence, to cancel the lease, the lessee will usually have to

pay the lessor an account settlement figure which is made up of the outstanding capital balance plus the interest differential (Uliana, et al. 1987:450-451).

Reekie and Lingard (1986:38) add that financial leasing involves a liability indistinguishable from that of medium term debt, even though its accounting and taxation treatment is different. It need not for example be recorded as a liability on the balance sheet itself.

#### 5.4.2.2.4 BILLS OF EXCHANGE

As indicated by Miller, et al. (1985:130-131) the signing of a bill or the acceptance thereof indicates that the acceptor undertakes to pay a debt plus interest at some agreed future date. A bill may also take the form of what is termed an 'acceptance credit,' being a bill drawn in terms of a letter of credit.

The debtor's bank could, in a letter of credit, indicate that it will accept bills on behalf of its client subject to certain conditions being fulfilled. Accumulatively the bank can add its guarantee to such bills. These bills can be discounted at keen rates. These bills are often used in international trade.



Accommodation bills are drawn by one party on another without an underlying trading transaction having taken place. This kind of bill is used specifically to raise money or to evidence existing debt.

#### 5.4.2.2.5 FACTORING

Factoring is a relatively recent innovation in the RSA and involves the outright sale of the firm's debtors accounts to a financial institution called a factor (Miller, et al., 1985:134-136). A factor could provide one or more services for his clients.

With sales ledger factoring, the factor buys all the clients debts and becomes wholly responsible for credit control, issuing of invoices, debt collection and risk of default or bad debts.

The firm is immediately paid by the factor an amount which will usually be expressed as a percentage of invoices and/or bills outstanding. The difference between the invoice value and the price paid is the factor's reward or commission for services provided. This difference, expressed as an annualized percentage of the amount paid constitutes the cost to the firm. However, that cost is partly for financial and partly for administration.

Alternatively, the factor may not take over the accounting duties of sales ledger management but will simply pay (at an agreed discount) for approved invoices already issued by the firm. Furthermore, the factor in such circumstances may or may not assume the risks of bad debts, depending on the agreement with the client. If he does not, and a bad debt occurs, the factor would then call on the client to repay to the factor the full invoice amount.

The true cost of factoring tends to be very high and is often regarded as the last resort to raise urgently needed cash for maturing commitments.

Factoring is generally employed by small firms rather than larger ones which already have sophisticated internal accounting mechanisms and controls for the collection of debts (Reekie and Lingard 1986:38-39).

What is significant about the forms of finance, discussed under 5.4.2.2.1 to 5.4.2.2.5 above is the fact that they all have an explicit cost which can be calculated (Reekie and Lingard 1986:39). These authors, on the other hand are also able to cite a source of medium term capital which has only an implicit cost. This source is identified as deferred taxation : an item of growing importance on South African balance sheets.

#### 5.4.2.2.6 DEFERRED TAXATION

The item of deferred taxation that is often of greatest monetary importance relates to taxation on company profits. This phenomenon can arise as follows:

In any given year, when a firm calculates its profits, it is technically and legally liable to pay taxes on that income at the ruling rate. There can, however, be reasons why the accounting income calculated is more than the taxable income for the current period. For example if the government, for tax purposes, permits fixed assets to be written off against profits (eg. wear and tear allowance) at a faster rate than the firm deems appropriate from an accounting point of view, two profit figures can be calculated. Where the permissible wear and tear 'allowance' has been charged against profits the 'taxable income' is lower than the accounting income where less depreciation has been applied to more accurately reflect the true state of affairs of the company. In the latter case, the taxation calculated and debitted will be more than the amount due to the Receiver of Revenue in respect of that tax year. The difference would be credited to a Deferred Taxation account. The difference between the taxable income figure and the accounting income figure provides a source of funds to the firm to the extent that excess tax has been provided for on the discrepant amount.

Since the purchase of assets is generally a continuous process and not a one-off event, a positive and large sum can continuously exist against this balance sheet item (Reekie and Lingard 1986:40-41).

However, it is pointed out by Uliana, et al. (1987:122) that if there should be a deferred taxation balance, the necessity exists to decide whether to classify deferred tax as equity or debt. Frequently, deferred tax is regarded as equity. This is based on the premise that the liability is unlikely to arise in fact as there will always be new tax allowances to replace those that are expiring. If it were known that this is not the case then it is suggested that deferred taxation would more correctly be treated as debt.

The example shown in figure 5.1 depicts a situation where a provision for deferred taxes is created in the first 3 years (a temporary source of funds) but reverses when the wear and tear allowance falls below the accounting depreciation charge after the third year.

FIGURE 5.1

DEPRECIATION ON PLANT AND MACHINERY

	<u>ACCOUNTING INCOME EFFECT</u> <u>(Deduction of depreciation</u> <u>- straightline method)</u>	<u>TAXABLE INCOME EFFECT</u> <u>(Deduction of wear and tear</u> <u>allowance - declining balance</u> <u>method)</u>
Yr1	R10 000	R15 000
Yr2	R10 000	R12 000
Yr3	R10 000	R10 000
Yr4	R10 000	R 8 000
Yr5	<u>R10 000</u>	<u>R 5 000</u>
	<u>R50 000</u>	<u>R50 000</u>

In the above case the provision for deferred taxes is credited in the first two years as follows:

1st Year : (Wear and Tear Allowance

- Depreciation) x tax rate (say 50 per cent)

(15 000 - 10 000) (.5) = R2 500

2nd Year : (12 000 - 10 000) (.5) = R1 000

In the third year there will be no change in this provision. However it is clear that the actual liability will materialize after the third year when the wear and tear allowance falls below the depreciation charge. The provision for deferred tax will diminish by  $(10\ 000 - 8\ 000) \cdot 0.5 = R1\ 000$  in year 4 and vanish in year 5. In this case, because the provision was only a temporary source of funds, deferred tax should be classified as debt.

However, if a case, occurs where replacement of the plant and machinery is done every 3 years on a continuing basis a permanent source of funds of R3 500 is created with debits to the account being offset by credits relating to new machinery so that the balance will not fall below R3 500.

In such an instance to the extent of R3 500, the provision can be classified as equity since it will never materialize under prevailing tax legislation.

This 'equity' portion of deferred taxation, Everingham and Hopkins (1982:46) say, may legitimately be regarded by a shareholder, who believes he is investing in an expanding company, as a reserve, since it is unlikely ever to be used if the company continues to expand in items of plant and machinery.

They point out however, that a long term creditor certainly would not regard deferred tax as a reserve since credit balances would be likely to disappear if business activities contracted or the firm was liquidated.

Where these funds constitute a temporary source, it clearly is a 'cost free' source. In the second instance, however, where the source is classifiable as equity, its implicit cost is a function of the opportunity applicable to the firm's ordinary shareholders.

#### 5.4.3 THE COST OF PREFERENCE SHARES

The component cost of preference shares is an explicit cost and is equal to the dividend investors receive on the shares. Assuming the preferred issue is a perpetuity that currently sells for R100 a share and pays an R8 annual dividend, its yield is 8 per cent:

$$\text{Preferred yield} = \frac{\text{preferred dividend}}{\text{price of preference share}} = \frac{8}{100} = 8 \text{ per cent}$$

In calculating the explicit cost of preference shares it is necessary to observe that the payment to shareholders is in the form of dividends and not interest and is accordingly not deductible for tax purposes.

As in the case of debentures and loan stock, if the preference shares are not listed or seldom traded, the current price can be approximated by reference to other listed preference shares with similar terms and risk profiles.

#### 5.4.4 COST OF EQUITY

Hampton (1976:31) says that equity capital represents the ownership of a business. Equity investors are the suppliers of the firms' basic risk capital. This capital is exposed to all the risks of ownership and provides a cushion for debt that has a preferential claim to income and capital on liquidation. Normally this risk capital will only receive returns in the form of dividends after the prior claims of interest on debt and preferred dividends have been satisfied. On liquidation equity investors only have a claim to what remains after the prior claims of creditors and preferred shareholders have been met (Uliana, et al. 1987:105-106).

Equity can formally be defined as the issued ordinary share capital of a company which carries an unrestricted right to participate beyond a specified amount in a distribution. Added to this are undistributable reserves (reserves which

are not available for distribution as dividends) e.g. any surplus arising as a premium on the issue of shares and debentures, as well as distributable reserves (reserves which are available for distribution as dividends) (Chartered Institute of Cost and Management Accountants 1981:62-63).

The cost of equity is an opportunity cost and is defined as such by Bierman and Smidt (1986:362) namely as the rate of return shareholders require on the firm's ordinary shares. The 'required rate' must be as good as or better than the return ordinary shareholders or potential ordinary shareholders, contemplating trading at prevailing prices, can obtain on the best alternative investment. This required return can be measured by comparing expected future dividends against the present market value of the shares. The rate of discount that equates the present value of expected future dividends to the current price of the share is the cost of capital for ordinary shares. The expectations that are relevant are those of the shareholders or potential shareholders who contemplate trading at prevailing prices. If this minimum rate is not earned inside the firm, investors will be better off by having their funds returned to them.

In order to calculate the cost of equity, certain models have been developed. One popular model which is frequently used in financial literature was articulated by professor Myron Gordon and was consequently named after him.



#### 5.4.4.1. THE GORDON MODEL<sup>6</sup>

##### 5.4.4.1.1 THE COST OF INTERNAL EQUITY

In terms of the Gordon Model the following formula approximates the cost of internal equity:

$$k_i = \frac{d_1}{p_0} + g$$

where :  $k_i$  = cost of capital for equity

$d_1$  = expected dividend rate in 1 year

$p_0$  = current market price per share

$g$  = expected long term annual rate of increase in future dividends.

Weston and Brigham (1978:704) comment on the Gordon approach as follows:

"Stockholder returns are derived from dividends and capital gains and the total of the dividend yield plus the average growth rate of earnings over the past five to ten years may give an estimate of the total returns that stockholders expect in the future, from a particular share."

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6. To see how the Gordon model was developed see Weston and Brigham (1978 :640-641)

The point must be made here that dividends are paid out of after tax profits and whether or not a company pays a dividend, and how large it will be are at the discretion of the board of directors. Consequently a change in management could very well impact on future decision making inter alia in this respect.

Weston and Brigham (1978:701-702) place their statement in perspective by the following example:

"Consider a firm that is expected by shareholders and prospective shareholders to earn R2 a year and pay a R1 dividend during the coming year. The company's earnings, dividends and share price have all been growing at about 5 per cent per year and this growth rate is expected to continue indefinitely and the dividend policy to remain unchanged."

The share is in equilibrium<sup>7</sup> and it currently sells for R20 a share.

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7. The dividend growth model might be used as a valuation model:  $p_0 = \frac{d_1}{k_i - g}$ .

The present value ( $p_0$ ) of the share after discounting may be higher or lower than the current market price of the share. If it is higher than the market price it will yield a rate of return that is lower than that according to the market price of the share. It follows then that if the market value is the same as the present value the rates of return yielded will correspond. When this is the case the share will be in equilibrium (Weston and Brigham (1978 :640-641)).

The rate investors require on the firm's shares and consequently the cost of equity will be:

$$\begin{aligned}
 k_i &= \frac{d_1}{p_0} + g \\
 &= \frac{1}{20} + ,05 \\
 &= 0,1 \text{ or } 10 \text{ per cent (effectively)}
 \end{aligned}$$

The expected annual growth rate for the price of the shares is 5 per cent, which on the initial price of R20, would lead to a R1 increase in the value of the share to R21 after one year. This price increase can only be attained if the R1 of retained earnings is invested in the firm to yield 10 per cent per annum. If it is invested to yield only 5 per cent per annum, earnings will grow by only 5 cents during the year and new earnings will be R2 05, a growth of only 2 1/2 per cent per annum. Once investors realize what is happening they will revalue the share downwards as follows:

$$\begin{aligned}
 p_0 &= \frac{d_1}{k_i - g} \\
 &= \frac{1}{0,10 - 0,05} \\
 &= R13,33
 \end{aligned}$$

The net present value of the share, discounted at 10 per cent, is now lower than the R20 market price which means that the share is not in equilibrium any more. This is the result of the share no longer earning the shareholder's opportunity cost or required rate of return.

In other words the best opportunity that would have been foregone by shareholders if funds were kept in the business, should now be accepted.

Shareholders will now start selling, and with a downward shift in the shares' supply curve, the share price will tend downward until it is in equilibrium again yielding the required rate of return.

#### 5.4.4.1.2 THE COST OF EXTERNAL EQUITY

According to Mathur (1979 :276) the investor is indifferent to the choice between existing and new equity. However management must consider this decision, since new externally generated equity has certain costs involved whereas internally generated equity has not.

When a company raises finance through the issue of new shares it does not get the full price of the share. Issue expenses have to be met. Uliana, et al. (1987 :375) specify the following typical share issue expenses:

- \* listing fee - 1 cent for every 100 shares with a maximum of R5 000;
- \* professional fees - legal and audit fees in drawing up the prospectus, and for other related professional services;

- \* bankers fee - the issue is usually administered by a merchant bank, the fee of which is usually 1 per cent of the gross proceeds of the issue and
- \* underwriting commission - the issue is usually underwritten to protect against the issue not being fully subscribed. A commission of 1,5 per cent is not unusual.

The authors point out that a new listing on the Johannesburg Stock Exchange would typically cost at least R200 000 while a listing on the Development Capital Market would amount to approximately R50 000.

If the figures used in the computation of the cost of internal equity were made applicable here and share issue expenses of R2(0,10) per share assumed the cost of external equity would be:

$$\begin{aligned}
 k_i &= \frac{d_1}{p_0(1-\text{flotation costs})} + g \\
 &= \frac{1}{20(1 - 0,1)} + ,05 \\
 &= 0,105 \text{ or } 10,5 \text{ per cent}
 \end{aligned}$$

From the above computation it can be seen that new equity's cost is higher than that of internal equity. Because of flotation costs being 0,10 or R2 per share it means that the firm will only receive R18 per share instead of R20, in net proceeds from issuing new shares.

Unfortunately the Gordon model, also known as the dividend growth model, makes certain dubious assumptions.:

- a) Investors assume that the past realised growth in the rate of return on the shares will persist into the future. (Uliana, et al. 1987 :184-185).

This is obviously an unwarranted assumption. The industry in which the firm operates could for example be adversely affected by an economic downturn. This could so adversely affect the earnings of the relative firm that the growth rate could decline significantly or even go into reverse.

- b) It is assumed that the share is in equilibrium (present value = market price) (Weston and Brigham 1978 :704). In this case it is presupposed that all investors take cognizance of the time value of money, are able to forecast dividends and react accordingly by buying and selling in the market.

There are also two serious anomalies inherent in the model:

- a) as growth ( $g$ ) approaches the required rate of return ( $k_i$ ) so the value of the share ( $p_0$ ) approaches infinity and

- b) if growth exceeds the required rate of return the model gives a negative valuation to the shares (Uliana, et al. 1987:184-185).

The last two limitations of the Gordon model clearly implies that in order for it to function,  $k_i$  (cost of equity) must be greater than  $g$  (growth rate). Uliana, et al. (1987 :185) cite that this clearly indicates that the model is suspect for a company that has a very high growth rate.

Weston and Brigham (1978:704) furthermore point out that the logic underlying the analysis assumes that investors are indifferent between dividend yield and capital gain.

This is clearly ignoring investors preferences. It is a known fact that because of differences in marginal tax rates, certain investors do prefer dividend payouts and others do not.

Further deficiencies of the dividend growth model are noted by Lo Cascio (1970:72). He regards the use of  $\frac{d}{p} + g$  as rather unfortunate because it treats  $k_i$  as a dependant variable with respect to  $d$ ,  $p$  and  $g$ . This tends to confuse the true cause and effect relationships involved. For example if one solves for  $d$ ,  $d = (k_i - g) p$ . By interpretation this could mean that a change in  $p$  could cause a change in  $d$ . This obviously is absurd. The 'best' statement of the equa-

tion is  $p = \frac{d}{k_i - g}$  because price changes are caused by  $d$ ,  $k_i$  and  $g$ . If this were the case there may be a further flaw in the structure of the dividend growth model : an assumed  $k_i$  will have to be slotted into the equation. What this in effect means is that it is not only assumed that all shareholders of a company have a predetermined opportunity expectation, but also that they have the same expectation. This can surely not be true.

All these limitations put a question mark on the reliability of the Gordon model and necessitates reconsideration of the cost of equity capital.

Another model has been developed which does not have the limitations of the Gordon model. This model is known as the Capital asset pricing model.

#### 5.4.4.2 THE CAPITAL ASSET PRICING MODEL (CAPM)

The point of departure in the theory underlying the CAPM is that a shareholder's perception of relevant risk will change if he holds a collection or portfolio of investments in the shares of a number of different companies. In this context the individual share will be important in terms of the marginal contribution it makes in the form of additional risk and expected return to his overall portfolio.



The benefit of diversification lies in the fact that investors typically spread their risks by investing in a number of securities rather than by putting all their money into one.

The benefits of diversification can be measured by the extent to which the returns on two securities (i.e. shares) vary together (statistically measured by the covariance).<sup>a</sup>

The CAPM is based on portfolio theory which distinguishes between two types of risk namely systematic and unsystematic risk.

Systematic risk cannot be avoided by security investors since it affects financial markets in totality (general economic conditions, government policy, changes at a macro level, wars, etc.). Unsystematic risk, however, is peculiar to the security or firm concerned and will pertain inter alia to strikes, innovations, management quality, state of the industry and competition. The CAPM assumes, that the unsystematic risk can be diversified away in any individual's portfolio since shares with a high level of risk can be off-set against low risk shares.

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8. Weston and Brigham (1978 :1011) define covariance as the correlation between two variables multiplied by the standard deviation of each variable. See also Weston and Brigham (1978 : 955-957).

Since any one security's unsystematic risk or diversifiable risk is therefore irrelevant to an investor, only the systematic risk will influence the security's price. In the CAPM securities are consequently priced according to their non-diversifiable or systematic risk which is measured by the beta coefficient (Reekie and Lingard 1986 :117-119).

Beta is a measure of the sensitivity of an individual security to changes in the market. It is an elasticity coefficient and can be denoted as the percentage change in an individual security's return for a 1 percent change in the return of the entire market (Henderson, et al. 1984 :109).

Since the cost of capital is the required rate of return on new investments, the beta used must be the beta of the new investment, which may be different from the beta that applies to the firm as a whole. We are, however concerned with estimating the cost of capital for investments at a level of risk equal to that of the firm. Therefore the firm's beta does apply. (Ben Horim 1987:151)

Looking at this from a different viewpoint one can observe that the cost of all funds in the firm namely equity, debt and preference shares are a function of the risk inherent in the firm. If the cost of equity, therefore is going to be calculated according to a risk that is different from that of the firm the cost of the other forms of finance will not

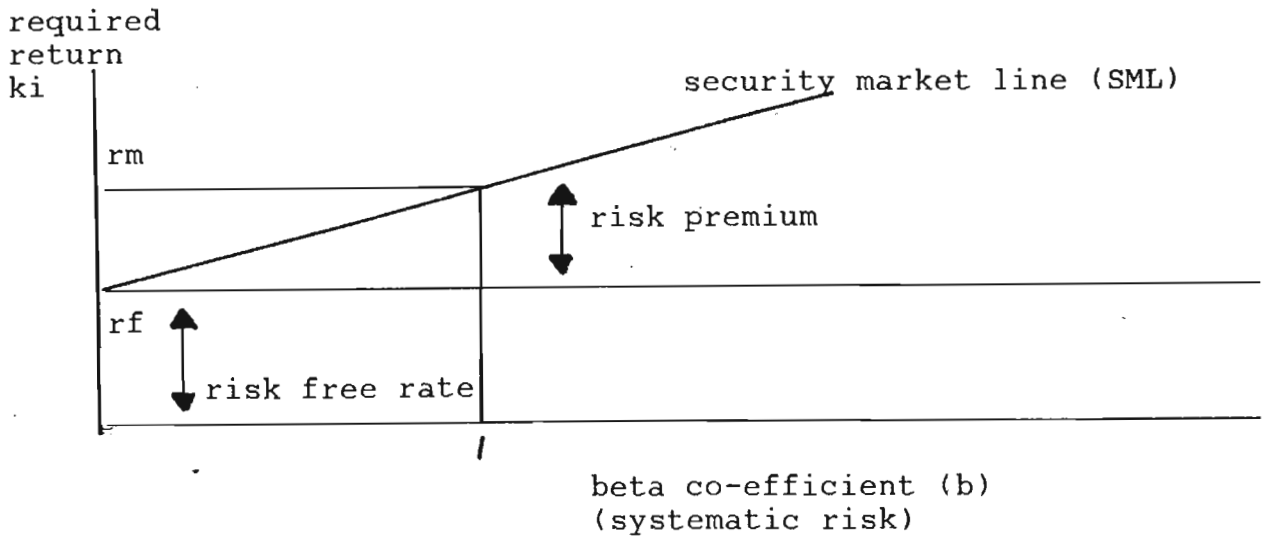
be comparable. It will be like operating in two firms, one financed with equity and the other one with debt, and preference shares. This surely doesn't make sense.

Reekie and Lingard (1986:120) note that calculating betas involves expectations about the future responsiveness of the share's return against changes in the market return. Since the future is unknown, historical data must be used as a substitute (monthly returns as measured by dividend yield plus capital appreciation for the share for a period of years). Since the market portfolio is also unknown a widely accepted share index could be used as a proxy.

When we are looking at the market as a whole the relevant perspective becomes that of all investors who are actively involved in buying and selling securities. A risk return line may consequently be identified that reflects their attitudes regarding the minimum acceptable rate of return for a given level of risk (Martin et al. 1979 :346-347). This line, also called the security market line (SML) and graphically portrayed in figure 5.1 may be described not only as an expression of the relationship between expected return and systematic risk but also as the market price for risk.

FIGURE 5.2

USE OF THE SML TO ESTIMATE REQUIRED RATES OF RETURN ON ORDINARY SHARES



Source: Reekie and Lingard, (1986:119)

The SML is plotted according to the equation known as the CAPM viz:

$$k_i = r_f + b (r_m - r_f)$$

where :  $k_i$  = required rate of return on equity

$r_f$  = risk free rate

$r_m$  = return available on the market portfolio

$(r_m - r_f)$  is the risk premium obtained by investing in the market portfolio and not in risk free securities (i.e. the premium awarded for accepting systematic risk).

$b$  = the factor by which  $(r_m - r_f)$  is multiplied to indicate the premium a relative security must earn above (or below) the risk premium on the market, thus taking into account systematic risk.

If the beta equals 1, then a security's returns will vary directly in proportion with the market returns (i.e. 10 per cent increase in market returns will produce 10 per cent increase in the security's returns). Correspondingly a beta of 2 implies that a 10 per cent change in the market return will produce a 20 per cent change in the security's returns. Thus when a beta<sup>9</sup> is larger than 1 individual security returns are more than proportionally responsive to changes in the market, both when returns are increasing and decreasing (Martin, et al. 1979 : 348).

If hypothetical data is substituted into the CAPM equation the required rate of return on equity is equal to:

$$\begin{aligned} & \text{(risk free rate) + (risk premium)} \\ = & \quad r_f \quad \quad \quad + \quad b(k_m - r_f) \\ = & \quad 0,10 \quad \quad \quad + \quad 1,25 (0,14 - 0,10) \\ = & \quad 0,15 \text{ or } 15 \text{ per cent} \end{aligned}$$

The CAPM is also not without blemish. Weston and Brigham (1978:431-432) list the following unrealistic assumptions underlying the CAPM:

- 
9. Beta's significance as far as investment on the stock-market is concerned is clear. High b value shares should be bought if the market is expected to rise since they will rise faster than the market. Conversely, if the market is expected to fall high b value shares are unattractive prospects.

- \* all investors are single period expected utility of terminal wealth maximizers who choose among alternative portfolios on the basis of standard deviation of returns;
- \* all investors can borrow or lend an unlimited amount at an exogenously given risk free rate of interest,  $r_f$ , and there are no restrictions on any short sales of assets;
- \* all investors have identical subjective estimates of the means, variances and covariances of return among all assets i.e. investors have homogenous expectations;
- \* all assets are perfectly divisible, perfectly liquid (i.e. marketable at the going price) and there are no transaction costs;
- \* there are no taxes;
- \* all investors are price takers and
- \* the quantities of all assets are given.

Van Horne (1983:201) furthermore, cites as a crucial assumption in the CAPM the fact that the cost of bankruptcy or insolvency is zero. This implies that if a firm fails, assets can presumably be sold for their economic values. No liquidation or selling costs are incurred. After creditors have been paid, the residual proceeds are distributed to shareholders.

These assumptions speak for themselves as being devoid of realism. What some of them imply, however, is that the CAPM effectively assumes that investors hold portfolios of securities which are simply miniatures of the overall stock-market.

However absurd this may sound Weston and Brigham (1978:432) point out that the CAPM has been used in several civil court cases in the USA where its advocates have stood up quite well under intense and expert cross examination.

Hyndman and Pogue (1984: 52-53) discuss a few problems inherent in the use of the CAPM, namely:

- \* the difficulty of obtaining an accurate measure of beta for a company or a project;
- \* it deals only with the systematic risk but the investment manager may be interested in the total risk of the project if his portfolio is not efficient. A portfolio is relatively inefficient if its securities still contains substantial unsystematic risk;
- \* changes in the capital structure<sup>10</sup> of a company usually require alterations in its beta factor and

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10. Capital structure denotes the prevailing long term financing of the firm and is represented by long term debt, preference shares and net worth (net worth consists of ordinary share capital, non distributable reserves and retained earnings. In order to see how beta is affected by changes in the capital structure of a firm, see Henderson, et al. (1984 :113-115). See also section 10.2.2

\* since the beta factor is calculated using historical data and also tends to be relatively unstable over time, its accuracy as a measure of risk surrounding present investment possibilities is somewhat undermined.

If one looks at the maze of limitations, assumptions and objections surrounding the CAPM it is no wonder that one of its midwives, Professor William Sharpe referred to 'the never-never land of the capital asset pricing model!' (Sharpe 1981 :144).

However this is at least another attempt by financial theorists to develop a means by which the cost of equity capital can be measured.

The near impossibility of this task is recognized by Bierman and Smidt (1986:372) when they say that 'there are no ways to estimate exactly the cost of equity of a publicly owned firm.'

A choice between the Gordon model and the CAPM is no easy task. Some comparative work has been done that justify closer scrutiny.



#### 5.4.4.3 GORDON MODEL VERSUS CAPM

In contrast to the dividend yield plus growth model, the CAPM is a single period model in that the expected rate of return for the stock market over a specified time period must first be estimated after which the expected return on a particular ordinary share for the same period must be estimated (Johnson and Melicher 1982 :418).

It is furthermore pointed out that the CAPM's estimated cost of capital and the dividend growth models' estimate can, and often do differ significantly (Levy and Sarnat, 1982:418). The authors suggest that in such an event the dividend growth model should be relied on since it represents a more pragmatic approach. They also feel that the CAPM's explanatory power leaves much to be desired. They do not, however, substantiate their position in a convincing manner. Despite the shortcomings of the CAPM and the preferences of Levy and Sarnat, the CAPM is generally accepted as providing the best available indication of the cost of equity capital.

The above conclusion differs from that of van Wyk and Joubert (1987:42-44) who undertook an empirical study (section 6.3.3) using 21 selected shares on the Johannesburg Stock Exchange and applying the Gordon model and the CAPM alternatively to calculate the cost of equity. They concluded that neither of the models can be advocated for use in preference to what they term the more 'traditional' methods used in the analysis of financial statements.

This conclusion of van Wyk and Joubert necessitates a closer examination of the merits (if there are any) of traditional financial statement measures of cost of equity.

#### 5.4.4.4 RATE OF RETURN ON SHAREHOLDER'S FUNDS

The rate of return on shareholder's funds is calculated by using the following ratio expressed as a percentage:

$$\frac{\text{Earnings after interest and taxes}}{\text{shareholder's interests}}$$

The numerator is self explanatory. The denominator consists of the nominal share capital as it appears in the firms balance sheet, plus reserves. Reserves in a company balance sheet arise from two main sources: retained profits from previous years which could have been but were not distributed to shareholders and any premium paid by shareholders over the nominal price of the shares when they initially bought the share, on the date of issue. The ratio prima facie appears to approximate the return expected by shareholders, but in fact it does not. Future growth or growth in current earnings are completely ignored.

Another severe limitation of this ratio is the fact that shareholders' interests in the balance sheet may bear virtually no relation to the stock market price of the firms shares, and it is this price, not a balance sheet entry

which is of interest to existing shareholders (who may wish to sell or hold their shares) and to potential investors who may wish to buy shares (Reekie and Lingard 1986 :57).

These arguments against return on investment as a criterion for cost of equity serve to reinforce the arguments against it as objective of the firm cited in chapter three.

Another effort to express cost of equity capital hinges around the dividend payment.

#### 5.4.4.5 DIVIDEND RATE

The dividend rate is the ratio of dividend paid to nominal share capital expressed as percentage. It ignores current retentions (in the numerator) and past retentions or reserves (in the denominator) and so ignores growth potential for the future. Furthermore, the denominator is again unrelated to the market value of the firm (Reekie and Lingard 1986 :57).

These arguments clearly exclude this ratio as a realistic criterion for cost of equity.

The dividend yield constitutes a criterion which is really a variation of the dividend rate.

#### 5.4.4.6 DIVIDEND YIELD

The dividend yield is the ratio of current dividend paid to market value of share capital expressed as a percentage. Market value is taken account of in this ratio but no account is taken of future earnings or dividends (Reekie and Lingard 1986 :57).

This limitation clearly renders the dividend yield method unsatisfactory.

The earnings yield constitutes a popular method of calculating cost of equity.

#### 5.4.4.7 EARNINGS YIELD

Mathur (1979:277-278) notes that the earnings yield (reciprocal of price to earnings ratio) is sometimes advocated as being a correct method to measure the cost of equity. The same ratio is also arrived at by dividing earnings per share (EPS) by share price.

This statement, he suggests, can only be true when the firm's dividend payout is one hundred per cent and its growth rate of earnings is consequently zero.

Reekie and Lingard (1986 :58) observe that the limitation of this ratio lies in the fact although that it takes cognizance of market value, it ignores future dividend or earn-

ings growth. 'Like' in the numerator is therefore not compared with 'like' in the denominator since market value of shares does embody future prospects but earnings or dividends do not.

Perhaps the most profound objection against all of the above financial ratio measures of cost of equity, propogated by van Wyk and Joubert (1987:44), is perhaps that they do not take cognizance of the objective of the firm viz. wealth maximization of the owners. Wealth maximization, as postulated is achieved through maximization of the market value of the ordinary shares. This value, as Porterfield (1965:43) indicates, is a function of future dividends and future dividends are in turn dependant on future cash flows. In order therefore that the investment decision criterion, which is the cost of capital, be consistent with the objective it must also be defined in terms of future cash flows.

In this respect all book value orientated measures fail miserably and the CAPM despite its defects, remains the best available approach to estimating the cost of equity capital.

Having identified the component costs of capital and having considered some of the measurement problems involved the crux of the matter now is to establish how these costs can be combined to form a valid selection criterion for investment decisions.

The rationale for using the cost of capital as a selection criterion for new investments was pointed out in the beginning of this chapter (section 5.2).

It is however, postulated by Schall and Haley (1986:181) that this cost should be calculated as a weighted average of the components. A basic assumption in this study is that investment decisions by a particular firm should be limited to those in its own industry.

A basic condition therefore for using the cost of capital to evaluate new investments is firstly that new investments must have the same risk as average investments made in the past. This means that new investments must not change the business risk of the firm if they are undertaken. Any prospective investments that are bound to increase the business risk of the firm should, according to Schall and Haley (1986:279) be evaluated inter alia by the CAPM in order to establish a required rate of return.

This rate (risk free rate + risk premium) should then be used as a risk adjusted rate in place of the weighted average marginal cost of capital (section 5.5.1).

It follows however that the rate of return on any investment having the same beta risk as that of the firm can be determined by the CAPM as alternative to the Gordon model and

that this component cost can be used as a weight in the computation of the marginal cost of capital (Schall and Haley 1986 :182).

Schall and Haley (1986 : 182) secondly state as condition for using this marginal cost that the financing of new investments should not change the financial risk of the firm meaning the relative amounts of the different types of securities used by the firm should not change as a result of undertaking any of the new investments being evaluated.

#### 5.5.1 THE WEIGHTED AVERAGE MARGINAL COST OF CAPITAL (WACC)

##### 5.5.1.1 INTRODUCTION

The WACC concept stresses that, in the long run, the firm will use many capital sources, thus the firms' cost of capital is a weighted average of the costs of the various sources. The rationale for this is supplied by Weston and Brigham (1978:694-695). These authors put forward an example of a hypothetical firm whose cost of debt and equity is estimated to be 8 per cent per annum and 12 per cent per annum respectively. The firm has made a decision to finance the following year's investment projects by selling debt. It could borrow heavily using up its debt capacity in the process, to finance on a marginal cost basis, projects yielding 9 per cent per annum. In the following year it might have projects available that yield 11 per cent per

annum but they cannot be accepted because they can only be financed with additional 12 per cent equity money. To avoid such an absurd situation from arising the firm should be viewed as an ongoing concern and its cost of capital calculated as a weighted average of the various types of funds it uses : debt, equity and preference shares.

In order however to proportion these various types of capital a value criterion is needed.

#### 5.5.1.2 VALUES TO BE USED WHEN CALCULATING THE WACC

Financial theory suggests that the WACC should be calculated according to market values of debt and equity and not book values. This will provide a more appropriate 'marginal' perspective.

Levy and Sarnat (1982:416-417) provide an example to illustrate the logic of this suggestion: A firm issued R100 debentures bearing 5 per cent per annum interest a number of years ago. For the sake of simplicity it is assumed that taxes are zero and that the debentures are perpetuities having no maturity. After a number of years, inflation lead to a sharp rise in the domestic interest rates and the market rate of interest on this class of debentures rose to 10 per cent per annum. The only way these debentures can now yield a 10 per cent per annum interest rate is by the market price falling to R50. In a free and competitive securities market therefore debenture holders will try to sell the



securities as long as the price is over R50 (and the yield below 10 per cent per annum) but no investor will buy them until the price drops to R50 (and the yield equals the going market rate of 10 per cent).

Assuming in this hypothetical world that all investment is financed by debt only, the use of historical accounting values would suggest that investments should be accepted if they earn a rate of return of more than 5 per cent per annum. The market value approach would stipulate 10 per cent per annum as the correct cut off rate. Only the latter is correct because the firm can always earn more than 5 per cent by simply repurchasing two of its own debentures in the market for R50 each, thereby saving R10 in interest payments and effectively earning a rate of return of 10 per cent per annum. Thus the cost of the debt component cannot be less than its opportunity cost to the firm which in this case is 10 per cent per annum.

The only conclusion one can possibly come to is that historical costs are completely irrelevant and that WACC should consequently always be calculated according to market values.

### 5.5.1.3 OPTIMAL CAPITAL STRUCTURE

Weston and Brigham (1978:714) point out that if it is assumed that an optimal capital structure exists at a particular time, any new funds should then be raised with a view to attaining the weights reflected in the ideal structure. Should another subsequently become optimal, due perhaps to a change in financial markets, different target weights should be used. It is claimed by Weston and Brigham that an optimal capital structure for a firm is determined by finding the capital structure that minimizes the cost of capital.

In this respect Gup (1983:181) suggests that since a basic assumption underlying the theory of cost of capital is that it is applicable to new funds being raised by the firm, the weights to be used to calculate the cost of capital should reflect the proportions of the additional funds being raised to reach the target values.

### 5.5.1.4 COMPUTATION OF THE WEIGHTED AVERAGE MARGINAL COST OF CAPITAL (WACC)

The marginal concept is accentuated in current literature on cost of capital. What is professed is that only the cost of new or marginal funds have any importance. Since the firm is continuously making new or marginal investments this makes sense provided it is the weighted average which is referred to and not a single source of funds as in section 5.5.1.1.

Consequently if new funds are raised the cost of each R1 of funds will be a hypothetical weighted average of the proportion of funds represented in the new capital structure. Only these funds then have any relevance when a cost of capital is computed and is termed the weighted average marginal cost of capital. Table 5.1 illustrates the calculation of the WACC using 'target values' for weight purposes.

TABLE 5.1

COST OF CAPITAL FOR 'HYPOTHETICAL COMPANY' USING 'TARGET VALUE'WEIGHTS

Source of financing	Target Proportion (per cent)	Prevailing Component Cost per annum (per cent)	Average (per cent)
Long Term Debt	25	5,14 <sup>11</sup>	1,29
Preference Shares	10	10,50	1,05
Ordinary Shares	65	15,70	10,21
Weighted Average Marginal Cost of Capital			<u>12,55</u>

-----  
 11. 5,14 per cent signifies the after tax cost of debt, calculated in terms of prevailing market rates of interest on equivalent debt.

The logic of using the WACC as criterion for investment decision making should now be clear. It represents the minimum rate of return required by a firms' suppliers of capital on marginal investments. These investments should therefore, in order to be acceptable, yield a rate of return as high or higher than this rate in order to be eligible for acceptance.

## 5.6 SUMMARY

In this chapter the relationship between the cost of capital and the objective of the firm viz. shareholder wealth maximization has been outlined. The cost of capital acts as a 'cut off' rate for new proposed investments in that the estimated rate of return on these marginal investments should be higher than the 'cost' in order to be acceptable.

Both explicit and implicit costs are involved in the cost of capital. Explicit costs prove to be relatively easy to calculate because they are mainly contractual in nature. Implicit costs, however, are much more complicated to establish since they are opportunity costs.

With regard to the cost of equity 'popular' methods in financial theory were investigated : the Gordon model and the capital asset pricing model were evaluated. Although both methods were found to have merits they were also found lacking in many respects. The CAPM, however, seems to be the most favoured of the two.

Although short term debt is not an ingredient of permanent financing as represented in the capital structure of a firm and should consequently not be normally used as a financing source for long term investment decision making, literature suggest that small businessmen in South Africa make extensive use of this source of financing in their investment decision making. It was therefore decided to conduct a review of the cost of short term sources of funds as a point of reference for later discussions.

The rationale for regarding the discount rate or cost of capital as the weighted average of the different component costs of capital in the capital structure is also outlined. This cost is then also a marginal cost which can be applied as criterion to marginal investment decisions, and can be weighted according to target proportions representing the optimal capital structure as perceived by management.

In the next chapter a study will be made of empirical studies conducted in the United States of America, the United Kingdom and the Republic of South Africa which have probed the place and calculation of cost of capital in actual investment decision making situations.

## CHAPTER SIX

### SURVEY OF EMPIRICAL STUDIES ON COST OF CAPITAL IN PRACTICE

#### 6.1 INTRODUCTION

The review of the studies embodied in this chapter give an indication of the relative degree of sophistication with which business people over a broad spectrum, interpret the concept of 'cost of capital' and its component costs.

One problem encountered in this review is that the size of businesses studied were not always clearly stated. Bearing in mind also that 'size' is a relative concept, it is in any event extremely difficult to equate any business of a 'size' like 'small or large' in another country to its counterpart in South Africa.

The first studies reviewed are those which examine cost of capital determination in the United States of America (USA).

#### 6.2 STUDIES ON COST OF CAPITAL IN THE USA

Several studies in the USA have been undertaken regarding cost of capital. Unfortunately no differentiation was made between listed and unlisted firms. The following studies pertain inter alia to the so-called 'small firm'. It must be

stated, however, that many of these so called 'small firms' are listed companies and by South African standards would probably be regarded as 'medium' or 'large'.

#### 6.2.1 THE SOLDOSKY STUDY

Robert Soldosky undertook a study on capital budgeting practices (section 8.2.3.2) among 'small firms'. In this study some questions on cost of capital featured prominently (Boyer 1974 : 7-10). The interviews conducted in the research probed methods of financing and the managers' views on the nature and measurement of the related costs.

##### 6.2.1.1 COST OF BORROWED FUNDS

Interest on borrowed funds was most often viewed in dollar terms rather than a rate or percentage. Interviewees seemed to be concerned about the amount of dollars they had to pay out.

Quite a substantial number of the respondents viewed the cost of debt to be higher than the cost of equity. This viewpoint according to Boyer (1974:9) is not consistent with financial literature for two reasons. Firstly there is a tax advantage on debt which reduces the cost and secondly the cost of owner supplied funds is supposed to be higher because of the risk factor it reflects.

#### 6.2.1.2 COST OF EQUITY

One fifth of the firms surveyed said that equity funds had no cost. The basis for this belief was that no cost outlay was required since dividend payments were optional.

Of the respondents 70 per cent considered the cost of equity to be a rate. The most commonly accepted definition of the 'rate' proved to be current earnings as a percentage of the book value of equity capital. None of the firms employed the earnings\market price ratio.

Very few respondents attempted a weighting process in the final computation of a cost of capital. Soldofsky expressed the feeling that this was beyond the conceptual framework of the respondents.

#### 6.2.1.3 CONCLUSIONS

Soldofsky's principle conclusions were that 'small businesses' are basically cash and profit orientated and are naive in their use of 'traditional' computation of cost of capital when making decisions.



### 6.2.2 THE GRAY, MONROE BIRD AND SCOTT STUDY

The Gray, Monroe, Bird and Scott study (1972: 1-9) focussed specifically on investment decision making (section 8.2.5) by 'small firms' which were defined as those having net assets of less than 1 million dollars.

From a random sample of 500 questionnaires sent to small manufacturers, 135 responses were received.

The Gray, et al. (1972:35) study indicated that 61 per cent of the firms used a basic standard of financial performance against which proposed uses of funds were appraised. The most popular procedure employed was to compare the expected rate of return on an investment proposal with the cost of a single source of funds. The respondents who used this type of procedure totalled 37 per cent; this amounted to 62 per cent of the 61 per cent above who said they used a screening rate.

Of the other respondents 13 per cent used some mix of financing costs such as an average overall cost of all sources of funds and 9 per cent used an historic 'hurdle rate', such as a historic return on investment.

This study certainly confirmed a lack of consistent understanding of the cost of capital concept among 'small firms' in the USA.

### 6.2.3 THE BOYER STUDY

By far the most significant contribution made to knowledge pertaining to the cost of capital of the 'small business' was an empirical study done by P Boyer (1974:43-44) in the USA. The sample was drawn from manufacturing firms in the Tidewater area in the state of Virginia. The population was limited to manufacturing firms since Boyer felt that capital budgeting was a more vital process for this type of business than retailing or wholesaling because of the heavier investment in long term assets. Size was determined on basis of an employment criteria of 250. This constituted a suggested maximum employment criterion for 'small business' laid down by the Small Business Administration of the USA.

In the area under surveillance 462 firms met this criteria. Firms consisted of sole proprietorships, partnerships and corporations. A sample of 30 firms was decided on and interviews were conducted personally by the author.

#### 6.2.3.1 COST OF DEBT

The cost of borrowed funds was commonly regarded as a rate rather than a dollar flow.

The respondents who felt that the cost of debt was greater than the cost of equity totalled 87 per cent. This could be understood since most respondents felt that equity had no

cost. Of those who viewed a cost of equity other than zero the following two reasons were given for debt cost being higher than equity:

- a) there is a cost of aggravation associated with borrowing and
- b) interest rates are higher than those of equity.

The author unfortunately, did not elaborate on the method according to which the 'interest rates' were calculated by respondents.

#### 6.2.3.2 COST OF EQUITY

Slightly more than 73 per cent of the interviewees regarded equity funds as cost free. The reasons suggested to back up this viewpoint were:

- a) there is no outlay as there is with interest;
- b) it cannot be computed;
- c) it is the owners money and need not be repaid.

Of the respondents considering a cost to exist for equity, 62,5 per cent viewed it as a rate rather than a dollar cash flow. Again the author did not elaborate on methods of calculation.

Others looked at it as being a cost for all funds (debt and equity), even if only an opportunity cost, while others did not compute the cost but did recognize its existence.

#### 6.2.3.3 CONCLUSION

This study did confirm that the concept of the cost of capital is only loosely and naively understood, if at all, by many small business firms in the USA.

It is a pity that the study did not probe the reasons why many respondents claimed that capital costs cannot be computed.

#### 6.3 A STUDY ON COST OF CAPITAL IN THE UNITED KINGDOM (UK)

Carsberg and Hope (1973:23-65) undertook a study in the UK with the specific purpose of evaluating a hypothesis that the investment appraisal practice commonly used in British firms contribute to a tendency to under-investment, (the meaning of 'under-investment' will become clear in due course).

The study also dealt with the cost of capital as an acceptance criterion for investment decisions.

The questionnaire pertaining to this study was sent to a sample of 325 companies chosen from 'The Times' list of 1000 leading UK companies for 1971-72. Financial and banking

institutions were excluded since most of their investments would be undertaken in financial markets and would consequently raise special problems of appraisal.

A total of 103 usable responses were received, which represented a response rate of 31,7 per cent.

#### 6.3.1 RESULTS

Table 6.1 reflects a list of some basic discount rates which were put to interviewees. They were asked to indicate, irrespective of whether they used an accounting rate of return method, or a 'discounting method', which of the following describes most closely how the basic discount rate should be selected.

TABLE 6.1

## CHOICE OF BASIC DISCOUNT RATE

	NO.
a) Rate charged on bank overdrafts	11
b) Actual rate of return on equity shares in your company over some past period	4
c) Actual rate of return earned on a diversified portfolio of equity shares over some past period	2
d) Current dividend yield on equity shares in your company plus an allowance for growth	3
e) Current redemption yield on government securities	0
f) Current redemption yield on fixed interest securities	0
g) Ratio of accounting profit to book value of equity (as per recent accounts)	4
h) Ratio of accounting profit to total assets at book value (as per recent accounts)	5
i) Coupon rate on fixed interest securities in your company	0
j) Some average of the above	14
k) Rate chosen by management as a matter of policy	59
l) Other	6
	<u>108</u>

Source: Carsberg and Hope (1973:58)

In answering the above question some respondents selected more than one option reflecting different rates in different situations, with the result that the total number of choices, 108 in all, exceeds the total number of replies.

The authors concluded that, the fact that the most popular method of setting a target rate involved policy considerations resulted in a rate that is not directly related to market factors.

Also the rate charged on bank overdrafts is not directly relevant to the appraisal of investment projects because it relates to a source of short term rather than long term capital. They furthermore state that the bank overdraft rate will normally also be lower than the cost of equity capital

and may tend to produce an underestimate of the weighted average cost of capital. According to the authors it is also apparent that firms selecting methods (b), (c) and (d) have little or no fixed interest capital. Since the cost of equity is generally supposed to be higher than the cost of fixed interest capital, these firms could reduce their cost of capital and hence may be under-investing. In other words the wealth of the shareholders could be enhanced by increasing long term liabilities, thereby reducing the acceptance criterion enabling more investment to take place. It was further concluded that firms which calculated their target rate of return as some average of basic rates (j), generally used some combination of rates (a), (c) and (f) or rates (b) and (i). These firms according to the authors, appears to operate closest to the prescriptions of financial theory in that they appear to have used a rate of weighted average of debt and equity in order to arrive at a weighted 'cut off' rate.

Finally, firms which used target rates of return equal to an actual accounting rate of return in a past period would be constraining future potential on the basis of past performance. These firms will then also suffer from the weaknesses of the accounting rate of return, amongst others its dependability on chance matters such as the average age of assets (section 7.5.1).

### 6.3.2 CONCLUSION

This UK study reveals much ignorance amongst supposedly sophisticated firms in the calculation of cost of capital. This ignorance seems to extend into the field of financial theory since no mention is made by the researchers of models utilized for the purpose of the calculation of the cost of capital like the 'dividend growth model' or the CAPM.

Most respondents seemed to rely on historical data, mostly based on accounting figures, and managements' intuition.

## 6.4 STUDIES ON COST OF CAPITAL IN THE REPUBLIC OF SOUTH AFRICA (RSA)

### 6.4.1 THE LAMBRECHTS STUDY

#### 6.4.1.1 INTRODUCTION

In 1972 Lambrechts (1976:27-31) conducted a survey on capital investment appraisal methods in the RSA (section 8.6.1).

The top 100 quoted companies (in terms of total assets) which appeared in the Financial Mail top 100 list in 1971 were approached in 1972. The assets of these companies ranged from R19 million to R290 million. Positive reactions were received from 57 of the 100 companies and of this number 48 were included in the investigation and personally



visited by the investigator. Of the 48 companies, 38 were in the manufacturing industry. In this study some pertinent questions were posed on cost of capital issues.

#### 6.4.1.2 SURVEY RESULTS

Lambrechts (1976:30) found that the figure being used as 'cost of capital' of the co-operating companies varied between 10 and 20 per cent (after tax) at the time of the interview.

Common methods for the calculation of the cost of capital were 'experience' and subjective evaluation (37 per cent), some form of weighted cost of capital (24 per cent) and profitability allowed by the price controller (11 per cent). The remainder of the interviewees (28 per cent) were not certain of their practice!

In cases where the cost of capital was estimated in terms of 'experience' and subjective evaluation no definite method, approach or policy could be specified. Lambrechts indicates that the following justification was common:

"A profitability of 25 per cent after tax is too high and would lead to new competition, 10 per cent after tax is too low because it does not compensate the firm for risk. Therefore, the cost of capital should be between 10 and 25 per cent after tax." (Lambrechts 1976 :30)

Unfortunately, Lambrechts does not specify whether the above stated 'profitability' refers to a profitability on total assets or on owners equity.

In applying the weighted cost of capital method, 6 of the 9 companies concerned used the present capital structure for weighting purposes and 3 used the expected structure. Market values were used by 5 companies to determine the weight for ordinary share capital while 4 companies used book values.

For determining the cost of equity capital, earnings per share were preferred by 7 of the companies and dividend per share by 2 companies.

#### 6.4.1.3 CONCLUSION

Lambrechts' study revealed a great deal of confusion with regard to the calculation of capital cost and more particularly that of equity cost. Ignorance regarding the calculation of equity cost in terms of discounted cash flow seemed to exist across the board. This can be viewed as a disturbing situation.

A subsequent study by Reeves, on investment decisions was undertaken seven years later. This study also focussed inter alia on cost of capital issues.

## 6.4.2 THE REEVE STUDY

### 6.4.2.1 INTRODUCTION

Reeve (1981:10-14) undertook a survey on business investment decisions (section 8.6.2) under conditions of inflation in the RSA, in 1978.

The subjects utilized for this survey were the top 100 South African companies in terms of asset size, given in the April 1977 edition of the 'Financial Mails' Top 100 Companies' report. Of the replies received 50 were deemed usable.

In order to establish whether inflation was correctly treated in the methods used in practice, firms were requested to supply, inter alia, details regarding the basic discount rate of return used in investment decisions.

### 6.4.2.2 RESULTS

Table 6.2 depicts a range of the actual discount rates used by South African companies in this study, the number of companies using a specific rate, the numbers that have chosen this rate as a matter of policy and details about when last this rate was altered.

TABLE 6.2

LEVEL OF TARGET RATE OF RETURN OF DISCOUNT RATE AND TIME SINCE LAST ALTERED

Rate used per cent	Number of companies using rate	Rate chosen as a matter of policy	Time since rate last altered (in years)							Not Disclosed
			<1	1	2	3	4	5	6+	
9	3	-			2					1
10	1	1		1						
12	5	5			2	1	1			1
13	1	-		1						
14	1	1						1		
15	9	3	1	3		2			1	2
16	1	1								1
17	4	3		1	1	2				
18	1	1	1							
20	3	2		1	1					1
22	1	-	1							
23	1	1		1						
25	2	2		2						
30	1	1					1			
Not disclosed	16	8	2	4	1					9
	50	29	5	14	7	5	1	2	1	15

Source: Reeve (1981:12)

It is notable that over 50 per cent of responding companies indicate that their rate had been chosen as a 'matter of policy'. This probably was a way of 'saving face' for many respondents who had no formal appraisal methods for capital budgeting at all.

Firms were asked whether the 'normal' discount rate was varied for individual projects. Of the respondents interviewed 70 per cent said that this was the case. They stated that adjustment was usually based on top management judgement taking into account the nature of the project (8 firms), the risk of the project (12 firms) and 'strategic' factors (14 firms). Finally the firms advised that in about

80 per cent of cases the rate was established by managers alone, whilst in the remainder of the cases the advice of consultants or writers in the field was sought.

The author, who made the somewhat sweeping assumption that the typical industrial company in the RSA is financed half by debt and half by equity arrived at a weighted average cost of capital, suitable for use as an investment decision discount rate of about 15 per cent in nominal terms.<sup>1</sup>

This was derived from available data of average interest yields on company debentures, changes in the consumer price index and average dividend yields on industrial shares. It was decided that 8 per cent was a fair estimate of the after tax cost of debt. The cost of equity was computed according to the Gordon model viz.

$d_1 = 12$  per cent and  $g = 10$  per cent.

$p_0$

The growth rate was obtained as follows:

The average dividend yield on industrial shares for 1971 was 6,4 per cent and that of 1977 11,5 per cent. This constitutes a growth rate of 10 per cent.

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1. The 'nominal rate' reflects a premium for inflation, contrary to the 'real rate' which does not.

How the 12 per cent dividend yield was derived at is however not at all clear.

The weighted average cost of capital was therefore computed as  $(1/2 \times 8 \text{ per cent}) + (1/2 \times 22 \text{ per cent}) = 15 \text{ per cent}$ . This compares against a range of 9 per cent to 30 per cent in table 6.2.

Since the inputs on the authors' capital cost computation were derived from capital markets, he regarded 15 per cent as a criterion and consequently stated that all companies with a higher cost would create a bias toward under investment.

It is unfortunate that Reeves made the assumption that the typical South African industrial company is financed half by debt and half by equity. This assumption has far reaching affects:

- \* it automatically leads to the implication that all firms have the same financial risk;
- \* it furthermore implies that target capital structures do not exist in the South African industrial sector and
- \* it is sure to present a distorted reflection of the weighted average cost of capital.

#### 6.4.2.3 CONCLUSION

A most serious deficiency was once again exposed by the Reeve survey: not one company seemed to be aware of the existence of the Gordon model or even the concept of dividend discounting in order to arrive at some kind of cost of capital. Neither did they seem to be aware of the CAPM.

It is a pity that Reeve did not ask any questions about the objectives of the respondents. This might have substantiated the suspicion that some or all of the firms concerned were inclined to confuse wealth maximization with book value maximization or maximization of earnings per share or profit maximization.

Another disturbing factor is that some firms use the overdraft rate as the discount rate. It has already been stated in the UK study that this rate cannot be used as cost of capital since overdrafts, being for short term financial requirements, ought not to form part of the capital structure. In this regard Pike (1983:37) warns specifically that overdraft rates are not reliable as a measure of a project's cost of capital (section 8.4.1.2).

#### 6.4.3 THE VAN WYK AND JOUBERT STUDY

van Wyk and Joubert (1987:42-44) made an empirical study using 21 selected shares on the Johannesburg Stock Exchange and applying the Gordon model and the CAPM alternatively to calculate the cost of equity of each company.

The shares selected were all classified as industrial and represented most of the various industrial sectors.

##### 6.4.3.1 METHODOLOGY

van Wyk and Joubert established the risk free rate from price movements in the RSA 2005 13 per cent stock. Calculating the growth rate percentage (g) provided significant problems according to the researchers. They point out that the Gordon model relies on the product of the percentage return on shareholder's funds (r) and the percentage of net income retained (b) to provide the growth figure i.e.  $g = rb$ .

With the present rate of inflation in the RSA, however, the return on equity as reported by companies is distorted. Some companies revalue their fixed assets which leads to less distortion. To complicate matters further, the period 1982 to 1985 included a severe economic recession. Eventually it was decided to accept published results on face value but use a five year average, 1981 to 1985, as approximations for r and b. The average earnings per share for this period was



divided by the average net asset value per share to provide  $r$ , while  $b$  was taken to be the average plough back percentage for the same period.

As far as dividends were concerned  $d_0$  was taken to be the last dividend if dividends were decreasing. If it increased,  $d_1$ , was set equal to  $d_0(1 + g)$  as required by the Gordon model. If the company suffered a loss,  $d$ , was assumed to be zero.

The JSE industrial index was used to indicate the market. The monthly change in the index, adjusted for the market dividend yield, was expressed as a total yield of the market, and this was compared to the yields of the selected shares to calculate betas.

#### 6.4.3.2 RESULTS

They were surprised to find that no less than 11 of the 21 companies had a cost of equity lower than the risk free rate when the 'Gordon model' was applied. The companies with traditionally good investor ratings viz. Trek, Sasol, Altech, Toyota, Dunlop, Nampak, Pepkor, Pick 'n Pay and Trenchor had a cost of equity higher than the risk free rate.

The Gordon model approach provided a cost of equity of between 4,57 per cent and 24,33 per cent for the 21 companies with an average of 16,01 per cent.

According to the Beta approach all companies had a cost of equity in excess of the risk free rate. The percentage cost was also much more concentrated under this approach and varied between 17,11 per cent and 20,73 per cent with an average of 19,14 thus exceeding the Gordon model approach by 3,13 percentage points.

A real disappointment for the researchers was that for three companies only viz. Trek, Nampak and Pick 'n Pay did the two methods provide a cost of equity figure within one percentage point of each other.

Their conclusion (for which they provide no rationale) was that the CAPM provides truer figures, although the range between the best and poorest companies appeared to be too small. This phenomenon appeared to have occurred due to the fact that during the period under review, the risk free rate was approximately 16,5 per cent.

Although the authors do not mention the returns on the market ( $k$ ) when this study was undertaken it appears that this situation could arise due to the fact that the difference between the risk free rate and the market rate of return at the time was relatively small. To illustrate, let us assume there are two companies A and B. A is a business cycle sensitive company and displays a beta of 2 (twice as risky as the market) whilst B the more stable company displays a beta of .5 (half as risky as the market). Let us further assume that  $r_f$  (the risk free rate) = 16 per cent

and  $k_m$  (the return on the market) = 18 per cent. The required rate of return for company A would be 20 per cent  $(0,16 + (0,18 - 0,16) (2))$  and company B 17 per cent  $(0,16 + (0,18 - 0,16) (0,5))$ .

The range is only 3 per cent. As the difference between  $r_f$  and  $k_m$  becomes bigger so does the range between the required rates of return. A possible reason therefore for the small range between the required rates of return of the more stable companies and the business cycle sensitive companies in the above study seemed to be a market return relatively little higher than the risk free rate of 16,5 per cent which prevailed at the time.

Further conclusions drawn by van Wyk and Joubert were that the results obtained by the Gordon model were suspect and its use should only be limited to the calculations of equity costs of very prosperous companies. van Wyk and Joubert do not elaborate on the rationale of this cryptic statement. If one accepts that a 'prosperous' company, is likely to have supernormal growth rates, the Gordon model cannot be used at all. A pre-requisite for the use of this formula is that  $k_i$  (the cost of equity capital) should be bigger than  $g$  (the growth rate) (Weston and Brigham 1978:647). Consequently, when the growth rate is very high this condition is unlikely to prevail. Weston and Brigham (1978:647) stipulate that the Gordon model can only be used for 'normal' growth firms, that is firms that display a growth rate similar to that of the Gross National Product.

van Wyk and Joubert concluded that preference for calculation of the cost of equity capital should be given to the more 'traditional' methods found in simple ratio analysis of financial statements. One can only assume they refer to methods discussed in sections 5.4.4.4-5.4.4.7 viz. rate of return on shareholders funds, dividend rate, dividend yield and earnings yield.

#### 6.4.3.3 CONCLUSION

The researchers might have improved the quality and value of their findings had they formulated their concept of the firm's 'financial objective' before they employed base value orientated methods for calculating the cost of equity capital.

#### 6.5 SUMMARY

Studies on cost of capital in the USA, UK and RSA seem to have exposed one common denominator: there is a widespread ignorance of time related methods by which cost of equity may be calculated. It furthermore appears that a serious information gap exists between decision makers and theorists.

A large number of inappropriate methods are employed in the calculation of equity costs ranging from subjective evaluation, management policy, overdraft rate to profitability allowed by the price controller.

Firms using the overdraft rate as a 'cut off' rate for investment decision making are particularly prominent and they ignore the fact that, overdraft facilities do not represent long term funds. To use the rate on these funds as cost of capital for long term decision making is consequently erroneous.

Smaller firms appear to be completely ignorant of cost of capital issues. Their attention appears to be focussed on cash and liquidity issues.

Chapter seven will deal with the actual selection of investments from among alternative investment proposals. Different methods will be evaluated in terms of their contribution towards the objective of the firm.

## CHAPTER SEVEN

### SELECTION FROM ALTERNATIVES

#### 7.1 INTRODUCTION

It has thus far being argued that the objective of the firm should be to maximize the utility of the consumption of the owners of the firm over time. This is achieved through the maximization of the market value of the ordinary shares.

The market value is a function of investor expectations regarding future dividends and future dividends are in turn dependent on future cash flows. In order that the acceptance criterion, which ought to be the cost of capital, be consistent with the objective and the method of measuring it, it has also been defined in terms of future cash flows.

It is logical to suppose that the price of a share on the market should reflect the cumulative results of a series of investment decisions that have been taken within the firm. It is furthermore logical to assume that the method that is used for the valuation of ordinary shares should also be used for investment decisions within the firm. The rationale for this being that if a certain investment proposal is evaluated according to a method that is consistent with the goal of wealth maximization, and it is found that it will contribute positively toward wealth maximization it will also contribute positively towards maximization of the share

price. The reason for this is that the evaluation method has taken into consideration the factors upon which the market price depends and operates. Thus, the method of measurement of any investment, whether it is an ordinary share or whether it concerns the purchase of a new forklift, will be the same as long as they are consistent with the goal of maximizing shareholder wealth.

Methods which take into account the factors upon which market price depends and operates are called discounted cash flow methods. These methods are discussed below.

## 7.2 DISCOUNTED CASH FLOW METHODS

### 7.2.1 NET PRESENT VALUE METHOD (NPV)

Weston and Brigham (1978:294) describe the implementation of this method as one by which the present value of the expected net cash flows of an investment is discounted by applying the weighted average marginal cost of capital as the discount factor. If the net present value is positive, the project should be accepted, and if negative it should be rejected. If two projects are mutually exclusive the one with the higher NPV should be chosen. The equation for this method can be depicted as follows:

$$NPV = \frac{F_1}{(1+k)^1} + \frac{F_2}{(1+k)^2} + \dots + \frac{F_n}{(1+k)^n} - I$$

In the above equation  $F_1, F_2, \text{ etc.}$  represents the net projected cash flows;  $I$  is the initial cost of the cash flows;  $k$  is the marginal cost of capital and  $n$  is the project's expected life.

According to Weston and Brigham (1978:295) the logic of this method can be seen in the fact that a project with a positive NPV will increase the value of the firm by the amount of the NPV.

Gup (1983:249) observed that the NPV method assumes that all positive cash flows are reinvested at the marginal cost of capital. However, actual reinvestment returns may differ from the original marginal cost of capital significantly, thereby distorting the meaning of the NPV.

A second problem noted was that the cost of capital is unrealistically assumed to remain constant throughout the life of the project (Gup 1983 : 249).

Thirdly the author argues that the concept of NPV is confusing to some managers in that they incorrectly interpret a project with a zero NPV as one with a zero return. Such a project, in fact promises the required rate of return. This difficulty can of course be overcome by suitably educating the decision maker.

A further problem noted by Gup (1983 : 249) arises when prospective mutually exclusive investments are of substantially different sizes. A project with a NPV of R500 would



for instance normally be preferred against a project with a NPV of R400. However the first project might require an investment of R1 million whereas the second might only require an investment of R50 000. Therefore the second project provides a larger return per Rand of investment and would accordingly boost shareholder's wealth to a greater extent. This problem can be avoided by converting NPV's to what is known as profitability indices.

### 7.2.2 PROFITABILITY INDEX

A profitability index is calculated by dividing the present value of future cash flows by the investment outlay. It shows the relative profitability of any project in terms of the present value of benefits per Rand of cost.

Moyer, et al. (1981:225-226) describe the method as follows:

"Any project whose profitability index is greater or equal to one is considered acceptable while a project having a profitability index less than one is considered unacceptable. The rationale for this being that when a project has a profitability index of one the present value of the cash flows is exactly equal to the net investment. Thus the project has a net present value of zero, meaning that it is expected to earn the minimum required rate of return (weighted average mar-

ginal costs of capital). In such a case the value of the firm will neither be increased nor decreased and the value of the shares will remain unchanged."

However, Moyer, et al. (1981:226) point out that if projects are mutually exclusive, not as a result of capital rationing (section 7.4.3) but because of technical considerations the normal NPV approach is preferred since it will select the project which is expected to generate the largest total Rand return. Capital rationing compels the firm to choose the profitability index approach since it will indicate which projects will maximize the return per Rand of investment, an appropriate objective when a funds constraint exists.

### 7.2.3 DISCOUNTED PAYBACK

Uliana, et al. (1987:221) describe this method as one which takes into account the time value of money. The discounted payback period is the time it takes for the present value of a project's cash flows to equal the cost of the investment.

This approach in fact provides more of a liquidity measure than one of profitability. Because it recognizes the time value of money, it would however, be more acceptable than its common counterpart which simply measures the payback period with no cognizance being taken of the time value of money. However in terms of underlying principles it does not differ from the payback period method (section 7.5.2) and will accordingly not be discussed further here.

#### 7.2.4 INTERNAL RATE OF RETURN (IRR)

Whereas the acceptance criterion for new investments viz. the marginal cost of capital was used in the NPV approach as the discount rate to be applied to expected cash flows, the marginal cost of capital is used in the IRR method as a 'cut off' point or hurdle rate that is compared against the internal rate of return of the investment.

The IRR is the direct rate that equates the present value of expected future cash flows or receipts to the initial cash outlay (Weston and Brigham 1978:295-296).

This time adjusted method of evaluation of investment proposals has the following equation for calculation:

$$\frac{F_1}{(1+k)^1} + \frac{F_2}{(1+k)^2} + \dots + \frac{F_n}{(1+k)^n} - I = 0$$

Here the value of I is known as well as the values of F1, F2 ... Fn, but the value of k is unknown. Some value of k will cause the sum of the discounted receipts to equal the critical cost of the project, causing the equation to equal zero. That value of k, which is the solution value of the equation, is defined as the internal rate of return.

It is significant to note that the same basic equation is used for the IRR and the NPV. In the NPV method the discount rate is specified and the NPV found, while in the IRR method the NPV is specified to equal zero, and the value that causes the NPV to equal zero is found.

Arithmetically the IRR is found by trial and error. An arbitrarily selected discount rate is initially used to compute the present value of an investment from the cash flows. This procedure is repeated using a rate which is judged to be 'closer' until the present value of cash flows from the investment is approximately equal to its cost.

The discount rate that brings about this equality is defined as the internal rate of return. The selection of any project using the internal rate of return method will depend upon the yield exceeding some minimum cost standard such as the marginal cost of capital. In effect, this means that if the internal rate of return equals the marginal cost of capital, the firm will be able to use the cash flow generated to repay the funds obtained, and to cover the cost of the funds (Weston and Brigham 1978 : 279). If the IRR exceeds the marginal cost of funds, the value of the firm will increase and if less, the value will decline. It is this breakeven characteristic that makes the IRR method very appealing.

Caution needs be exercised when the IRR method is used to evaluate mutually exclusive investment proposals of differing sizes. To avoid pitfalls in this respect it is wise for the decision maker to make use of the incremental approach to IRR where appropriate (Schall and Haley 1986 :213). This method consists of first determining whether the smaller investment opportunity alternative is the most profitable by applying the normal IRR approach. If it is, it is necessary to determine whether that opportunity is sufficiently more profitable than the alternative to warrant preference. The larger investment opportunity is preferred if the incremental IRR exceeds the cost of capital. To demonstrate, take for example two mutually exclusive investments D and E, involving outlays of R3 000 and R2 000 respectively. D has expected level cash flows of R900 per year for 5 years and E R610 per year for 5 years. Projects D and E promise expected returns of 15,2 per cent and 16 per cent respectively. Assume that the marginal cost of capital is 10 per cent. Because the smaller opportunity has a higher IRR, the incremental approach is appropriate.

To compare alternatives D and E using the incremental IRR method, it must be established whether an incremental investment of R1 000 in D as compared with E is justified. If D is picked instead of E an additional investment of R1 000 must be made and it would be expected to receive comparatively, an additional R290 for 5 years. The IRR on the additional investment is found to be 13,8 per cent. As the firms' cost of capital of 10 per cent is less than 13,8 per

cent D is preferred to E. Had the cost of capital however, been greater than 13,8 per cent, E would have been better than D. If the cost of capital had for example been 15 per cent E would have been chosen over D because the additional investment required by D would not provide a high enough rate of return.

The final step is to decide whether the better alternative, D, is sufficiently profitable to be acceptable. D is acceptable since its rate of return of 15,2 per cent exceeds the cost of capital of 10 per cent. If more than two mutually exclusive alternatives of different sizes are involved a series of comparisons would be necessary.

The IRR method has been criticized by reference to the following issues:

#### 7.2.4.1 THE REINVESTMENT RATE ASSUMPTION

According to Herbst (1982: 89) it may not be unreasonable to assume that a firm in a growth situation, where profitable investment opportunities exist, could reinvest cash flows at a rate of earning equal to the IRR. For other firms however, and government institutions, analysts think it more realistic that cash flows can be reinvested at a rate equal to the cost of capital. This he states is the usual formulation of the reinvestment rate assumption.

Herbst (1982: 89) now proceeds to consider the IRR and reinvestment rate in a rather controversial manner.

He furnishes an example of a R100,000 loan that is made by a bank to an individual business proprietor for a period of 5 years. The loan is repaid in equal instalments of R38,438 per annum. From the lender's viewpoint this investment has the following cash flows:

t = 0	t = 1	t = 2	t = 3	t = 4	t = 5
-----	-----	-----	-----	-----	-----
-R100,000	R33,438	R33,438	R33,438	R33,438	R33,438.

The yield (IRR) on the investment is 20 per cent.

From the borrower's point of view, the cash flows are identical except that the signs are reversed. The cash flows of the borrower are the cash flows of the lender multiplied by minus one:

t = 0	t = 1	t = 2	t = 3	t = 4	t = 5
-----	-----	-----	-----	-----	-----
+R100,00	-R33,438	-R33,438	-R33,438	-R33,438	-R33,438.

The effective cost on the loan to the borrower is 20 per cent. The borrower must earn at least 20 per cent per period on the loan just to be able to repay it. The pretax return to the lender on the investment (loan) cannot be less than the cost to the borrower. Even if the lender does not reinvest the cash flows as the loan is repaid the implicit return will still be 20 per cent. The return is measured as

a time-adjusted percentage of the principal amount outstanding, and is independent of what disposition is made of the cash flows as they are received.

Herbst (1982: 90) continues by observing that the uses to which the cash flows are put will have an effect on the organization. However, although the yield on funds originally invested may be increased by such uses, it cannot be reduced by lack of such investment opportunities. The author explains his stance by stating that the payments made by the borrower, once given over to the lender, can earn nothing for the borrower. The borrower must, in absence of other sources of funds, be able to earn 20 per cent per period on the remaining loan principal. If the borrower is unable to earn anything on the remaining loan principal, he or she must still make the required periodical payments. The payments, even if made from other sources of funds, will be the same as those required if the loan were to generate funds at 20 per cent per period. If funds must be diverted from other projects to repay the loan, the opportunity cost to the borrower may be more than 20 per cent, if the funds could have earned more than this percentage in other uses. The cost internal to the loan itself, however is 20 per cent. Table 7.1 depicts a breakdown of the loan payments into the principal and interest components implicit in the IRR method of rate calculation.



TABLE 7.1

COMPONENT BREAKDOWN OF CASH FLOWS

(Amounts rounded to nearest Rand)

I	BEGINNING PRINCIPAL	INTEREST ON PRINCIPAL	PRINCIPAL REPAYMENTS
1	100,000	20,000	13,438
2	86,562	17,312	16,126
3	70,437	14,087	19,351
4	51,086	10,217	23,221
5	27,865	5,573	27,865

Source : Herbst (1982: 91)

Herbst (1982: 90) points out that it should be noted that interest is computed at 20 per cent per annum on the beginning of period principal balance. The excess of payment over this amount is used to reduce the principal.

A second loan (to the borrower) will have identical cost of 20 per cent, but the principal is not amortized but paid in full of the end of the loan.

t = 0	t = 1	t = 2	t = 3	t = 4	t = 5
+R100,00	-R20,000	-R20,000	-R20,000	-R20,000	-R120,000

The borrower may place the loan principal in a bank account that pays exactly 20 per cent annually. At the end of each year the borrower withdraws the interest and pays it to the

lender. At the end of the loan the borrower withdraws the principal plus interest and repays the loan. Since he or she pays the interest to the lender as soon as it is earned, the person does not earn interest on interest. The bank pays the borrower exactly 20 per cent annually on the deposit, which he or she immediately turns over to the lender. The loan costs exactly equal the 20 per cent annual interest the bank pays the borrower for the deposit, so there is no gain to the borrower. (Transaction costs are ignored). For the lender the loan also yields exactly 20 per cent. There is, however, an important difference in that the lender may reinvest the interest payments if desired and increase the gain. The 20 per cent return remains the minimum return on the loan and this is independent of reinvestment opportunities. The reinvestment rate could be zero and still the lender would earn 20 per cent on the loan.

The only difference between the two loans, Herbst (1982: 91) points out, is the handling of the principal repayment. In the first case the principal is amortized over the life of the loan. In the second case the entire principal repayment is made at the loan maturity date. The first loan does provide better reinvestment opportunities to the lender since larger payments are received in all but the last year. Once again however, 20 per cent is the minimum return to be expected, even if the reinvestment opportunity rate were to be zero.

Herbst (1982: 91) observes that if a zero reinvestment rate is assumed and it is considered that the R100,000 principal is returned in equal installments of R20,000 over the five-year loan maturity it means that the amount of R13,438 over and above the principal repayment is earned on the remaining principal. The percentage return on the remaining principal in each year is then as shown in table 7.2.

TABLE 7.2

PER PERIOD RETURN ON REMAINING PRINCIPAL (CONSTANT AMORTIZATION OF R20,000 PER PERIOD)

T	PRINCIPAL REMAINING	PER CENT RETURN
1	R100,000	13,438
2	80,000	16,798
3	60,000	22,397
4	40,000	33,595
5	20,000	67,190

Source : Herbst (1982: 92)

The geometric mean return is 29,4 per cent, the arithmetic mean return is 30 per cent and the median return 22.4 per cent.

This treatment according to the author differs from the IRR formulation in assuming a fixed allocation of periodical payments to principal amortization rather than a gradually increasing amortization payment.

The principal is more quickly reduced, consequently yielding a higher return on that which remains.

These results Herbst (1982: 92) observes, do not require any reinvestment rate other than zero. They show however that the percentage return on an investment does not depend on the available reinvestment rate.

The available reinvestment rate will have an impact if greater than zero but that fact, the author observes, is a condition external to the investment.

The IRR is concerned with the internal characteristics only, and therefore provides a measure of the minimum return on investment.

Herbst (1982: 92) concludes that the conceptual difficulty with the reinvestment rate assumption arises from focusing on the superficial aspects of the mathematics of the IRR while neglecting the economic interpretation of the initial investment and the subsequent cash flows. Mathematics, the author states, is a tool in financial mathematics and economics the master. The reinvestment rate problem arises from confusion of this hierarchy, from trying to make

economics conform to mathematics. He finally states that the IRR might be called more properly return on invested capital to make clear its economic assumptions.

The IRR method implicitly assumes reinvestment at the internal rate of return and this is unrealistic (Herbst 1982:72).

#### 7.2.4.2 MULTIPLE RATES OF RETURN

Under certain conditions this method may produce multiple rates of return. This may occur when there is a mixed sequence of receipts and outlays in successive years over the life of the investment. For a simple investment there is an initial cash outlay followed by a series of net cash receipts in all successive periods. In a more complex case however, there may be periods with net cash outlays interspersed with those having net receipts. This situation generates multiple rates of return for the same investment and therefore produces a serious problem (Fremgen 1981:99).

#### 7.2.4.3 MAXIMIZING SHAREHOLDER'S WEALTH

Clark, Hindelang and Pritchard (1979: 94-95) observe that the IRR does a good job of measuring the compounded rate of return over time on the funds that remain invested in the asset, but the problem is that this figure has nothing at all to do with maximizing shareholder's wealth.

The authors state that a firm that attempted to maximize IRR could very well find that the highest IRR project had an original cost of R100 and a return next year of R150, leading to a 50 per cent IRR. Shareholders would be very pleased over the R50 return, but would raise more questions about how the remaining portion of the capital budget was invested. If management indicated that they did not want to invest any more than R100, because to do so would deteriorate the IRR below the very attractive 50 per cent level achieved, they might well lose their jobs. Clark, et al. (1979: 94-95) furthermore underline the fact that the NPV criterion shows clearly and unambiguously the impact of projects on shareholder's wealth or the present value of the firm. The same however, cannot be said of the IRR.

An example of three projects is furnished (Clark, et al. 1979: 94-95). The three projects have NPV's of R10,000, R14,000 and R16,000. These figures show the magnitudes of the increase in shareholder's wealth if the respective investments are accepted. On the other hand if these same projects have IRRs of 40 per cent, 30 per cent and 25 per cent respectively there is no indication which of the three will lead to the greatest increase in shareholder's wealth. The increase in shareholder's wealth can therefore be the opposite of the rankings indicated by the IRR.

Clark, et al. (1979: 95) also quote Keene (1974: 78-82) who regards the IRR method as invalid, not because of any implicit reinvestment rate assumption or because of the pos-

sibility of producing multiple yields but simply because a rate of return expressed in percentage terms is inappropriate for discriminating between projects of different sizes. All but identical projects have different sizes whatever their initial outlays or expected lives may suggest and although the IRR method might appear at times to give correct investment advice, it is never correct in principle.

#### 7.2.4.4 CONCLUSION

It is unfortunate that Pritchard, et al. (1979: 94-95) failed to relate the IRR to the firm's cost of capital: they take a rather incomplete view. Weston and Brigham (1978: 297) states explicitly and correctly that a firm's value increases if the IRR exceeds the cost of capital.

As regards the observations of Herbst (1982), some valid points are made which underline the limitations of the IRR method. Accordingly, while the IRR method of investment appraisal can be applied correctly at times, the NPV method must be preferred as being more generally valid. This matter is considered further in section 7.4.

### 7.2.5 TERMINAL VALUE

Strictly speaking, the 'terminal value' method is not a discounted cash flow technique. It is not widely accepted in financial literature.

The terminal value method differs from conventional DCF methods in that it handles the time value of money differently when calculating profitability. It assumes that all net cash flows are immediately reinvested, and that these cash flows are compounded forward at the reinvestment rate and accumulated to provide a terminal value at the end of the life of the project. This method is therefore different in that it accumulates cash flows whereas NPV and IRR discount it back to the present (Banda and Nolan 1971:15); (Porterfield 1965:37-41). Porterfield (1965: 35) indicates that under this method explicit assumptions are made as to reinvestment rates and future capital costs that are expected to prevail over the period in question. These rates and costs may differ from each other and may also vary over time. The author states that the major problem with this method is that of forecasting future reinvestment rates and capital costs under conditions of uncertainty. This is complicated by the dependence of tomorrow's opportunities upon the financial decisions that are made today. The approach is accordingly unacceptable and will not be considered further.



### 7.3 ACCOUNTING PROFITS AND THE SHAREHOLDER

Solomon and Pringle (1980:332) have attacked DCF methods for ignoring the effect of accounting profits on the perception of shareholders.

It is not unusual for a DCF validated investment to generate low, or even negative, net cash flows in early years, but substantial cash flows later on. In such cases, near term accounting profits of the firm can be adversely affected and investors on the stock market tend to react strongly to accounting profits. Accordingly, an apparently sound investment by the firm can lead to a drop in the share price rather than a gain.

This criticism of DCF methods is considered to be misdirected. In practical terms there is a duty on the part of directors to ensure that shareholders and the investment community are properly informed on the merits of company investments. Should the directors fail in this duty the situation described by Solomon and Pringle would apply. But the fault then lies with directors and not DCF methods.

### 7.4 NPV VERSUS IRR

The NPV method and the IRR method in most cases provide the same accept and reject decisions for specific projects. This means that for mutually exclusive projects, generally the one with the higher NPV or higher IRR, depending on the

method implemented, should be selected, whereas with independent projects, those with a positive NPV or an internal rate of return higher than the cost of capital should be accepted. There are however certain circumstances under which these methods can give conflicting answers.

#### 7.4.1 SIZE DISPARITY

Johnson and Melicher (1982:328) provide an example, the elements of which are depicted in Table 7.3.

TABLE 7.3  
NPV VERSUS IRR FOR SIZE DISPARATE INVESTMENTS

PROJECT	INITIAL OUTLAY	NET CASH INFLOWS END OF 1ST YEAR	IRR PER CENT	NPV AT 10 PER CENT COST OF CAPITAL
A	R10 000	R11 500	15	R454
B	R22 000	R24 860	13	R598

Although projects A and B both offer a rate of return greater than the cost of capital and have positive NPV's it is assumed that we cannot accept both, either because they are mutually exclusive or because the firm is constrained by capital rationing.

The first observation one can make is that the ranking provided by the NPV and IRR approaches are not the same. This difference exists because of an implicit assumption in

the IRR result concerning the reinvestment of the extra R12,000 that would be available if project A, rather than B, were selected. If project A is chosen on the basis of the IRR result there is an implicit assumption that the extra R12 000 can be reinvested in some other project for at least the same return as earned by project A, viz. 15 per cent. This is an unrealistic assumption and the fact is pointed out by Johnson and Melicher (1982:329). They observe that if shareholders have established the firms marginal return at 10 per cent it cannot be assumed that investment opportunities for the excess cash will yield 15 per cent; certainly not if the firm remains in the same risk class.

Table 7.4 depicts the situation where the proper theoretical assumption is made that the extra R12 000 can be reinvested in some project C at the marginal rate of 10 per cent. The terminal value at the years end of this investment strategy will be R24 700.

TABLE 7.4

INVESTMENT OF EXTRA R12 000 (PROJECT C) AT 10 PER CENT

PROJECT	INITIAL OUTLAY	IRR PER CENT	CASH EARNINGS END OF YEAR	NET CASH INFLOWS END OF YEAR
A	R10 000	15	1 500	R11 500
C	R12 000	10	1 200	R13 200
A & C	R22 000			R24 700

Source: Johnson and Melicher (1982:329)

The terminal value of project B however is R24 860 (table 7.3). Accordingly there is no doubt that B is a better investment than A which has an effective comparable terminal value of R24,700. It is thus clear that in these circumstances the NPV approach provides a more valid ranking of the two projects.

#### 7.4.2 TIME DISPARITY IN GENERATION OF CASH FLOWS

The problem of underlying assumptions also arises when there are timing disparities in the cash flows of mutually exclusive investment alternatives. To illustrate the difficulty, the NPV's and IRR's are calculated for mutually exclusive projects D and E having the cash flows reflected in table 7.5.

TABLE 7.5

CASH FLOWS OF PROJECTS D AND E

YEAR	PROJECT D	PROJECT E
0	-R10 000	-R10 000
1	4 200	7 000
2	4 200	4 000
3	4 200	1 000

Source: Johnson and Melicher (1982:329)

In contrast to the level cash inflows for project D, cash inflows decrease over time for project E and the relative NPV's, calculated at a variety discount rates, are shown in table 7.6.

TABLE 7.6

RELATIVE NPV'S CALCULATED AT VARIOUS DISCOUNT RATES

COST OF CAPITAL DISCOUNT RATE (PERCENTAGE)	NPV	
	PROJECT D	PROJECT E
0	R2 600*	R2 000
5	1 437*	1 156
10	441*	418
12	88	151*
14	-252	-110

Source: Johnson and Melicher (1982:330)

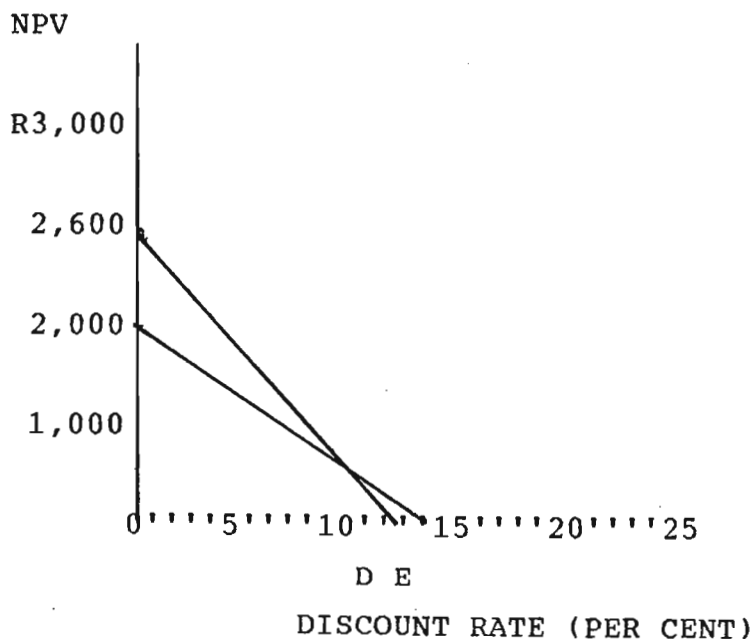
\* The project which would be preferred

From table 7.6 it is evident that project E has lower NPV's for discount rates of 10 per cent and below. Above 11 per cent (the cross over point) project E would get preference over project D until the point where neither project would be acceptable. This is depicted graphically in figure 7.1. By contrast, the IRR for project D is 12,52 per cent and for

E it is 13,6 per cent. The IRR method would thus consistently favour project E until the cost of capital exceeds its IRR when neither project is deemed feasible.

The differing results between the two methods has to do with the reinvestment rate assumption viz. that the NPV method assumes reinvestment at the marginal cost of capital whereas the IRR method assumes reinvestment at the internal rate of return.

FIGURE 7.1  
PRESENT VALUE PROFILE FOR CASH FLOWS OF PROJECTS D AND E



Source: Johnson and Melicher (1982:330)

In summary it can be said that the NPV of project E is higher than D when the cost of capital is 11 per cent or more. Above 11 percent it is also consistent with projects' E higher IRR of 13,16 per cent. Below 11 per cent, however,

conflicting rankings exists. Johnson and Melicher (1982:331) suggests that when this disparity exists the NPV method is preferable since it assumes that cash flows are reinvested at the usually more conservative firm's marginal cost of capital rather than at the IRR. This approach is however debatable : neither approach is totally satisfactory.

#### 7.4.3 CAPITAL RATIONING

When there is no capital rationing and the cost of capital is not expected to change, a firm's value is maximized when it accepts all projects with a NPV of zero or greater (Gup 1983:255).

When a firm operates in the above manner it adheres to the laws formulated by the economic theory of the firm, namely that it should operate at the point where marginal revenue is just equal to marginal cost. When this rule is applied to the capital budgeting decision, marginal revenue is taken to be the percentage rate of return on investments while marginal cost is the firm's marginal cost of capital (Weston and Brigham 1978:286).

However, when capital rationing does exist value maximization cannot be achieved because the firm has to forego some profitable projects. The firm can therefore only maximize its value subject to the capital it has available.

Two basic approaches to capital rationing are the IRR and NPV approaches:

#### 7.4.3.1 THE IRR APPROACH

According to Gitman (1988 : 357-358) the IRR approach involves selecting the investment projects yielding the highest IRR's (provided their yields exceed the cost of capital) within the budget constraint. The problem however with the IRR method is that it does not guarantee the maximum Rand return to the firm. Table 7.7 depicts six investment projects indicating their relative Rand sizes, present values and IRR's.

TABLE 7.7  
INVESTMENT PROJECTS COMPETING FOR A FIXED BUDGET OF R250 000

INVESTMENT	INITIAL INVESTMENT	PV OF INFLOW AT 10 PER CENT	IRR (PER CENT)
A	R 80 000	R100 000	12
B	R 70 000	R112 000	20
C	R100 000	R145 000	16
D	R 40 000	R 36 000	8
E	R 60 000	R 79 000	15
F	R110 000	R126 500	11

Source : Gitman (1980 : 357)



Table 7.7 indicates that the hypothetical firm is confronted with six projects competing for the firm's fixed budget of R250 000. If it is furthermore assumed that the firm has a cost of capital of 10 per cent only projects B, C and E should be selected under the IRR approach. These three projects will absorb R230 000 of the R250 000 budget. There is no guarantee however that projects B, C and E will maximize, total Rand returns and therefore owner's wealth. This problem will be cleared up when the NPV approach is discussed.

#### 7.4.3.2 THE NPV APPROACH

'The NPV approach is based on the use of present values to determine the group of projects that will maximize owner's wealth. It is implemented by ranking projects on the basis of IRR's and then evaluating the present value of the benefits from each potential project to determine the combination of projects with the highest overall present value. This is the same as maximizing net present value, since whether the entire budget is used or not, it is viewed as the total initial investment. The portion of the firm's budget that is not used does not increase the firm's value. At best, the unused money can be invested in marketable securities or returned to owners in the form of cash dividends. In either case the wealth of the owners is not likely to be enhanced' (Gitman 1980 :357-358).

It was noted that if the IRR approach is implemented to select the best possible combination of projects for the capital budget of R250 000 projects B, C and E would have been selected. These projects however which together require R230 000 yield a present value of R336 000. However, if projects B, C and A were selected, which together require R250,000 the present value of the expected cash flows would be R357 000. This is greater than the return expected from selecting the projects on the basis of their IRR's. Gitman (1988 : 358) observes that the firm's objective is to use its budget to generate the highest present value of inflows. Assuming that any unused portion of the budget does not gain or lose money, the total NPV for projects B, C and E would be R106 000 (R336 000 - R230 000), whereas for projects B, C and A, the total NPV would be R107 000 (R357 000 - R250 000). Selection of projects B, C and A would therefore maximize NPV.

It would be appropriate under conditions of capital rationing to choose projects which yield the highest NPV provided there is no great size disparity. In the latter case, conversion to the profitability index would provide a more reliable indicator (section 7.2.1).

Uliana, et al. (1987: 288) observe that manual manipulation of possible combinations becomes onerous when a firm is faced with hundreds of possible investments. To solve this,

techniques such as linear programming have been developed. Due to complexity and cost however, widespread use of these techniques is limited at present.

#### 7.4.4 CHOICE BETWEEN NPV AND IRR

In most instances the NPV and IRR methods will generate identical results. However, Gitman (1985:354) asserts that on a theoretical basis the NPV method is far superior to the IRR method in that the former method assumes reinvestment at the marginal cost of capital whereas the IRR method assumes reinvestment at the higher IRR. Choice of the NPV method accordingly eliminates the anomalies discussed earlier and also avoids the possibility of having more than one answer for the same cash flow data; a possibility which does arise when using the IRR method.

In spite of the superiority of the NPV method, evidence led by Gitman (1985:356) suggests that financial managers of large companies prefer the IRR method. This preference Gitman ascribes to a general disposition of business people to relate more easily to rates of return rather than to the monetary results of NPV calculations. This is probably the case because interest rates and profitability measures are in everyday life most often cited as annual rates. Consequently IRR measures make sense to decision-makers. They find it easy to relate to such numbers.

The same people find NPV results harder to comprehend since they do not really reflect the benefits relative to the amount invested.

In the final analysis what is of overriding importance in relation to both the NPV and IRR methods of evaluating investment proposals is the fact that both are consistent with the objective of the firm namely the maximization of owners wealth which is attained through the maximization of the market value of the ordinary shares. Despite their flaws both measure proposed investments in terms of time adjusted cash flows and as such both are superior to any other evaluation method available today.

#### 7.5 USE OF OTHER METHODS

Financial literature identifies two other basic methods which are used in practice for determining the acceptability of capital expenditure alternatives.

Gitman (1985:338) regards both as unsophisticated capital budgeting techniques which can furnish false signals. The first of these is known as the average rate of return method.

### 7.5.1 AVERAGE RATE OF RETURN METHOD

This method is a popular approach for evaluating proposed capital expenditures in that it is calculated from accounting data (profits after taxes). The average rate of return method, also called 'accounting rate of return' is calculated as follows:

$$\text{Average rate of Return} = \frac{\text{average profits after taxes}}{\text{average investment}}$$

Average profits after taxes are found by adding up the after tax profits expected for each year of the project's life and dividing the total by the number of years.

Average investment is found by halving the initial investment. The averaging process implies that the cost of the asset is written off at a constant (straightline rate) over the life of the project. This in effect means that, on the average, the firm will have one half of the assets' initial purchase price on the books.

The division of the average profits after taxes by the average investment, results in the average rate of return for each project (Gitman 1985:340).

Variations of this method do exist. One approach involves using average annual cash inflows instead of average annual accounting profits as numerator.

Another approach is to use the initial investment rather than the average investment as denominator in the ratio. This approach will half the percentage answer.

Gitman (1985:340) points out that in order to use this general approach for decision making, the decision maker must compare the average rate of return against some predetermined 'cut off' rate or minimum acceptable rate of return.

#### 7.5.1.1 ADVANTAGE OF THE AVERAGE RATE OF RETURN METHOD

Gitman (1985:340) observes that the only advantage of this method appears to be its ease of calculation. The only inputs, being projected profits are easily obtainable.

This advantage is however overwhelmingly outweighed by the methods' weaknesses.

#### 7.5.1.2 DEFECTS OF THE AVERAGE RATE OF RETURN

The average rate of return method's key weakness lies in the fact that it is unable to specify the appropriate average rate of return in light of the wealth maximization goal. This is so because share values are not a function of average rates of returns. Instead this method which is book value oriented, has as its implicit objective, the maximization of the book value of the ordinary shares.

A second weakness stems from using accounting data which, amongst other things, ignores the time value of money.

These weaknesses of the average rate of return method are so limiting that it renders the method totally unacceptable.

#### 7.5.2 PAYBACK PERIOD

Henderson, et al. (1985:126-127) suggest that this method of evaluation of investment proposals is simple, easy to explain, and, because of its widespread use, has been sanctified. Its' shortcomings are however, of such a nature that this method is completely unsatisfactory from a theoretical viewpoint.

This method is described as the length of time it takes to recover the initial investment on a project. For example, if a R1 000 investment returns an after tax cash flow each year of R400, the payback period is 2 1\2 years ( $1\ 000/400$ ). This method dictates acceptance of a project only if the project has a payback period less than some level specified by management. In comparing 2 alternatives using this method, the 1 with the smaller payback period is preferred and is accepted provided its payback period is less than the specified requirement.

#### 7.5.2.1 ADVANTAGES OF THE PAYBACK PERIOD METHOD

An argument for payback is that a firm with cash shortages should give great emphasis to a quick return of its funds in order that they may be put to use in other places. However, better methods exist for handling cash shortages (Weston and Brigham 1978:293-294).

Payback is furthermore defended on grounds of its impact on earnings per share. Typically, projects with faster paybacks have more favourable short run effects on earnings per share. On the other hand it can be said that firms using payback for this reason may be sacrificing future growth for current accounting income, and in general such a practice will not maximize the value of the firm if the shareholding public are properly informed by directors on investment merits.

Ease of application is probably the most important advantage of this method (Weston and Brigham:1978:293-294).

Payback is sometimes defended on grounds that after the payback period the uncertainty may be so great for some projects, that requiring recovery of capital within that period is a good way to avoid undue risk. However, the risk is rarely so great that returns beyond payback should be completely ignored (Schall and Haley 1986:218).



A good point in favour of the payback method is that if a firm is making many small capital expenditure decisions, the cost of using more complex methods may outweigh the benefits of possibly better choices among competing projects (Weston and Brigham 1978:294). The authors furnish an example of electric utility companies which employ very sophisticated capital budgeting techniques, using discounted cash flow principles for large projects but payback on certain small replacement decisions. When these sophisticated companies do use the payback method, they do so after studies have shown that the payback method will provide sufficiently accurate answers for the decisions at hand. Weston and Brigham also state that many firms use payback in combination with discounted cash flow procedures. The latter method is used to appraise projects' profitability while the payback method is utilized to show for how long the investment will be at risk. In other words it is used as a risk indicator. The longer the payback period, the longer the investment is regarded to be at risk. It is also pointed out that recent surveys indicate that when larger firms use payback in connection with major projects it is almost always used in this manner.

In the last instance one can add that the use of payback period method provides a firm with some flexibility in that funds need not be locked into a project for too long.

#### 7.5.2.2 DISADVANTAGES OF THE PAYBACK PERIOD METHOD

The payback method fails in that it does not consider returns after the payback period. If the project is one that matures in later years, the payback period can lead to the selection of less than optimal desirable investments (Schall and Haley 1986:217).

It is furthermore indicated that the payback method fails in that it ignores the time value of money. Benefits occurring in all the years are given the same value.

#### 7.5.2.3 EVALUATION OF PAYBACK PERIOD

Williams (1982:38) states that ever increasing levels in the sophistication of techniques for appraising investment have led to a situation where the humble payback time criterion is today viewed with some disdain. He feels that the criticisms are justified because the complexities which discounted cash flow were designed to handle are real enough whilst payback in its simplicity evades issues. The question is then posed as to what actually preserves the longevity of the payback criterion.

In this regard Piper (1981:20) indicates that although surveys show that the use of DCF are on the increase, payback holds a significant position in project analysis and might even be on the increase in relation to DCF.

Andrews and Butler (1986: 31-37) have however indicated in a recent study that just the opposite has happened in the RSA.

Williams (1982:38) is adamant that payback's longevity is due to the diversity of groups associated with investment in capital projects. The people involved may be designers, project engineers, marketers or production managers, each of whom faces complexity in his own sphere. They do not wish to be confused by financial analysis and have an essential need to establish a simple relationship between capital and revenues. To them financial analysis is worthless if it does not convey the effects of decisions which they are making. They would, Williams argues, prefer to be approximately right rather than precisely wrong and they would prefer to do so rather early in a project than later.

Williams does not provide reasons why the choice falls on payback but his reference to decision makers who prefer to see the impact of their decisions early rather than later implies that the payback period methods' simplicity enables them to utilize a method where they can appreciate results quickly. To them the investment proposal with the fastest cash flow will be the most acceptable.

To overcome what is clearly a communication problem, training is required. This would ensure that professional people will be better equipped to appreciate the sophistication of more appropriate evaluation techniques.

Progress should not be stifled because some people are reluctant to adapt. Widespread ignorance of decision makers<sup>1</sup> can very well be the reason why so many listed as well as unlisted companies of various sizes in the United States the United Kingdom and in the Republic of South Africa prefer payback period method, either exclusively or in conjunction with another method.

The crucial question, in the final analysis, remains whether the measurement of proposed investments in terms of the payback period method is consistent with the firm's objective of wealth maximization as manifested in the maximization of share values. In this respect the method quite clearly fails. It would be consistent with the wealth maximization objective only if share values were a function of payback period.

### 7.5.3 THE CAPITAL ASSET PRICING MODEL (CAPM)

The CAPM can, apart from being used as a model for the calculation of cost of equity, also be used as a valuation model for prospective investments. Its name denotes its function, it is a model that prices capital assets.

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1. See Soldofsky and Olive (1974:12).

Whereas valuation models always have a rate at which future returns are discounted to arrive at a value and this rate is often subjectively calculated, the CAPM provides a model for calculating this rate (Uliana et al. 1987:187). This rate as was already established, is termed the required rate of return and depicts that minimum rate that induces an investor to buy and hold a security. This rate equals the risk free rate plus a risk premium ( $r_f + p$ ) for any security with a given level of risk.

Martin, et al. (1979:348-349) provides the following example to explain the CAPM method of valuation. If the expected return on the market ( $r_m$ ) as a whole (diversified market portfolio, like Johannesburg Stock Exchange) is 12 per cent and the risk free rate ( $r_f$ ) is 8 per cent, the risk premium on the market portfolio would be 4 per cent.

This in effect means that the same risk premium would apply to any security having systematic risk equivalent to the general market, or a beta of 1.

As previously stated (section 5.4.4.2) a firm or security with a beta of 1 means that it is as risky as the market portfolio, a beta of 2 denotes twice as risky as the market whereas a beta of ,5 denotes half as risky as the market.

Let it now be assumed that a firm with a beta of 2 wants to make a marginal investment in a security with the same beta having an expected annual return of 14 per cent.

By applying the equation of the CAPM the marginal investment should have the following required rate of return:

$$\begin{aligned} r_e &= r_f + b (r_m - r_f) \\ &= 0,8 + 2,0 (0,12 - 0,08) \\ &= 0,16 \text{ or } 16 \text{ per cent} \end{aligned}$$

In the above case the security should not be acquired since the required rate of return (16 per cent) is higher than the expected rate of return (14 per cent).

The CAPM, as a market price for risk measure, provides a risk adjusted required rate of return for analyzing risky projects (Weston and Brigham 1978:374).

This discount rate can be utilized in the basic capital budgeting equation that was discussed in chapter four. It was also mentioned in chapter four that one way to treat risk was to adjust the denominator of the equation. Since we are, however, only evaluating projects that are in the same risk class as that of the firm its use in that respect would be restricted to a risk adjusted rate that is relative to that specific firm's beta.

Evaluation of marginal investments by the CAPM model is not appealing for the following reasons:

- \* Investments in assets or securities implies a long term commitment with cash flow expectations emanating over many years. As we have already stipulated the CAPM is a one period model.

Freear (1980 :274) refers to Fama (1970 :163-174) who has demonstrated that an investors utility function with regard to risk exhibits similar characteristics whether it is a single-period function or part of a multi-period function. Freear (1980:274) asserts however that the CAPM remains incapable of handling irregular returns over time. This he states is hardly surprising, given that theories which allow for portfolio revision over time are still at an early stage of development.

- \* The security market line which depicts the market price for risk and which is assumed to be a composite of the utility functions of all investors can change overnight. This can happen as a result of a change in systematic risk which is a function of factors inter alia like depression, inflation, political events, international incidents and war.

- \* Firms evaluating only investment proposals that fall into a risk class equal to its own would probably not be diversified. This means that such a firm cannot compensate for unsystematic risk.

This approach clearly does not contribute to the objective of the firm: since it is a one period model it ignores future streams of benefits.

## 7.6        SELECTION FROM ALTERNATIVES UNDER CONDITIONS OF INFLATION

### 7.6.1      INTRODUCTION

Inflation has been running double digits in the South African economy since 1973 (Reeve 1981 : 9). It is therefore important to analyze the effects, if any, that inflation will have on the capital budgeting decision (Uliana, et al. 1987:232).

### 7.6.2      THE DISCOUNT RATE

Uliana, et al. (1987:22) say that the marginal cost of capital used as a discount rate to evaluate marginal investment decisions will include an inflation premium.

The reason for this is that investors will attempt to protect themselves against a decline in purchasing power, by including an adjustment for inflation in the required rate of return. The company's cost of capital is therefore a 'nominal' rather than 'real' rate, because it takes into account expected inflation.



The authors state the nominal rate as follows:

$$M = [(1 + R)(1 + i)] - 1$$

where

M = nominal rate of return

R = real rate of return

i = expected inflation rate

If a firm requires an investment to earn a real rate of return of at least 6 per cent and the expected inflation rate is 15,1 per cent, then projects must provide a nominal return of at least 22 per cent. The following equation depicts the situation:

$$\begin{aligned} M &= [(1,06)(1,151)] - 1 \\ &= 0,22 \text{ or } 22 \text{ per cent} \end{aligned}$$

A return of 22 per cent will protect the firm against the loss in purchasing power and also provide a real rate of return of 6 per cent.

The real rate can thus be stated as:

$$R = [(1 + M)/(1 + i)] - 1$$

### 7.6.3 INVESTMENT BIAS

Companies sometimes estimate future cash flows at current prices but discount these flows at a nominal rate. In other words inflation is ignored in the numerator but not in the denominator of the NPV equation. This situation, where future cash flows are incorrectly stated in real terms but the discount rate in nominal terms, can result in an unjustified bias against long term investment projects (Uliana, et al. 1987:232).

It is essential according to Uliana, et al. (1987:234) to adjust cash flows for inflation. If this is not done, the bias against investing in long term assets would be extremely prejudicial to the firm.

### 7.6.4 DISCOUNTING CASH FLOWS AT THE 'REAL RATE' OF RETURN

If on the other hand, cash flows are projected in nominal terms and the discount rate used is expressed in real terms with no allowance for inflation poor investment projects will be mistakenly accepted, thereby eroding the value of the firm in real (purchasing power) terms.

#### 7.6.5 CONCLUSION

Discounting cash flows projected at current prices at the 'real rate' results in the same NPV as discounting nominal cash flows at the nominal rate of return (only a slight difference might occur as result of rounding).

Uliana, et al. (1987:234) stress, however, that conceptually the former approach assumes inflation neutrality in that inflation affects all components of net cash flows equally. The nominal approach on the other hand allows specific price changes to be taken into the NPV analysis e.g. if the general inflation rate is expected to be 12 per cent but wage rates are expected to rise by 15 per cent, this may be taken into account.

#### 7.6.6 TAX ALLOWANCES

A second objection to using the 'real' approach refers to the effects that inflation has on tax allowances based on historical cost. The initial allowance<sup>2</sup> and the wear and tear allowance 'shield' a certain portion of income from being subject to tax.

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2. Plant and machinery which is used in a process of manufacture or similar process and is brought into use for the first time on or after, 1 January 1989, qualifies for a depreciation tax allowance of 50 per cent in the year of assessment the asset is brought into use, and 30 per cent and 20 per cent in the second and third years respectively. (Income Tax Act No. 90 of 1988 amending Income Tax Act No. 58 of 1962).

These tax allowances, however, are based on historical cost and therefore do not keep up with inflation. An increasing part of income therefore becomes subject to tax and a projects' NPV declines (Uliana, et al. 1987:234).

Accordingly, the NPV of an investment's after tax cash flow which is projected at today's prices and discounted at the real rate of return, will be higher than the NPV calculated by using after tax cash flows at future nominal prices discounted at the required nominal rate of return.

The presence of inflation therefore results in lower real rates of return and less incentive for companies to undertake capital investments. The cash flow situation is improved with accelerated depreciation but the same unfavourable comparisons remain. There simply is a disincentive for companies to undertake capital expenditures, so they typically invest less and become less capital intensive in periods of inflation (van Horne 1983:127).

During inflationary periods, tax allowances based on historical cost may also have the following real effects:

- \* A lower capital/labour ratio due to the effective increase in the cost of the investment.
- \* The rankings of mutually exclusive projects may change if the timing of tax allowances of various projects differ.

- \* Short term investment will be preferred as tax allowances will keep up at a faster rate with inflation due to the more frequent replacement of projects.
- \* Old machinery with high operating costs may be preferred to new machinery with lower operating costs. The old machinery's higher operating costs are tax deductible and will keep up with inflation whereas, tax allowances on new machinery, will not keep up with inflation.

The possibility, however, still remains that the benefits that could be reaped from improved technology could be so great that it could offset disadvantageous cash flows resulting from tax allowances based on historical costs.

In the Republic of South Africa a lower capital/labour ratio, apart from its disadvantages, might at least be beneficial in the sense that it could lead to fuller employment of labour. The condition of course for the above to prevail is that market opportunities should be taken and that labour intensive discounted cash flows should be at a lower rate. Otherwise a negative multiplier effect could result.

## 7.7 SUMMARY

The goal in this chapter was to identify different methods of evaluating prospective investment proposals. It was more specifically endeavoured to isolate methods that are consistent with the goal of wealth maximization and consequently maximization of the share price, from methods that are not.

It was found that discounted cash flow methods viz. net present value, internal rate of return and the profitability index take into account the factors upon which market price depends whereas non discounted cash flow methods do not. Of the latter, the payback period and average rate of return methods were found to be invalid despite their being widely used. Their continued popularity seems to stem primarily from their simplicity of application. The third of the non discounted cash flow methods i.e. the capital asset pricing model which evaluates prospective investments in a portfolio context, is utilized for new investments which fall in the same risk class as that of the firm. The volatility of factors upon which systematic risk depends as well as its inability to incorporate a stream of benefits beyond one year are severe limitations.

It is finally noted, that under conditions of inflation where cash flows are sometimes stated in current terms and the discount rate in nominal terms a bias can develop towards underinvestment. A second case where a bias can develop against underinvestment relates to tax laws in the

RSA. Tax allowances that shield a portion of income from being taxed are based on historical cost and not replacement cost. This leads to an increasing portion of future income being taxed which on it's part leads to lower or even negative NPV's.

In the next chapter a survey will be made of empirical studies on investment decision making of listed and unlisted firms in the United States of America, the United Kingdom and the Republic of South Africa.

## CHAPTER EIGHT

### EMPIRICAL STUDIES OF THE PROCESS OF INVESTMENT DECISION MAKING

#### 8.1 INTRODUCTION

Whereas chapter six dealt with empirical studies concerning the acceptance criterion (cost of capital) of investment decision-making, this chapter deals with empirical studies relating to the methods of measuring investment proposals.

As in chapter six, the orientation here is to establish whether methods of measuring investment proposals are consistent with the objective of the firm, namely maximization of the utility of the consumption of the owner's of the firm over time. As already stated this objective is attained through maximizing of the market price of the ordinary shares of the investing company.

In this respect, interesting studies, out of which significant findings have emanated have been conducted in the USA, the UK and the RSA. A closer look will now be taken at these surveys on investment decision making.



8.2            SURVEYS ON METHODS OF INVESTMENT DECISION MAKING  
UNDERTAKEN IN THE UNITED STATES OF AMERICA (USA)

8.2.1        THE FREMGEN SURVEY

Fremgen (1981:94-98) conducted a survey on capital budgeting practices in the USA<sup>1</sup>

A questionnaire containing 25 questions about capital budgeting practices was sent to the financial executives of 250 business firms. The firms in the sample were selected randomly from Dun and Bradstreet's Reference Book of Corporate Managements.

Questionnaires were sent to companies engaged in manufacturing, retailing, mining, transportation, land development, entertainment and utilities. Unfortunately the researcher does not indicate whether the survey included both listed and unlisted companies.

Respondents were asked to indicate the sizes of their firms' annual capital budgets.

They were further questioned on the following matters:

- \*     methods employed in evaluating prospective investment proposals;

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1.     It must be pointed out that although this article was published in 1981, the actual survey took place in May, 1973.

- \* mutually exclusive investments;
- \* multiple rates of return;
- \* rate of return on reinvestment;
- \* risk and uncertainty and
- \* capital rationing.

The results of the survey will now be dealt with according to the above sequence.

#### 8.2.1.1 METHODS EMPLOYED IN EVALUATION OF PROPOSED INVESTMENTS

Respondents to the questionnaire were asked to indicate which of the following five methods (which were described to them) they actually used in evaluating a proposed capital investment. (If other methods were used this was to be indicated):

- \* internal rate of return (IRR);
- \* net present value (NPV);
- \* profitability index (PI);
- \* payback period and
- \* simple rate of return.<sup>2</sup>

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2.

Computationally, this is similar to the return on investment in assets calculated from financial statements of the end of a year. It is the expected average annual net income from an investment divided by the initial outlay for that investment. It is sometimes referred to as the accounting or the financial statement method of computing rate of return. (Fremgen 1981 :95).

The responses are summarized in table 8.1

TABLE 8.1

INVESTMENT APPRAISAL METHODS IN ACTUAL USE

SIZE OF ANNUAL CAPITAL BUDGET	DISCOUN- TED RATE OF RE- TURN PER CENT	NPV PER CENT	PI PER CENT	PAYBACK PERIOD PER CENT	SIMPLE RATE OF RETURN PER CENT	OTHER METHODS PER CENT
Over \$100 million	78	34	9	72	60	14
50-100 million	79	21	10	62	55	3
10-50 million	64	14	2	68	44	11
Under 10 million	67	0	5	52	33	0
No size given	67	33	0	67	0	33
All respondents	71	20	6	67	49	10

Source : Fremgen (1981 :96)

Unfortunately Fremgen does not specify how many firms there were in each category.

Fremgen observed that the most popular single method was the IRR, which recognizes the time value of money. Next in order of popularity were two methods that do not recognize the time value of money namely payback period and simple rate of return.

"Other methods" were reported as follows:

\* lifetime cost;

- \* minimum life required to achieve a predetermined discounted rate of return;
- \* rate of return on sales;
- \* revenue required to cover average annual costs including depreciation and interest on investment;
- \* rate of return calculation required by the Federal Power Commission;
- \* payback period based on discounted cash flows;
- \* effect of the investment on the earnings per share;
- \* MAPI formula<sup>3</sup>
- \* necessity to maintain current operations or product lines;
- \* requirements for new products;
- \* future corporate needs;
- \* safety and
- \* management judgement.

Fremgen points out that the last 5 methods are not financially orientated at all. He furthermore observes that by adding the percentages horizontally in table 8.1 they add up to considerably more than 100 per cent in each case which indicates that most respondents used two or more different methods.

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3. The MAPI method involves calculating the time adjusted annual average cost of the project or projects under consideration. See also Herbst (1982:103-113).

If a respondent indicated that his firm used more than 1 method of investment analysis, he was asked to indicate which was considered most important in the decision making process. Responses to this question are summarized in table 8.2. This time the percentages add up to less than 100 per cent horizontally (except in the case of firms with the smallest capital budget.) Fremgen indicates that the reason for this is the fact that not all respondents who use more than one method answered this particular question. He recognizes the possibility that no single method is always considered to be most important.

TABLE 8.2

MOST IMPORTANT INVESTMENT APPRAISAL METHOD

SIZE OF ANNUAL CAPITAL BUDGET	IRR PER CENT	NPV PER CENT	PI PER CENT	PAYBACK PERIOD PER CENT	SIMPLE RATE OF RETURN PER CENT	OTHER METHODS PER CENT
Over \$1 million	34	5	0	2	31	7
50-100 million	38	7	3	7	14	0
10-50 million	39	3	0	23	18	5
under 10 million	47	0	5	24	24	0
No size given	0	0	0	33	0	33
All respondents	38	4	1	14	22	5

Source : Fremgen (1981 :98)

Fremgen observed another significant aspect when he compared table 8.1 and table 8.2. Although the IRR still featured most prominently, the payback period declined dramatically in frequency of mention: although 67 per cent of all firms used it, only 14 per cent considered it the primary indicator of an investment's profitability. This is consistent

with the notion that the payback period is not a valid index of investment profitability by itself, but it may be a useful supplementary tool.

#### 8.2.1.2 ANALYSIS OF MUTUALLY EXCLUSIVE INVESTMENTS

As pointed out in chapter 7 mutually exclusive investments can pose problems in that different alternatives can entail significantly different outlays.

Most respondents stated that, in choosing among mutually exclusive alternatives they looked for that alternative with the 'best rating as determined by the index of financial attractiveness' which they regularly used to evaluate investment proposals. Fremgen interpreted this 'rating' as the highest IRR or the shortest payback period.

The survey furthermore revealed that where different alternatives entailed different outlays, respondents using the IRR method of appraisal were relatively unconcerned about incremental cash flow determination. Only 29 per cent of the relative respondents indicated that they used it.

#### 8.2.1.3 MULTIPLE RATES OF RETURN

In the survey questionnaire respondents were asked two questions regarding the phenomenon of multiple rates of return.

Firstly, how frequently they actually encountered investments with mixed sequences of cash receipts and outlays and secondly if they used the IRR method, how frequently they actually encountered investments with multiple rates of return. The responses are reflected in table 8.3.

TABLE 8.3  
MIXED SEQUENCES OF CASH FLOWS AND MULTIPLE RATES OF RETURN

	INCIDENCES OF MIXED SEQUENCES OF CASH FLOWS (PER CENT)	INCIDENCES OF MULTIPLE RATES OF RETURN (PER CENT)
Never	3	21
Rarely	62	52
Fairly Frequently	29	13
Very Frequently	3	2
No response	3	12

Source : Fremgen (1981 :100)

Fremgen notes that the condition of multiple rates of return is encountered frequently by a significant minority of firms. Those who do use IRR revealed one incidence of multiple rates that is sufficient to warrant attention. His conclusion to this question however, is that it would appear that the problem is not so prevalent as to invalidate any use of IRR in investment analysis.

#### 8.2.1.4 RATE OF RETURN ON REINVESTMENT

Respondents to the survey were asked whether they made any explicit assumption about the rate of return to be earned on reinvestment of cash receipts. Amongst the respondents 29 per cent indicated that they did in fact do so. Most of the firms indicated that they explicitly assumed that the rein-

vestment rate would be equal to either the current investments' or the current average cost of capital. As result of this answer Fremgen came to the conclusion that most of the explicit assumptions seemed to accept the nature of implicit assumptions.

#### 8.2.1.5 RISK AND UNCERTAINTY

Amongst the responding firms 67 per cent stated that they considered risk and uncertainty explicitly in the analysis of individual investment proposals. This was true somewhat more frequently in firms with larger annual capital budgets than in those with smaller budgets.

Table 8.4 summarizes the methods used by the respondents to allow for risk and uncertainty in investment analysis. Percentages in the table are based on the number of firms that stated they did adjust for risk and uncertainty, not on the total number of firms in the survey. Many of the firms reported use of two or more methods of allowing for risk and uncertainty. Hence, the figures in table 8.4 add up to more than 100 per cent.



TABLE 8.4

ADJUSTING FOR RISK AND UNCERTAINTY

	PER CENT
Requirement for a higher-than-normal index of profitability	54
Requirement for a shorter than normal payback period	40
Adjustment of estimated cash flows by use of quantitative profitability factors	32
Purely subjective non qualitative adjustment	29
Other methods	8

Source : Fremgen (1981 :101)

Among other methods mentioned were the following:

- \* sensitivity analysis of critical variables;<sup>4</sup>
- \* Monte Carlo simulation;<sup>5</sup>
- \* comparative analysis of results at high and low estimates of benefits and
- \* analysis of project profitability.

Fremgen's findings in this respect reflected that the most popular methods of dealing with the problem appear to involve the placing of more stringent requirements on the customary financial criteria for investments. For example, a relatively risky investment is expected to offer a higher

- 
4. Sensitivity analysis measures how a project's net present value or internal rate of return changes if the value of any input variable changes. It is assumed that the other variables stay constant (Uliana, et al. 1987:274).
  5. Monte Carlo simulation analysis represents a refinement on sensitivity analysis in that probability estimates are attached to different outcomes. For a more extensive discussion on Monte Carlo simulation see Weston and Brigham (1978:405-412).

rate of return, a higher present value index or perhaps a shorter payback period than a safer investment. Fremgen found logic in the approach although he questions the fact that 'risk premiums' are not specified.

In this regard he states that a major deficiency in the risk adjustment methods of the respondents seem to be that their methods do not permit them to adjust for varying degrees of risk.

A final objective of the survey was to determine the incidence and causes of capital rationing and to determine the practices used by management in dealing with the condition.

#### 8.2.1.6 CAPITAL RATIONING

Capital rationing was experienced by 73 per cent of the respondents whilst 64 per cent of these firms indicated that it was a restriction they had to contend with every year. The other 36 per cent encountered the problem only in certain years. Finally, 87 per cent of the firms faced with capital rationing stated that the limitation was not a single fixed monetary amount but an inexact amount within a certain recognized range.

Only 56 per cent of the firms reporting a fixed monetary capital limit stated that it was caused by a restriction imposed by higher management.

Most respondents ranked projects according to one or more of the financial methods used earlier to determine whether or not investments were profitable.

#### 8.2.1.7 OBSERVATIONS CONCERNING THE 'FREMGEN STUDY'

##### i) Structure of the 'Fremgen Questionnaire'

It appears that the questionnaire used by Fremgen was highly structured and of a closed end nature. Boyer (1974:12) (section 8.2.6.2), who undertook a similar study on capital budgeting practices, is of the opinion that certain respondents select methods that they neither use nor understand when given structured choices. She noted in her study that respondents sometimes indicated that specific methods were used by their firms but when requested to describe them they were unable to comply.

This possible response phenomenon places a question mark against the Fremgen study findings.

##### ii) Methods of Investment Decision Making

Although the IRR method emerged as the single most used method in the Fremgen survey, there is an anomaly in that it is perceived by firms with smaller capital budgets as more important than firms with larger capital budgets. This seems inconsistent with the sophistication level expected. In

larger firms one would expect greater rather than less use of DCF methods. It is true of course that those few organizations which used the NPV method had large budgets. But they were the exception and not the rule. It is probable that Gitman's (1985:354) observation that businessmen often prefer decision criteria in the form of percentages rather than monetary returns was true also of the Fremgen study. The smaller respondents clearly preferred the IRR to the NPV method. In a separate study Doenges (1979 : 207) came to the same conclusion.

A very significant finding of the Fremgen survey was the extremely low usage of the most sophisticated, NPV time value method of evaluating investment proposals. Of all respondents only 20 per cent used it at all and only 4 per cent regarded it as the most important method.

Another significant finding was that 67 per cent of respondents used the payback period method, which is not time adjusted. In this regard Fremgen's findings coincide with those of Weston and Brigham (1978:294) i.e. that payback period is frequently used in combination with a discounted cash flow method; the former to indicate how long the investment will be at risk and the latter to indicate the project's profitability.

Table 8.2 however, indicates that payback period seemed to decline in importance relative to the size of the companies capital investment. Although this could be interpreted as a

tendency towards greater sophistication, in that these companies perceive IRR as much more important, they perceived simple rate of return to be equally important. This suggests that some large companies, those with an annual capital budget in excess of 100 000 dollars are still very unsophisticated in their investment decision-making. Indeed, forty nine per cent of the respondents used the 'simple rate of return' method. Taken together, the payback period and simple rate of return methods proved to be nearly as popular as the time related methods.

A feature which emerged prominently from this survey was the minimal usage or ignorance of time related methods of investment decision making in the sample of USA firms.

### iii) Risk and Uncertainty

It seems that Fremgen dealt with the issue of risk and uncertainty in isolation.

It was pointed out in chapter six that firms using the weighted average marginal cost of capital as criterion for investment decision making, tend only to evaluate investments that are in the same risk class as existing investments.

One would expect risk adjusted discount rates to be used by firms evaluating investment projects belonging to a risk class other than its own. Fremgen fails to address this aspect.

#### iv) Capital Rationing

A most disturbing feature of the Fremgen study was that only 6 per cent of the respondents used the profitability index method for ranking mutually exclusive projects. This is despite the fact that this method is recognized in financial literature as a powerful method of appropriately ranking mutually exclusive projects. Perhaps this feature was linked to the fact that so few of the respondents used the NPV method.

### 8.2.2 THE KIM AND FARRAGHER SURVEYS

#### 8.2.2.1 INTRODUCTION

Kim and Farragher undertook surveys in 1975 and 1979 which embraced inter alia project evaluation techniques, risk assessment and risk adjustment.

The data for the study were derived from responses to a questionnaire sent to the chief financial officers of all firms in the 1979 Fortune 1000 largest industrial corporations list.

Responses returned totalled 200 and were categorized by asset size, industry classification and risk. The authors found a significant difference in the evaluation methods used by large and small companies. It should be noted, however that such 'small' companies would, by South African standards be rated as large. It is most probable that the shares of all respondents were listed on stock markets in the USA.

#### 8.2.2.2 RESEARCH RESULTS

In order to place the work of Kim and Farragher in perspective reference should be made to table 8.5. Table 8.5 provides a summary of some surveys dating back to 1959 including those of Kim and Farragher.

TABLE 8.5

USE OF QUANTITATIVE TOOLS IN CAPITAL BUDGETING - OVERALL PER CENT

A. PRIMARY TECHNIQUE	KLAMMER			FREMGEN	KIM AND FARRAGER	GITMAN AND FORRESTER	KIM AND FARRAGHER
	1959	1964	1970	1971	1975	1977	1979
Payback	34	24	12	14	15	9	12
Accounting							
Rate of							
Return	34	30	26	22	10	25	8
IRR	19	38	57	38	37	53	49
NPV	-	-	-	5	26	13	19
<b>B. SECONDARY METHODS</b>							
Payback	-	-	-	53	33	44	39
Accounting							
Rate of							
Return	-	-	-	27	3	14	3
IRR	-	-	-	33	7	14	8
NPV/PI	-	-	-	21	7	28	8

Source: Kim and Farrager (1981:28)

Kim and Farrager (1981:28) found that large industrial companies were becoming increasingly sophisticated in the use of quantitative DCF tools in the capital budgeting process. They found the degree of sophistication to be linked to size: the larger the company the more sophisticated would be the techniques of evaluation. Thus Kim and Farrager (1981:30) expected that the observed tendency toward sophistication of the evaluation techniques used by large companies would continue at an accelerated pace in the 1980s.

What is also notable in table 8.5 is the steady decrease in non time related methods from the period 1959 to 1979.



Further surveys which have been conducted in the USA, and which focus on the 'small business' need review. Some particularly interesting and relevant findings have emerged from these studies.

### 8.2.3 THE SOLDOSKY STUDY

#### 8.2.3.1 INTRODUCTION

Boyer (1978:8) makes mention of a study undertaken by Robert Soldofsky in 1964 with the objective of determining the approach to capital budgeting used by owners and executives of 'small' manufacturing concerns. Selection of the firms was stratified by employment size. Soldofsky did not differentiate between listed and unlisted companies but closely as well as widely held firms were included in the survey. Very small firms with employment size less than 20 were eliminated from the study.

#### 8.2.3.2 RESEARCH RESULTS

Soldofsky found that out of 123 firms in Iowa, 71 or 58 per cent used payback. It was, furthermore, established that not one of the firms employed any form of discounted cash flow method. Soldofsky further found that many of the respondents described their methods as both vague and flexible, indicating a lack of a formalized decision making criterion. No attempt was made to determine the reason for this approach (Boyer 1978:8).

## 8.2.4 THE OHIO STUDY

### 8.2.4.1 INTRODUCTION

Nolan and Banda (1971:12-18) conducted a study on capital investment policy which used a stratified sample of industrial companies in the state of Ohio in the USA. Again there was no differentiation between listed or unlisted companies but 'size' was classified on the basis of the number of employees and relative size within an industry. Table 8.6 depicts this classification.

TABLE 8.6

SIZE CLASSIFICATION AND THE TEN INDUSTRIAL GROUPS SELECTED FOR THE PURPOSE OF THE STUDY

INDUSTRY DESCRIPTION	NUMBER OF EMPLOYEES		
	SMALL	MEDIUM	LARGE
Food	0-199	200-499	500+
Printing and Publishing	0-149	150-999	1 000+
Chemicals and Allied Products	0-149	150-399	400+
Rubber and Plastic	0-199	200-999	1 000+
Stone Clay and Glass Products	0-199	200-599	600+
Primary Metal Industries	0-449	450-1999	2 000+
Fabricated Metal Products	0-399	400-999	1 000+
Machinery (except electrical)	0-399	400-999	1 000+
Electrical Equipment Supplies	0-499	500-1299	1 300+
Transportation Equipment	0-599	600-1249	1 250+

Source: Nolan and Banda (1971:13)

#### 8.2.4.2 RESEARCH METHOD

It was decided that a sample of 10 firms be drawn from each of these 10 largest industrial classifications for a total sample of 100. The firms in each industrial classification were further divided into size classifications : small, medium and large. Since the use of uniform size ranges for all industrial classifications was not feasible, the basis for size classification was the number of employees and the relative size within the specific industry.

The desire to obtain an approximately equal number of responses in each group size led to the conclusion that 3 large, 3 medium and 4 small companies should be sampled. This decision was initiated as result of the assumption that small companies would not be as responsive to the survey as large or medium sized firms.

Firms were asked to indicate which of the following (fully defined) methods, were used by them:

- \* net present value;
- \* internal rate of return;
- \* payback;
- \* average rate of return and
- \* terminal value.

#### 8.2.4.3 RESEARCH RESULTS

Of a total of 87 firms which responded 57 firms checked only one method, 20 firms used two methods and 10 firms checked more than two methods. In all, responses totalled 128. The order of popularity in which the methods featured was as follows:

1. payback period (used by 27 respondents);
2. average rate of return (used by 27 respondents);
3. NPV (used by 17 respondents) and
4. IRR (used by 10 respondents).

The net terminal value was used by 3 firms whereas 11 respondents did not specify any useful criteria. In 5 of the latter cases "need" was indicated as a basis for capital investment decisions. In 3 cases it was admitted that the decisions were subjective in nature whereas the last 3 responses made use of a rate of return on assets criterion.

The study furthermore established that the use of the payback method was not a function of the size of the firm. Categories, regardless of size, made equal use of the payback method.

## 8.2.5 THE GRAY, BIRD AND SCOTT STUDY

### 8.2.5.1 INTRODUCTION

Gray, Bird and Scott (1972:29-38) conducted a survey relating to the investing and financing behaviour of small business firms. A two page questionnaire was sent to a random sample of 500 small manufacturers.

From this sample 135 responses were received for a response rate of 27 per cent.

Firms with net assets totalling less than 1 million dollars were regarded as 'small'.

Firms were asked to select their investment evaluation methods from the following five:

- \* payback period;
- \* accounting rate of return;
- \* net present value;
- \* internal rate of return and
- \* profitability index.

#### 8.2.5.2 RESEARCH RESULTS

Results of the survey indicated that payback period was used by 51 per cent of the firms whilst 30 per cent used some variation of an accounting rate of return on investment. Only 10 per cent of the firms identified one of the DCF methods as their method of valuation.

In conclusion, Gray, Bird and Scott indicate that their findings coincide with those of Soldofsky. They also refer to a study by Amling (1963) who reported that 52 per cent of large industrial firms use the payback method either as a single valuation method or in conjunction with some other system.

In 1974, Boyer conducted a survey on cost of capital to the small firm.<sup>6</sup> Apart from questions on cost of capital, however, part of the survey covered capital budgeting methods.

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6. The research method of this study was outlined in section 6.1.3.

## 8.2.6 THE BOYER STUDY

### 8.2.6.1 INTRODUCTION

As indicated in chapter 6 Boyer (1974:12) determined the size of her survey sample on basis of an employment criteria of 250. This constituted a suggested maximum employed by the Small Business Administration of the USA. In the area under surveillance 462 firms met this criteria.

### 8.2.6.2 RESEARCH RESULTS

During the pilot stage of this study an interesting phenomenon appeared in that when traditional forms of investment evaluation techniques were suggested, the owners would indicate use of one or more of these procedures. On further questioning however, it would be determined that they had no understanding of any of these methods. It was also established that interviewees had a reluctance to answer 'yes' to using formal procedures when asked to describe them. The author feels that when a choice mechanism is used a post testing based on open ended questions could yield interesting results.

In this study payback period featured prominently as the most practical formal method of project evaluation. Other methods, were based on profit as compared to cost. There was no hint of cash flows or discounting.

### 8.3 OBSERVATIONS CONCERNING THE USA STUDIES

Although the Boyer study suggests that there may be confusion with regards to the evaluation methods used in the USA a certain pattern emerged from the other studies. Although not all the studies conformed it seems that in general the smaller the business, the less sophisticated its investment evaluation techniques (payback and average rate of return) tends to be. It is furthermore clear that 'payback' is very popular as a basis of at least secondary evaluation for the vast majority of firms in that it is simple to understand and apply and provides a quick measure of liquidity.

Amongst discounted cash flow methods, the internal rate of return method seems to appeal most to decision makers. Net present value, supposedly the most sophisticated DCF method according to financial theory, appears to be the most neglected.

### 8.4 SURVEYS ON METHODS OF INVESTMENT DECISION MAKING UNDERTAKEN IN THE UNITED KINGDOM (UK)

#### 8.4.1 THE PIKE SURVEY

##### 8.4.1.1 INTRODUCTION

Pike (1982:36-37) conducted a survey among 150 large British companies concerning their capital investment appraisal methods.



#### 8.4.1.2 SURVEY RESULTS

Pike (1982:36) found, despite all of its deficiencies, that payback period is still the most popular investment appraisal criterion. In this respect Pike relates that one manager summed up the endearing qualities of payback. 'It is simple, quick to produce and rapidly understood by non financial over-extended management'.

The IRR method, although less extensively used than payback, was found to be the most popular primary evaluation method. The NPV method proved distinctly less popular with only 17 per cent of firms surveyed regarding it as the primary evaluation technique. Pike found that the main arguments of non usage of DCF methods were:

- \* managers do not understand them;
- \* they are not necessary when payback periods are rapid and
- \* difficulties are experienced in estimating the 'correct' discount rate.

It was made clear by respondents that the main appeal for the IRR method was that it measured investment worth in percentage terms. It consequently supplied a comparative measure against current interest rates and current accounting rates.

Pike regarded this perception as extremely dangerous in that 'book yield' is not a generally reliable measure of the true yield; and current interest rates (such as the overdraft rate) may not be a reliable measure of a project's cost of capital.

Pike also established that 74 per cent of the respondents used a combination of appraisal criteria rather than a single method. The most popular combination proved to be IRR and payback period.

Pike makes much of the obvious disparity that exists between theory and practice. In particular he observes that in theory the NPV method is regarded as being entirely compatible with the prescribed financial objective of the firm, namely wealth maximization, and yet it is virtually non-existent in practice.

#### 8.4.1.3 CONCLUSION

In the light of the latter observation by Pike one can seriously question whether firms are actually attempting to maximize wealth in the context of which the objective of the firm is formulated.

## 8.4.2 A 'MECHANICAL ENGINEERING INDUSTRY SURVEY'

### 8.4.2.1 INTRODUCTION

Woods, Pokorny, Lintner and Blinkhorn (1984:36-37) conducted a survey on capital budgeting practices amongst 101 firms in the mechanical engineering industry.

The surveys were conducted by means of personal interviews and covered firms in the UK with employment ranging from 3000-8000.

### 8.4.2.2 SURVEY RESULTS

Evidence obtained from 93 respondents confirmed that payback was the most popular appraisal method in the mechanical engineering industry: 49,5 per cent of the responding firms used payback period, 12,9 per cent used a discounted cash flow system and 10,8 per cent used both methods (DCF and non DCF) on a comparative basis. Non financial criteria were specified by 8,5 per cent as being dominant in the investment decision, whilst remaining firms specified a variety of influential factors, such as essentiality of equipment and control of investment decision making by holding companies.

In interviews, the impression was given that firms often realised the technical inadequacies of the payback system but at the same time their immediate problem was short run cash flows. This problem, according to them cannot be alleviated by the use of DCF methods.

Woods, et al (1984: 36-37) furthermore followed up work undertaken by Pike (1982) who suggested that capital budgeting behaviour is strongly influenced by the extent of capital rationing experienced by firms, with capital rationing itself being influenced by firm size.

The authors accordingly collected details of turnover for 58 firms between the years 1979 to 1983 with the objective of establishing the relationship between turnover and investment appraisal.

Table 8.7 depicts the relationship between turnover and investment appraisal method which emerged during the study.

TABLE 8.7  
RELATIONSHIP BETWEEN TURNOVER AND INVESTMENT APPRAISAL  
METHOD, 1983

TURNOVER (Pounds p.a.)	FIRMS USING A GIVEN APPRAISAL METHOD			
	PAYBACK PER CENT	DCF PER CENT	NON FINAN- CIAL PER CENT	OTHER PER CENT
Less than 500 000	50	0	0	50
500 000-1 million	0	0	40	60
1-2 million	62,5	12,5	0	25
2-10 million	51,6	12,9	9,7	25,8
More than 10 million	70,0	20,0	0	10

Sample : 58 Firms

Source: Woods, Pokorny, Lintner and Blinkhorn (1984:36-37)

According to the conductors of the survey, table 8.7 indicates that the bias towards payback occurs across all sizes of firms and that there is no suggestion that it is used more heavily by the smaller businesses which may lack the management expertise to employ more sophisticated techniques.

At the same time, the fact that DCF or comparative methods only come into use when turnover exceeds 1 million pounds may suggest that, at least among smaller firms, there exist an 'information gap' as regards such methods.

### 8.4.3 THE CARSBURG AND HOPE SURVEY

#### 8.4.3.1 INTRODUCTION

Carsberg and Hope (1981:9-14) obtained empirical evidence for their study of investment decisions under inflation by means of a postal questionnaire survey. The questionnaire was sent in August 1973 to a sample of 325 companies chosen randomly from 'The Times' list of 1000 leading U.K. companies for 1971-72.

#### 8.4.3.2 SURVEY RESULTS

Of the firms surveyed only 32 per cent responded. Their responses revealed appraisal methods in terms of the primary most popular method. These are depicted in table 8.8.

TABLE 8.8

POPULARITY OF INVESTMENT APPRAISAL METHODS IN THE UK

<u>METHOD</u>	<u>RANKING</u>
Qualitative Judgement	1 st
IRR	2 nd
Payback Period	3 rd
Payback Period - with Discounting	Joint 4 th
First Year Accounting Rate of Return (First year profit/initial investment)	Joint 4 th
Average Rate of Return	Joint 4 th
NPV	Joint 4 th
Net Terminal Value	Joint 5 th

Source: Reeve (1981:11)

Carsberg and Hope observed that, despite the wide use of DCF (85 per cent), these were supplementing rather than displacing traditional methods such as payback and accounting rate of return. Also, of the two main DCF methods the IRR method enjoys much wider usage than its counterpart, the NPV method.

Although qualitative judgement might appear to be an unsound evaluation method relative to methods that recognize time value Carsberg and Hope (1981:45-46) provides some rationale for it. They reason that projects will often have important effects which are 'remote' and hence not readily estimated in cash terms. As example can serve the case of favourable publicity associated with the development of an advanced technology, or the advantage, in attracting customers, or offering for sale a product which will complement a range of similar products. Effects such as these can, they say, can best be considered in the appraisal by subjective judgement after carrying out as many explicit measurements as possible.

Another reason that favours qualitative judgement, Carsberg and Hope observe, is the uncertainty associated with business undertakings. Therefore exclusive reliance on single valued forecasts of direct financial results might expose a manager to the danger of criticism should the actual results differ from the forecasted.

They state however that provided managers have some forecasting ability, the use of numerical calculations seems likely to improve the chances of optimal decisions.

Carsberg and Hope (1981:10) believe that the evidence accumulated in their study provides strong support for the contention that investment appraisal practices used by large British firms tend to lead to investment below optimal levels. Their rationale for this statement rests on the observation that a large number of firms use a money target rate of return (nominal rate) whereas cash flows are estimated in current prices (real values). These firms displayed the added disadvantage of failure to predict the effects of inflation on their resources.

Evidence of under investment stemmed from the fact that several firms used the IRR as well as a first year accounting rate of return (first year profit/initial investment). Both methods, according to the authors, in comparison with the NPV method will favour 'under investment'<sup>7</sup>

Carsberg and Hope do not properly substantiate this statement but it has been shown in chapter 6 that the IRR method is biased against investments where the bulk of the cash flows occur very late in the investments life.

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7. By 'underinvestment' is meant that the total amount invested in capital assets will eventually be smaller (below the optimal level) as a result of the usage of certain methods instead of others.



The 'first year accounting rate of return' criterion will have an adverse effect on the 'rate of return' in subsequent years in that profits will become more subject to taxes since wear and tear allowance is based on historical cost and not replacement cost.

#### 8.5 OBSERVATIONS CONCERNING THE UK STUDIES

Studies in the UK seem to supply evidence that the larger the company the slightly stronger the bias towards DCF methods. Also the most favoured DCF method appears again to be IRR.

However, there are contradictory items of evidence in some studies. The Carsberg and Hope study for example revealed that the most popular method of investment evaluation appeared to be qualitative judgement. But in other studies payback period remains a firm favourite amongst large as well as small companies. At least one study viz. Woods, et al. (1984 : 37) suggests that the largest companies in the survey used payback period and DCF in the proportion of 7:2. This evidence further contradicts the findings of Carsberg and Hope that IRR was more popular than payback period.

8.6            SURVEYS ON METHODS OF INVESTMENT DECISION MAKING  
UNDERTAKEN IN THE REPUBLIC OF SOUTH AFRICA(RSA)

8.6.1        THE LAMBRECHTS SURVEY

8.6.1.2     INTRODUCTION

In 1972 Lambrechts (1976:27-31) conducted a survey on capital investment appraisal methods in the RSA.

The 100 top quoted companies (in terms of total assets) which appeared in the Financial Mail top 100 list in 1971, were approached in 1972. The assets of the companies ranged from R19 million to R290 million. Positive reactions were received from 57 of the 100 companies. Of this number 48 were included in the investigation and personally visited by the researcher. Of the 48 companies, 38 were manufacturing companies.

8.6.1.3     SURVEY RESULTS

The responses of the 48 companies in respect of appraisal methods followed are depicted in table 8.9.

TABLE 8.9

INVESTMENT EVALUATION METHODS IN THE RSA

METHOD	PERCENTAGE OF CO-OPERATING COMPANIES
Priority Rating	82
Accounting (average) rate of return	74
Payback Period	63
Discounted Cash Flow (IRR)	76
NPV	18
MAPI	3
Annual Cost	0
Net Terminal Value	0

Source: Lambrechts (1976:28)

Although not evident in the table Lambrechts indicates that 30 per cent of the sample did not apply any form of financial evaluation for replacement decisions.

Lambrechts mentions that the percentage users of IRR and NPV methods compared favourably with those of the USA and UK. He points out however, that DCF methods were used to a greater extent by companies controlled from overseas than South African controlled companies. The converse applied for non DCF methods. Also, 93 per cent of the users of DCF methods preferred IRR because it provides results in terms of percentages.

Lambrechts gathered significant information when he compared primary company objectives with evaluating methods of co-operating companies. Of the companies which applied DCF methods as primary evaluation methods about 40 per cent for-

mulated their primary company objective in terms of earnings per share and about 50 per cent in terms of average rate of return.

This phenomenon appeared to point out a contradiction because it is a well known fact that there can be considerable differences between a discounted rate of return on the one hand and an average rate of return or earnings per share on the other hand.

This finding indicates a serious deficiency in the comprehension of executives regarding the causative relationship between the time value of future benefits and the value of the firm.

The following study in the RSA was conducted in 1978.

#### 8.6.2 THE REEVE STUDY

##### 8.6.2.1 INTRODUCTION

Reeve (1981:10-14) obtained the Carsberg and Hope questionnaire and in 1978 conducted a similar survey on capital appraisal methods in the RSA. He set out to prove inter alia a hypothesis that investment appraisal methods in the RSA tend to lead to investment below the optimal level.

The subjects utilized were the top 100 South African companies given in the April 1977 edition of the 'Financial Mail' top companies report. The industrial companies used were ranked by asset size. Of the replies received 50 were usable.

#### 8.6.2.2 SURVEY RESULTS

The results of the survey revealed a remarkable similarity to those obtained in the UK. The primary most popular investment appraisal method in the RSA proved to be the IRR method as indicated in table 8.10.

TABLE 8.10

POPULARITY OF INVESTMENT APPRAISAL METHODS IN THE RSA

METHOD	RANKING
IRR	1 st
Qualitative Judgement	2 nd
Payback Period	3 rd
Payback Period - with discounting	Joint 4 th
First Year Accounting Rate of Return (First year profit/Initial Investment)	Joint 4 th
Average Rate of Return	Joint 4 th
NPV	Joint 4 th
Net Terminal Value	5 th

Source : Reeve (1981:11)

It was revealed by the responses, that despite the wide use of DCF methods in the RSA (84 per cent), these supplement rather than replace traditional methods like payback period and average rate of return. It was furthermore established that 78 per cent of South African companies used more than one method of appraisal.

The conclusion from this study was that it gives strong support to the hypothesis that investment appraisal practices used by large South African industrial firms will tend to lead to investment below the optimal level.

The reasons for this Reeves concluded, seem to coincide with those of the British study by Carsberg and Hope viz. real cash flows discounted by a nominal rate, use of IRR and applying payback period lead to over conservative decisions, resulting in investment below the optimal level.

#### 8.6.3 THE ANDREWS AND BUTLER STUDY

The most recent survey conducted in the RSA on capital budgeting was conducted by Andrews and Butler (1986 : 31-37).

Using a questionnaire, data was gathered from investment decision makers in some of South Africa's largest industrial and mining corporations in respect of such issues as:

1. What capital budgeting techniques were employed?
2. When were the techniques introduced?
3. How were such complicated factors such as inflation, risk and mutually exclusive alternatives dealt with?

The questionnaires were mailed to the chief financial officers of 500 of South Africa's major mining and industrial companies. The replies received totalled 132.

### 8.6.3.1 SURVEY RESULTS

#### i) Methods of Capital Appraisal

Respondents were asked which capital budgeting methods they used in evaluating the profitability of a proposed investment.

Table 8.11 shows that the most popular method used is the payback period. However, the discounted cash flow methods (internal rate of return, net present value and profitability index received considerable support).

TABLE 8.11

CAPITAL BUDGETING METHODS IN USE IN SOUTH AFRICA

SIZE OF ANNUAL CAPITAL BUDGET	TECHNIQUE EMPLOYED					
	INTERNAL RATE OF RETURN PER CENT	NET PRESENT VALUE PER CENT	PROFITABILITY INDEX PER CENT	PAYBACK PERIOD PER CENT	ACCOUNTING RATE OF RETURN PER CENT	OTHER
Over R50 million	40,0	81,8	9,1	72,7	45,2	0,0
R25 million - R50 million	80,0	46,7	13,3	66,7	46,7	20,0
R10 million - R25 million	63,2	42,1	15,8	68,4	47,4	10,5
R5 million - R10 million	68,7	37,5	12,5	93,7	43,8	12,5
R2 million - R5 million	63,2	36,8	26,3	84,2	42,1	5,3
Below R2 million	36,6	31,7	12,2	51,2	34,1	4,9
All respondents	59,5	39,7	14,1	68,6	41,3	8,3

Source : Andrews and Butler (1986:36)

Andrews and Butler (1986:36) point out that the percentages total far more than one hundred per cent. The reason for this is that several methods was common. The average number of techniques used per firm was 2,31. The firms were asked if they used any technique aside from those tabled. The most common of these tabled were the CAPM, MAPI and assessment of earnings and dividend yield.

Table 8.11 furthermore indicates that time-weighted criteria play a more important role in firms with larger capital budgets. No definite trend is however discernable in the data regarding the other methods surveyed.

The respondents were also asked what their primary method of evaluation was at present and had been five and ten years ago respectively. The findings appear in table 8.12.

TABLE 8.12

HISTORICAL ANALYSIS OF MOST IMPORTANT CAPITAL BUDGETING

METHOD IN USE

CAPITAL BUDGETING METHOD	YEAR		
	1982	1976	1971
	PER CENT	PER CENT	PER CENT
Internal rate of return	45,3	37,3	27,0
Net present value	7,7	6,6	5,4
Profitability index	4,3	3,3	6,8
Payback period	26,5	27,5	32,4
Accounting rate of return	15,4	24,2	27,0
Other	0,8	1,1	1,4
TOTALS	100,0	100,0	100,0

Source : Andrews and Butler (1986:36)



Andrews and Butler (1986:33) observe that what is illustrated is a trend, with time, away from the less sophisticated methods of payback period and accounting rate of return to the more sophisticated time weighted methods of IRR and NPV. The sample also revealed that 57,3 per cent use time-weighted methods as the most important basis of evaluation.

IRR proves to be the most popular method which is in agreement with the study of Reeve (section 8.6.6.2).

The authors also investigated the type of investment to which South African firms employed modern budgeting techniques. Over 40 per cent said they used the techniques for all investment decisions and 43 per cent said that they restricted their use to investment purposes over a set amount. The average value of this amount proved to be R148 546 with a standard deviation of R259 672.

This indicated that the value was very wide, ranging from R100 up to R1,000,000. Of the remaining respondents 5,9 per cent claimed they did not use capital budgeting techniques for any investment decision. Andrews and Butler (1986: 33) found this surprising since the sample firms were regarded as leading firms.

Another alarming fact proved to be that one out of 20 of the leading firms relied only on intuition. The remaining 10 per cent said they only employed capital budgeting techniques

for certain type of investment. Among those names were investments for new products, major expansions, take overs and capital used in the production of income. Table 8.13 summarizes these findings.

TABLE 8.13

TYPES OF INVESTMENTS WHERE CAPITAL BUDGETING METHODS ARE  
EMPLOYED

<u>TYPE OF INVESTMENT</u>	<u>PERCENTAGE OF RESPONDENTS USING CAPITAL BUDGETING METHODS</u>
ALL	40,7
NONE	5,9
RESTRICTED TO OVER A CERTAIN AMOUNT	43,2
RESTRICTED TO CERTAIN TYPES OF INVESTMENT	10,2
TOTAL	100,0

Source : Andrews and Butler (1986: 33)

ii) Treatment of Risk and Uncertainty

According to the survey results 76,8 per cent of the responding firms made some explicit adjustment to account for risk and uncertainty. Hence, nearly a quarter of the firms are ignoring a critical factor in assessing major in-

vestments and another quarter of the firms are using subjective judgement alone to cater for risk. A summary of the findings appears on table 8.14.

TABLE 8.14

ADJUSTMENTS MADE FOR RISK AND UNCERTAINTY

RISK ADJUSTMENT METHOD	PERCENTAGE OF FIRMS USING METHODS
Requirement of higher-than-normal index of profitability	37,5%
Requirement of shorter-than-normal Payback period	31,7%
Adjustment of cash flow by probability factors	14,2%
Purely subjective non-quantitative Adjustment of cash flows	27,5%
No adjustment made	24,2%
Other methods	2,5%

Source : Andrews and Butler (1986: 35)

The authors point out that the techniques specified under 'other methods' were stochastic models, break-even analyses of the cash flows and attempts to apply the CAPM.

iii) The Effects of Inflation

The respondents were also required to indicate what methods they used to take account of inflation.

Findings are presented in table 8.15.

TABLE 8.15

ADJUSTMENTS MADE FOR INFLATION

<u>INFLATION ADJUSTMENT METHOD</u>	<u>PERCENTAGE OF FIRMS USING METHOD</u>
No allowances made for inflation	42,4%
All items in cash flow inflated at an agreed rate	48,0%
Inflated at an agreed rate for a certain number of years	4,8%
Some other method	3,2%

Source : Andrews and Butler (1986: 35)

Andrews and Butler observe that it is essential that cash flows be adjusted for the effects of inflation when assessing major investments (section 7.6). However over 40 per cent of the respondents made no such allowances. This find-

ing is in agreement with that of Reeve (section 8.6.2.2). Several firms inflated items in their cash flows for a specific number of years and then continue cash flows uninflated for the remainder of the life of the project. The average period of inflation allowance for these firms was 6,75 years, the shortest being 2 years and the longest 10 years, with a standard deviation of 3,95 years. Almost one half of the respondents inflated all items in the cash flow but some listed other methods such as viewing current economics and subjecting the payback allowances alone to inflation.

iv) Rate Of Return on Investment

Respondents to the survey were asked whether they made any explicit assumption about the rate of return to be earned on reinvested funds. Only 17 per cent of those who answered the question made an assumption regarding reinvestment rates of return. In most cases this was their cost of capital rate which is implicitly assumed in the NPV model in any event (Andrews and Butler 1986: 35).

The authors mention that Fremgen in his study of American firms in 1971 found that a substantially higher percentage, namely 20 per cent (section 8.2.1.4) of firms made explicit assumptions on the models they used. This fact the authors concluded provides further evidence that South African firms lag behind their American counterparts in terms of investment sophistication.

It must be pointed out to Andrews and Butler that this discrepancy could be much bigger since American firms at this point in time could be much more sophisticated than in 1971.

v) Choice Between Mutually Exclusive Alternatives

The survey revealed that in this respect only 31 per cent of the responding firms apply the theoretically accepted technique of incremental cash flows. Most of the respondents (54,9 per cent) stated that they decide on the alternative that gives the best rating as determined by the index of financial attractiveness they regularly use. Several other methods were proposed by the sample, many of them non-financial.

vi) Sophistication in Investment Decision Making

With the co-operation of a panel of knowledgeable financial analysts, five key factors in a firm's investment decision making practice were rated. These were:

- \* most important capital budgeting method used;
- \* risk assessment method;
- \* allowance made for inflation;
- \* analysis of mutually exclusive alternatives and
- \* technique for dealing with reinvestment of cash flow.

Ratings for each factor produced scores between 0 and 10, with 0 indicating a low level of sophistication and 10 a very high level of sophistication.

The mean sophistication index with its standard deviation by industrial sector appear in Table 8.16. The listing is arranged in descending order of sophistication.

TABLE 8.16

SOPHISTICATION IN CAPITAL BUDGETING BY INDUSTRY CATEGORY

INDUSTRY SECTOR	MEAN SOPHISTICATION INDEX	STANDARD DEVIATION
Coal, petroleum and chemical industries	90,1	30,6
Supermarkets, department and variety stores	88,8	29,1
Automotive products	78,9	30,7
Mining	77,1	33,7
Miscellaneous manufacturing	75,0	36,5
Food, beverage and tobacco	74,4	30,2
Other	71,5	38,5
Primary metals and fabrication	68,6	28,3
Wood, pulp and paper	65,0	29,8
Electrical and electronics	64,5	41,9
Construction and industrial equipment	52,0	47,9
Household and personal products	49,7	37,8

Source : Andrews and Butler (1986: 36)

Linear regressions of the sophistication index against the net asset size, capital budgets size, growth rate and profitability of the respondent firms provide interesting correlations.

In general the following seems evident :

- i) Larger firms are more sophisticated in capital budgeting techniques than smaller firms.
- ii) Firms having larger capital budgeting expenditures use more sophisticated capital budgeting techniques.
- iii) Firms that are using more sophisticated capital budgeting techniques are growing faster.
- iv) Firms that are using more sophisticated capital budgeting techniques are more profitable (Andrews and Butler 1986: 36).

#### 8.7 OBSERVATIONS CONCERNING THE RSA SURVEYS

A most significant conclusion in the Lambrechts study was that companies which apply DCF methods have book value orientated objectives. This suggests a serious information gap between theory and practice.

A disturbing factor that emerged from the Reeve survey is the fact that large South African companies have a bias toward less than optimal investment. This could have detrimental long term effects on the South African economy.



The evidence from studies of investment evaluation methods indicates that businesses seldom utilize properly validated theories. Despite a clearly defined trend towards greater sophistication, there is still a minimal usage of theoretically valid techniques. Where these techniques are used, firms seem unable to relate their benefits to the objective of the firm viz wealth maximization. The reasons for this seem to be twofold:

1. there is a lack of knowledge on the part of the decision maker and
2. smaller firms do not have the ability to apply theory fully.

An unfortunate aspect of the surveys scrutinized was that there was no differentiation between listed and unlisted companies. In most cases 'relative size' is a function of assets employed.

Evidence generated by surveys in the USA, UK and RSA indicate that investment appraisal methods are becoming more sophisticated in the sense that discounted cash flow methods are used to an increasing extent. This is especially true for large size firms. However an anomaly exists in that a large percentage of firms still use payback period. Some though, as is the case in the UK and USA use DCF in conjunction with payback period.

A significant finding in the Andrews and Butler (1986: 36) survey, that did not emanate from any other study, was that sophisticated capital budgeting methods can be coupled to foster growth and increased profitability in business firms.

It is puzzling, however, as to how firms can realistically and consistently use these two methods in conjunction with each other as they are fundamentally incompatible.

As mentioned, a disconcerting aspect of the surveys stemmed from the fact that no differentiation was made between listed and unlisted firms. Since the study at hand focusses on investment decision making of unlisted firms, specific information in this respect would have been of immense value in the construction of an investment decision making model for the unlisted firm.

#### 8.9 SUMMARY

The evidence generated by the surveys reviewed in this chapter reveals that investment appraisal methods in the USA, UK and RSA are becoming more sophisticated in the sense that DCF methods are used to an increasing extent. This appears true for large size firms. It is puzzling however that some of these firms use DCF in conjunction with payback period since these two methods are fundamentally incompatible.

There furthermore seems to be a bias towards usage of IRR in the USA, UK and RSA. This seems to stem from the fact that businessmen prefer investment information in the form of percentages.

A popular evaluation method appears to be 'qualitative judgement' in the UK and RSA. Qualitative judgment is defended on grounds that certain projects will have effects that are remote and hence not readily estimated in cash terms.

Evidence of possible investment below the optimal level exists in the UK and RSA. This stems from the fact that firms use a nominal rate of return whereas cash flows are measured in current prices. Under-investment can furthermore be attributed to use of IRR and first year accounting rate of return. Both these methods according to the researchers will favour investment below the optimum level.

An alarming fact is that according to all the surveys conducted, the NPV method, supposed to be the most sophisticated investment appraisal method, is virtually the least used.

Although there is a trend toward sophistication in the usage of valid techniques, the relative usage is still minimal. This points to a lack of knowledge on the part of the deci-

sion maker. This phenomenon also manifests itself in the inability of decision makers to relate their benefits to the objective of the firm viz. wealth maximization.

In the next chapter available theory regarding investment decision making specifically in unlisted firms will be explored. Problems in this respect viz. the absence of a formal market and the establishment of an appropriate discount rate, will also be investigated. The problem will furthermore be addressed as to whether, in the absence of a formal market, DCF methods are still appropriate in the evaluation of investment proposals.

## CHAPTER NINE

### INVESTMENT DECISION MAKING FOR UNLISTED FIRMS

#### 9.1 OBJECTIVES REVISITED

##### 9.1.1 INTRODUCTION

It has been stated that the investment objective of the firm should be to aid the owners in maximizing the utility of their consumption over time. This is tantamount to maximization of owner's wealth and is obtained through maximization of the market value of the relative shares.

When this criterion is applied to the unlisted firm one is confronted with various problems.

##### 9.1.2 PROBLEMS IN THE FORMULATION OF AN 'OBJECTIVE' FOR THE UNLISTED FIRM

###### 9.1.2.1 THE ABSENCE OF A FORMAL MARKET

The nature of this problem is that the unlisted firm has no formal market to value its shares. Consequently the gauging of the market value of ordinary shares through which owner's wealth in the listed firm is affected is ruled out.

#### 9.1.2.2 THE DISCOUNT RATE

The second but related problem concerns the discount rate. It has been stated that the appropriate criterion for accepting or rejecting an investment proposal is the marginal cost of capital. The complexity of such a calculation for the listed company has been stressed in previous chapters and it was pointed out that in most cases such a cost is a mere approximation. This was recognized by Walker and Petty (1978:190) in their discussion of the objective of the small firm. They point out that most writers of financial theory refer to the concept of enhancing the value of the firm and many use the cost of capital as the criterion simply because it has been defined in terms of investors expectations. It is extremely difficult, they say, to use the cost of capital as a criterion in either small or large companies since it is extremely difficult to calculate. While there are those who say that they can compute an acceptable cost of capital for middle size or large firms, it must be concluded that it cannot be done for unlisted companies.

This problem centres mainly around the implicit nature of the cost of equity capital which will be addressed in depth in chapter 10. In this chapter however, a closer look will be taken at the objective of the unlisted or small firm. Some commentators in this regard refer to the problems of 'DCF objectives'.

### 9.1.3 NON DCF OBJECTIVES VERSUS DCF OBJECTIVES

#### 9.1.3.1 PROPONENTS OF NON DCF OBJECTIVES

##### i) Roland Robinson

Robinson (1969:55) notes that it is not at all clear that capital expenditure in small businesses has yet been influenced by DCF techniques, nor is it certain whether they should be. He points out that the more sophisticated formulas for the evaluation of capital expenditure assume some degree of certainty in the returns from such expenditures or that the expected return can be represented by the mean of a probability distribution. But, he points out, small business's capital expenditures are characterized by a considerable degree of uncertainty. He further notes that when the future is so uncertain the computation of expected cash flows become less dependable foundations for the evaluation of capital expenditures.

Robinson observes that the history of difficulties and mortality clearly shows that unlisted companies and specifically the small ones, are subject to a higher degree of uncertainty than large listed companies. This he postulates, is another way of saying that the precise computation of capital expenditure returns, while having some evidential value, should not be made the central or decisive feature in planning small business expenditure.

The owner may find it useful to look the problem square in the face. If he has great confidence of success or at least of staying in business, he can justify fairly long range decisions. But if in all candor, he recognizes that this may not be the case, then he may find it more prudent to use all of the temporizing devices at his disposal. Robinson (1965:55) suggests the decision maker follows the simplest of all capital expenditure rules : 'As little as possible.'

Apart from this strategy he says, the small businessman must also consider the fact that he has fewer resources with which to deal with uncertainty. He cannot survive many mistakes. He notes that a giant oil company for instance can drill for oil in unlikely places on the off chance of opening up a new oil field but for a small firm this is "Russian Roulette" and unless it is willing to play 'go for broke' it cannot afford the same risks. This great uncertainty in the returns of capital expenditures makes most of the refined computations of present value and rate of return largely irrelevant for the small company.

ii) Ernest W. Walker

Walker (1975:195) insists that it is impossible for small firms to employ any of the known methods such as NPV, IRR or profitability index in their present design when evaluating investment proposals. His rationale for this statement is that in order to use any of the abovementioned methods ef-



fectively, a firm must know its cost of capital. This he states, because of its computational complexity, is virtually impossible for the small firm to establish.

Apart from those theorists who oppose DCF, there are others who feel that financial decision making that involves the time value concept is so important that the unlisted firm, even if small, should pursue it.

#### 9.1.3.2 PROPONENTS OF DCF OBJECTIVES

##### i) O'Connor and Bueso

According to O'Connor and Bueso (1981 : 33-34) the present value of owners'equity in closely held corporations, proprietorships and partnerships is determined by the same method as the present value of ordinary shares. The price or market value of smaller firms may be thought of as the present value of the net cash flows to the owners.

They then proceed to provide an equation by which the price at which a business can be sold will be reflected in the size of the expected cash flows to the owners and the discount rate employed.

$$\text{Price}_{\text{SB}} = \frac{\text{NCF}}{\text{K}_{\text{SB}}}$$

Where :  $\text{Price}_{\text{SB}}$  = Price of small business  
NCF = Net cash flows to owners  
 $\text{K}_{\text{SB}}$  = The rate of return that could be earned elsewhere on comparable investments (opportunity cost)

O'Connor and Bueso substantiate their view by indicating that this proposition is confirmed by real estate practices in the USA. For example, the prices paid for apartment complexes and office buildings are based on cash flow estimates and discount rates based on opportunity costs. It is furthermore seemingly a fact that federal and state courts in the USA use the above stated equation in establishing the values of non publicly owned businesses.

A very good point is made by the authors regarding the markets in which large publicly owned firms operate and those in which small businesses operate. The valuation between these two are going to be influenced by the fact that the one asset, the publicly owned firm, is going to be sold in a large national market which is naturally competitive whereas the other asset, the small firm, must rely in most cases on the peripheral of the local market.

But this limited marketability must surely compound the riskiness of the unlisted firm!<sup>1</sup> It must necessarily have an impact on the discount rate and will be discussed further in chapter ten.

O'Connor and Bueso fail to provide a definition of market value. They appear to accept that a firm's market values and present values are always in equilibrium or that it is one and the same value since they refer to the price of the business as its market value, but without proper definition.

ii) Walker and Petty

Walker and Petty (1978:190) propose the following solution to the impasse of an investment objective of the small firm. They indicate that the predominant reason why businesses invest funds in assets is to increase the present value of the firm's equity capital. This objective is achieved only if the return on invested funds equals or exceeds the returns desired by both suppliers of debt and equity capital. If the return is equal to these expectations then there will be no change in the value of the firm; however if it is below or above, a change in value may be expected. It can therefore be assumed they conclude that the objective of the small business should be the maximization of owners equity.

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1. In this respect, see Martin, et al. (1979:377) regarding limited marketability of securities.

In this regard Reynders (1975:438-439) views the investment objective of the firm as a 'target rate' in that if an investment is made at this rate it would not increase or decrease the market value of the net worth. Reynders, however, refrains from coupling his 'target rate' to a time value.

Walker's and Petty's appealing statement above namely that the objective of the unlisted firm should be the maximization of the present value of owner's equity presents two problems. The first one is the discount rate which will be dealt with in chapter 10 and the second, concerns a market for the unlisted firm. In this respect Weston and Brigham (1987 :502) observe that it is difficult to argue for value based techniques when the value of the firm itself is unobservable.

It is therefore imperative that a closer look be taken at the market value of the unlisted firm.

#### 9.1.4 OTHER OBJECTIVES

##### 9.1.4.1 OBJECTIVE OF MAXIMUM MARKET VALUE OF THE UNLISTED FIRM

An objective of maximizing the market value of the unlisted firm is conceptually not all that different from the 'DCF objective.' The nature of the underlying problem is however more clearly defined.

To have a market value for the unlisted firm is an appealing thought. Such a value can be compared to present value of owners equity and should the two values be the same, an equilibrium value would exist.

A downswing in the economy could for example result in the market value being lower than the present value whereas in a period of upswing the contrary could be true. Whatever the case may be the buyer or seller has an idea of the equilibrium between two important values.

The listed firm invests funds in assets in order to increase the market value of its ordinary shares. This however, can only happen as has already been observed, if the present value of the equity increases. Only when investors have taken cognizance of this increase will they price the share upwards.

Whilst the listed firm has a market for its shares where it is formally priced, the market price of the unlisted firms equity is much more informally and infrequently determined. It is consequently much more the product of risk preferences of individual investors on the periphery of the local market and the negotiating skills of buyers and sellers.

Olson (1975:268-269) illustrates this point. He states that 'fair market value' is defined in the Federal Estate Tax Regulations and the Gift and Tax Regulations of the USA. This value is the price at which the property would change hands between a willing buyer and a willing seller, neither being under any compulsion to buy or sell and both having reasonable knowledge of relevant facts. He points out, however, that it is a time honoured definition and often quoted by experts, but, unfortunately of no help in valuing a closely held corporation.

Conradie (1982 : 34) regarded a study of Engler (1978:5), who refers to 'market value' in his definition of the normative objective of the small firm:

"If the owners interest is in a proprietorship the objective of management should be to operate in such a manner that the owners can obtain a maximum price in the market place for their interest."

This 'market value' as has been suggested, is based conceptually on present value. If owner's interest is given time value, such interest becomes the present value of owners equity. It therefore seems appropriate to accept that, in the absence of a formal market place for the unlisted firm, the market value when in equilibrium is determined by the formula suggested by Henderson, et al. (1984:86).

According to Henderson and his co-authors the market value of equity is the present value of the after tax earnings, capitalized at the required rate of return or equity rate. It must be pointed out however that Henderson's numerator namely 'after tax earnings' does not represent cash flows.

This formula can be depicted as follows:

$$\text{present value of owners equity} = \frac{\text{net income after taxes}}{\text{cost of equity capital}}$$

where:

$$\begin{aligned} \text{present value of owners equity} &= \text{present value of owners interest} \\ \text{net income after taxes} &= \text{net income} \\ &\quad (\text{earnings before interest and taxes less payments to financing sources and after deduction of applicable taxes}) \\ \text{cost of equity capital} &= \text{cost of owner supplied funds} \end{aligned}$$

There is a problem however for the unlisted firm in that in the absence of a formal market the cost of equity cannot be computed.

Apart from the possible objectives discussed up to now there are still other objectives which may be of overwhelming importance to investment decision making in the unlisted firm. One such objective concerns risk of insolvency.

#### 9.1.4.2 MINIMIZING THE RISK OF INSOLVENCY

Small firms face greater uncertainty than large firms in the cash flows they might generate beyond the immediate future. Large firms like IBM and General Motors have 'staying power': they can generally make an investment and then ride out cyclical downturns. Such periods are referred to as 'shake outs', and it is usually the smaller firm that is 'shaken out.' Therefore most small business managers feel uncomfortable when called upon to make forecasts beyond a year or two. Since DCF techniques require explicit estimates of cash flows through the life of the project, small business managers may feel that they cannot take seriously an analysis that hinges on what they regard as guesswork which, if wrong, can lead to bankruptcy (Weston and Brigham 1987 :501).

Walker takes up this dilemma and observes that because of the larger risk associated with unlisted firms an investment decision making problem is created. This risk does not only refer to business risk but also to financial risk (Walker 1978 :953).



Because of the increased risk problem, Walker suggests that the unlisted firm should try to avoid investments which might prove lethal. He furthermore recommends that the unlisted firm should not pursue investment criteria of expected value and risk associated with dispersion, but rather pursue a strategy of avoiding risk that could bring about insolvency.

According to Walker the reasons for the unlisted firms high risk profile are threefold:

1. unlisted small firms are not diversified;
2. they have less equity to form a cushion against losses and
3. they generally do not have the same credit status or assets to weather such losses (Walker 1978:953).

Weston and Brigham (1978:953) also discuss the small firm's high risk profile. They state that these firms usually do not have much initial capital. As a consequence, the typical small firm incurs an inordinate amount of trade credit, it has a weak current ratio, it is slow in paying its bills, and if it is inefficient, what little capital it has is quickly eroded.

It is consequently considered imperative by most observers that small firms should avoid investment alternatives that have the slightest possibility of precipitating insolvency (Walker 1975 :195-196).

An aspect that is very closely related to risk of insolvency concerns the way in which the unlisted small firm finances its long term investments.

#### 9.1.4.3 CAPITAL STRUCTURE OBJECTIVE

This objective can best be explained by quoting from Weston and Brigham (1978:145):

"Suppose a firm borrows on a one year basis and uses the funds obtained to build and equip a plant. Cash flows from the plant (profits plus depreciation) are not sufficient to pay off the loan at the end of the year, so the loan has to be renewed. If for some reason the lender refuses to renew the loan, then the firm has problems. Had the plant been financed with long term debt, however, cash flows would have been sufficient to retire the loan, and the problem of renewal would not have arisen. Thus, if a firm finances long term assets with permanent capital and short term assets with temporary capital, its financial risk is lower than it would be if long term assets were financed with short term debt."

Apart from the risk of insolvency problem in the above situation it must be remembered that by convention the marginal cost of capital is a function of only long term funds. If short term funds are introduced into the computation, the already problematic computation becomes nearly impossible. It must furthermore be remembered that DCF computations require fairly accurate cost of capital calculations.

Despite the lesson outlined in the Weston and Brigham's quotation there is overwhelming evidence that in South Africa, small unlisted firms make considerable use of short term funds in their capital budgeting programmes. Conradie (1982:396) for example found that because of the inaccessibility of long term sources of capital to the small business in the RSA, many of them utilize short term sources especially bank overdrafts and trade credit to finance their permanent capital requirements.

Walker (1975:201) explains that the use of a larger debt ratio is favoured by the small firm for the reason that short term debt is fairly easy to obtain. Sources of equity are limited in that retained earnings are usually small or non-existent and no market exist for sale of shares to the public.

Conradie's study (1982:211-212) generated the results depicted in table 9.1. The number of respondents totalled 251.

TABLE 9.1

NUMBER AND PERCENTAGE OF SMALL BUSINESS UNDERTAKINGS UTILIZING DIFFERENT SOURCES OF FINANCING

SOURCE OF FINANCING	SMALL BUSINESSES UTILIZING FINANCING SOURCE	
	Number	Percentage
1. Owner supplied capital (equity)	210	83,7
2. Bank overdrafts	189	75,3
3. Trade credit	144	57,4
4. Leasing	104	41,4
5. Loans by owners	89	35,5
6. Hire purchase agreements	66	26,3
7. Mortgage bonds	43	17,1
8. Personal bank loans	32	12,8
9. Loans by members of family	28	11,2
10. Loans by private individuals	12	4,8
11. Other forms of capital (bills receivable, advances by suppliers and loans by statutory development corporations)	10	4,0

Source: Conradie (1982:211-212)

Conradie undertook a parallel opinion survey amongst bank managers concerning their opinion inter alia on the debt/equity ratios of small unlisted firms. Of the managers interviewed 66 per cent were of opinion that the small firms' equity capital ought to comprise at least 51 per cent of its total capital. Of bank managers that have authority over granting of bank finance only 33,3 per cent deemed a 40 per cent level of equity as sufficient. Only 6,2 per cent thought a 30 per cent equity in the capital mix was sufficient.

This in effect means that any small firm with an equity/debt ratio of less than 50 per cent will experience problems in acquiring additional capital (Conradie 1982:214), and yet bank overdrafts are the second most popular source of financing for the small unlisted firm.

Conradie furthermore conducted research into the financial statements of 116 small businesses. He compared the results of the survey with a study by the Bureau of Financial Analysis of the University of Pretoria (1972:73) and that of a British study by Wilson (1979:57). His results correlated positively with the other two showing an equity/debt proportion in the financial structures of small unlisted firms of +-40:60.

Conradie's study seems to verify Walker's (1975:195-196) observation, namely that small unlisted firms have relatively small equity bases and secondly that of Weston and Brigham (1978 :953) who stated that the typical small firm incurs an inordinately large amount of trade credit.

The capital structure objective might thus be of overriding importance at times. The small business with an equity/debt ratio (which includes short term debt) of 30 per cent might well have no option but to strive for a more respectable ratio by deliberately reducing trading levels dramatically.

#### 9.1.4.4 THE CERTAINTY EQUIVALENT OBJECTIVE

What makes the certainty equivalent method so appealing is, according to Walker (1975 : 199) that, the necessity of knowing the firm's cost of capital is eliminated. Furthermore the point is made that the individual is able to relate his personal objectives and risk attitude to the project under consideration. This means that a risk taker is permitted to accept those projects with greater risk but at the same time the risk averter is permitted to select less risky projects.

Walker claims that small businessmen are generally more capable of equating the expected value of a risky project with returns that are certain, than managers of large firms. He supports his argument on the following grounds:

- '1. Most small businessmen are able to determine their risk characteristics. The result is that they are able to relate the risk characteristics of proposed projects to their risk attitudes.
2. The method requires no knowledge of the firm's cost of capital' (Walker 1975:201).

Schwab and Schwab (1975:219) assert that ideally, in evaluating an investment proposition, the decision maker would like to derive the probability distribution of the net present value of the benefits to be derived from the invest-

ment. He would then assign a personal value derived from his particular utility curve to the present value of each of the possible gains and losses as given by the probability distribution. From this would be derived the expected value which the investment proposition has to meet, thus obtaining a truly valid measure of the preferences involved in the evaluation of investment alternatives.

However, Schwab and Schwab observe, that while it is very valuable to have a clear conceptual understanding of what it is one wants to accomplish, from an operational viewpoint one might have to compromise such an ideal simply because of the time and costs needed to carry it out.

It would of course be difficult to effectively communicate such an objective to other decision makers in the firm and it is highly likely that practical implementation of this approach would result in the 'subjective methods' attended to in UK and SA studies.

A further and perhaps more urgent investment objective that can be of extreme importance, since various studies have shown that small unlisted firms are mainly cash orientated (section 9.1.4.5), is the liquidity objective.

#### 9.1.4.5 THE LIQUIDITY OBJECTIVE

A firm is said to be liquid when it can meet its maturing short term obligations. The ratio that is intended to measure this rate of liquidity is the current ratio and is depicted as follows :

$$\frac{\text{current assets}}{\text{current liabilities}}$$

The quick ratio is also a measure of liquidity, but a much more stringent one in that it recognizes the fact that inventory may not easily be converted to cash at book value. It is consequently measured as follows:

$$\frac{\text{current assets} - \text{inventories}}{\text{current liabilities}}$$

The objective (though not always attainable) of liquidity seems to be a dominant requirement for many small firms. Walker (1975 :188) refers to a study by Gupta (1969 :527) for example which revealed that small firms were generally less liquid than large firms.

Soldofsky observed that small firms are first and foremost concerned with basic survival, so they tend to look at expenditures from the standpoint of their near term effects on



cash. This cash and survival orientation leads the firm to focus on a relatively short term time horizon, and this in turn leads to an emphasis on the payback period method.

The payback method gives the firm an indication of the time required to recover the cash committed to an investment and thus of when cash will again be available for new opportunities (Weston and Brigham 1987:501).

It therefore seems logical to reason that if survival of the small firm is dependant on liquidity it could become an investment objective that would exclude all others. It would of course be a derived objective : the fundamental objective is to survive.

## 9.2 CONCLUSION

It seems clear from literature that in so far as unlisted small firms do not use time related methods in their investment decisions they are placing themselves at a competitive disadvantage vis a vis firms who do use such methods.

Studies reveal a substantial utilization of short term debt by small unlisted firms in the financing of their investments. These firms will accordingly be unable to correctly utilize DCF methods in their investment decision making

since they would be unable to realistically calculate the marginal cost of capital (quite apart from the problem of market value of equity).

Although at first sight appealing the certainty equivalent method contains measurement difficulties. Furthermore, partnerships or private companies can have more than one relevant decision maker involved. This means that the utility preferences of all the decision makers are relevant. It is thus often simply not possible to specify expected values of utility preferences.

Although the certainty equivalent method cannot be directly employed it might however contribute an ingredient of a discounted cash flow process in which the degree of a projects risk is directly related to the managers perception of the extent to which cash flows will vary in any future period. The analysis of risky projects is consequently dependant upon the managers perceptions of cash flow characteristics and his personal risk preferences (see chapter four). The discounting rate consequently becomes a function of the decision makers utility preferences.

It might be appropriate at this point to reiterate Weston's and Copelands (1985 : 388) statement in this regard namely: 'that risk aversion is reflected in the discount rate investors apply when determining the value of the firm.'

A valid point is made by Walker in that the unlisted firm is likely to refrain from making an investment decision that has any chance of bringing about insolvency. The reason being that the small unlisted firm's limited capital resources make it difficult to weather a bad decision. The 'market value' objective has not been resolved. The absence of a discount rate for equity, due to the absence of a formal market makes it virtually impossible to compute a 'present value' that will according to Henderson, et al. reflect the 'market value'. Even if the 'present value' of owners equity could be computed it would be necessary for a transaction to actually take place in order to gauge whether the 'market value' is above or below 'present value'.

The liquidity objective of the unlisted small firm appears to be of such supreme importance that it can easily lead to the exclusion of all time related evaluation methods.

### 9.3 SUMMARY

Two main problems in the utilization of the classic profit maximization objective for the unlisted small firm have been identified. The first being the absence of a continuous formal market for its shares or equity and the second being the apparant impossibility of computing an appropriate discount rate.

Some opponents of DCF methods for small firms such as Robinson and Walker adopt their stance primarily because of the discrepancy in risk profiles between the small unlisted company and the listed company.

The theory put forward by proponents of DCF techniques for small business, is at first sight appealing in that it hinges around the time value of money. This 'value' can furthermore be compared to a 'market value' and is supposedly equatable to the valuation model developed for the listed company. Henderson, et al. suggested that the 'market value' of equity is the present value of the after tax earnings capitalized at the equity rate. However the computation of the capitalization rate of the equity of the unlisted firm is impossible in the absence of a formal market.

The problem of a reliable 'present value' and consequently 'market value' therefore remains unresolved and the approach really 'hangs by its own boot straps.' There is evidence that small unlisted companies make substantial use of short term funds in their financing of capital expenditures mainly because of limited access to capital markets. Accordingly the computation of a reliable discount rate is further complicated.

Further objectives considered include the avoidance of insolvency. Walker quite rightly states that the small unlisted firm, because of its limited capital should refrain

from making investments that have the slightest probability of bringing about insolvency (unless the owner is really a risk seeker or gambler).

The certainty equivalent objective approach by Walker does at least accommodate risk preferences directly. It has advantages in that it does not require a cost of capital calculation and secondly the individual is able to relate his risk attitude directly to the project under mention. The method is, however, impractical in that the compared utility preferences of directors of private companies or partners of a partnership cannot be measured or effectively communicated.

A final vital objective considered is that of liquidity. It seems very often to be of overriding importance to small unlisted firms and ties in neatly with the avoidance of the insolvency objective. Both of these objectives are undoubtedly rooted in the more fundamental quest for survival which the small unlisted firm must tackle from a relatively disadvantaged position. it seems that survival rather than profit maximization ought to be driving force of small business.

While the objective of the small firm might render the DCF approach inappropriate, the elusive search for a suitable discount rate might well render the DCF approach an impossibility. This aspect will now be addressed.

## CHAPTER TEN

### THE DISCOUNT RATE FOR UNLISTED FIRMS

#### 10.1 INTRODUCTION

The importance of an appropriate discount rate for the unlisted firms lies in the fact that such a rate is needed to gauge whether an investment is acceptable or not in terms of adding to the present value of owners equity.

Whereas the cost of debt can be computed since it is of contractual nature the same cannot be said of the cost of equity. The absence of a formal market for the equity of the unlisted firm is a formidable problem in the determination of an appropriate discount rate.

Weston and Brigham (1987:578) recognize this problem and suggest the CAPM be used in order to solve it.

#### 10.2 THE USE OF THE CAPM TO CALCULATE THE COST OF EQUITY OF THE UNLISTED FIRM

Since the unlisted firm's equity is not publicly traded its beta cannot be calculated and hence the above method cannot be applied, directly. However the so called 'price play' technique might be considered for the unlisted firm. This

involves finding a firm in the same line of business that does have public equity, estimating its beta and then using this beta<sup>1</sup> as a proxy for that of the unlisted firm in question in the CAPM model (Weston and Brigham 1987 :578). They furnish the example below to illustrate the approach.

Assume for example that a small privately held company in the paper manufacturing industry wants to calculate the cost of its equity capital. Using the paper industry beta (1.11) as a proxy for the firms beta, an expected market return of 14 per cent and a risk free rate of 10 per cent, the firm's cost of equity capital is estimated to be:

$$\begin{aligned}k_e &= r_f + b(k_m - r_f)^2 \\ &= 10 + 1,11(0,14 - 0,10) \\ &= 14,4 \text{ per cent}\end{aligned}$$

van Horne (1983:215-216) justifiably warns that caution be exercised in the application of the CAPM approach for the calculation of the cost of equity of the unlisted firm. His argument includes the following observations:

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1. In the RSA beta's for different firms on the JSE are calculated and compiled by the Bureau fo Financial Analysis at Pretoria University.

2. Refer to section 5.4.4.2 for an explanation of these symbols.

### 10.2.1 RESIDUAL (UNSYSTEMATIC) RISK

The CAPM assumes the presence of perfect capital markets. Under this as well as other assumptions the required return on equity is determined by the company's systematic risk. When these assumptions are relaxed, we take account of real world conditions. Consequently the residual risk of a firm may take on a significant degree of importance. The assumption of the CAPM, as will be remembered, is that residual (unsystematic) risk can be completely diversified away, leaving only systematic risk (van Horne 1983:215).

The unlisted firm, most of them having their eggs in one basket, does not live up to this assumption and will consequently have substantial residual risk. The total risk of the firm thus becomes a factor of concern. Stated differently, the probability of the firm going bankrupt depends on the total variability of its cash flows. Thus the greater the residual risk of a company, the greater the expected bankruptcy costs to be incurred, holding systematic risk constant. As a result, investors will demand a higher required rate of return for a company than that dictated by its systematic risk alone.

Therefore, the required rate of return given by the CAPM needs to be adjusted upwards by some arbitrary percentage if this factor is to be taken into account.



### 10.2.2 DIFFERENT CAPITAL STRUCTURES

If it happens that the proxy company has a capital structure different to that of the unlisted company which proposes to use its beta, (i.e. more or less leverage), the beta will have to be adjusted (van Horne 1983:194).

Van Horne recommends that the beta for the proxy firm first be estimated in the absence of leverage and that this figure then be adjusted for the proportion of leverage the unlisted firm wishes to employ. The overall required rate of return for a company would then be comprised of the risk free rate  $i$ , plus a premium for business risk,  $(r_m - i) b_{ju}$  and a premium for financial risk.

This is depicted as follows:

$$r_j = i + (r_m - i) b_{ju} [1 + b/s(1 - t)]$$

where  $r_j$  = required return (including a premium for business risk and one for financial risk)  
 $i$  = risk free rate  
 $r_m$  = return on the market portfolio  
 $b_{ju}$  = the beta measuring the responsiveness of the excess return for the security (returns for the security less risk free rate) in the absence of leverage to the excess returns for the market portfolio (returns for the market portfolio less risk free rate)  
 $b/s$  =  $\frac{\text{debt}}{\text{equity}}$   
 $t$  = tax rate

## Step 1

If  $r_j$  is now the required rate of return for the proxy company with a beta ( $b_j$ ) of 1.4 and a  $b/s$  ratio of .6 and the unlisted company has a  $b/s$  ratio of .3 the following procedure should be used.

Establish the proxy company's beta ( $b_j$ ) in the absence of leverage:

$$\begin{aligned} b_{ju} &= [1 + \frac{b_j}{b/s(1-t)}] \\ &= [1 + \frac{1,4}{0,6(0,5)}] \\ &= 1,08 \end{aligned}$$

## Step 2

Adjust the unlevered beta to comply the total risk of the unlisted firm:

$$\begin{aligned} \text{Adjusted } b_j &= b_{ju}[1 + b/s(1-t)] \\ &= 1,08[1 + 0,3(0,5)] \\ &= 1,24 \end{aligned}$$

Mechanically this is a satisfactory approach for overcoming financial risk. However, it does nothing to solve the previously mentioned problem of residual risk.

A further difficulty considered by van Horne relates to a 'liquidity premium', a matter raised by Weston and Brigham (1987 :579) themselves.

### 10.2.3 LIQUIDITY PREMIUM

A highly liquid asset is one that can be sold and thus converted to spendable cash on short notice. Actual markets, which provide liquidity, exist for government securities, the shares and debentures of large companies and the securities of certain financial intermediaries. If a security is not liquid, investors will add a liquidity premium when they establish the market interest rate on the security (Weston and Brigham 1987 : 71).

The shares of unlisted firms are not traded in the markets and are accordingly relatively illiquid. Accordingly, the authors indicate that a 'liquidity premium' should be added to reflect the illiquidity of the small unlisted firm. They acknowledge that it is very difficult to objectively assess liquidity premiums, but observe that a differential of at least 1 and probably 2 percentage points exists between the least liquid and the most liquid financial assets of similar default risk and maturity.

### 10.3 CONCLUSIONS

Although the utilization of the CAPM to calculate the cost of equity of the small firm seems at first sight to be conceptually appealing, it in fact presents formidable obstacles:

- \* it is doubtful whether the greater percentage of small businessmen, would be able to comprehend the CAPM with all its ramifications and adaptations;
- \* even if they were to master the theory of the model, a number of matters are of an extremely arbitrary nature. For example, how many percentage points should the required rate of return be adjusted upwards for relative degrees of residual risk that could lead to bankruptcy. The same can be said for the liquidity premium, and
- \* identification of an approximate proxy firm is not an easy matter in South Africa as many potential proxy firms are subsidiaries within large conglomerates which do not necessarily seek to optimize the financial structure of each subsidiary in isolation.

The small businessman furthermore finds himself very much in a real world situation where capital markets are imperfect and taxes and transaction costs are very real. These and other assumptions of the CAPM makes it unfit to calculate the cost of equity of the unlisted firm.

As was pointed out in chapter five the cost of equity in the large firm represents the values of investor's opportunity expectations. It is however unlike the small firm, quantifiable, although the method (the Gordon model) is questionable and subject to a multitude of assumptions.

In rejecting the CAPM for the purpose under consideration, alternative approaches need to be explored. Since opportunity cost is regarded as a valid criterion in financial literature for measuring the value of the firm it warrants closer scrutiny.

#### 10.4 OPPORTUNITY COSTS

Solomon (1963:52-54) considered two approaches to this problem viz the 'personal use' approach and the 'external yield' approach.

##### 10.4.1 THE PERSONAL USE APPROACH

This approach examines the use to which the shareholder would put the retained earnings had he received it in dividends. It consequently concerns the rate at which investors are assumed to be able to reinvest their dividends.

Freear (1980:133) observes that the problem with this approach is that shareholders are very different from one another in their attitudes and the time patterns of their consumption. Apart from this they have different tax rates. High rate income tax payers would tend to prefer lower tax capital gains which would not necessarily be the case among low or even zero rate income tax payers.

The personal use approach is thus considered to be impractical for the purpose of calculating the cost of equity and will not be dealt with further.

The second approach concerns the external yield that could be earned in the market.

#### 10.4.2 THE EXTERNAL YIELD APPROACH

In the 'external yield' approach Solomon (1963:52-55) suggested that the assumption should be made that shareholders would invest the money, if released to them, in alternative risk securities in the market. Therefore the minimum rate would be the rate at which the firm could reinvest the money on their behalf in other firms' securities.

This approach suffers from the disadvantage that it offers a minimum required rate of return rather than an accurate measure of the best alternative to internal investment. Furthermore individual shareholders may well have opportunities which exceed the rate that could be earned by the company externally (Freear 1980 :133). This statement by Freear activates the following question: Is the small businessman aware of better external investment opportunities of similar risk?

Scheurkogel (1971 :291) refers to Meij and Willems (1966:156) who suggest that the biggest problem here is the determination of the external yield or 'lending rate'<sup>3</sup> and secondly the quantification of the inherent risk. These two factors, they assert, will differ from person to person, from project to project, from firm to firm and from one period to another.

This criticism makes sense for the unlisted firm in that different utility preferences among small businessmen will naturally give rise to different degrees of risk aversity that will again result in different capitalization rates.

In order to avoid the problems put forward by Meij and Willems, Scheffer (1968:107-112) proposed a variant of the 'external yield' approach.

#### 10.4.3 'AVERAGE FIRM'S EARNINGS YIELD' IN THE INDUSTRY BRANCH

The 'external yield' or 'lending rate' is seen by Scheffer as the 'investment opportunity rate' which he equates to the average earnings yield achieved over a sufficiently long period by a similar representative undertaking in the same branch of industry, provided it is efficiently managed.

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3. Scheurkogel (1971:293) also describes the 'external yield' but calls it the 'lending rate'.

This is by interpretation the earnings yield of the 'model' undertaking in a specific branch of industry. This average must serve as a criterion against which all undertakings in that branch of industry should use to compare their internal rate of return.

Scheffer notes two advantages to this approach:

1. This approach to the cost of capital concept does away with the implicit assumption embodied in the NPV method, namely that all cash flows are reinvested at the cost of capital.

Scheffer's approach consequently assumes reinvestment at the internal rate of return.

2. The second advantage Scheffer notes is that this approach also provides the business that lacks a listing on the stock exchange with a cost of capital that is very real in value.

Scheurkogel (1971:292) refers to Meij and Willems (1966:157) who on the other hand, question the concept of a representative undertaking. This according to them, is not easy to establish. They furthermore feel that there is absolutely no reason why any undertaking in a specific branch of industry should aim to attain a yield equal to that of a so-called representative undertaking in the same industry. It is fur-



thermore felt that a representative yield is without any real significance since the problem at hand is centered around the significance of the project for the specific undertaking involved.

Finally Meij and Willems make the conclusion and valid point that Scheffer implicitly denies the fact that differences in capital structures between a firm and the so called representative firm will compel the management of the former to look for different yield targets: firms with relatively higher debt ratios will have a relatively higher cost of capital because of greater inherent risk and vice versa.

It will be useful to list certain additional aspects that have been overlooked by Scheffer:

\* **Firm Size**

This point concerns the fact that not all small undertakings in the same branch of industry are of the same relative 'size'.<sup>4</sup> Brigham and Smith (1967:10) state that in respect of cost of equity the usual argument is that the required rate of earnings should be higher for small firms, not only because they are more risky but also because they are less liquid. The small business

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4. 'Size' is here determined in terms of total capital employed.

must therefore require a higher return to compensate for the fact that it is much more difficult to liquidate its investment.

As will be remembered a liquidity premium was also suggested by Weston and Brigham for the small firm under discussion of the CAPM.

\* **Industry Averages**

The unfortunate fact exists that industry averages are not freely available in the RSA. This means that a so called 'target yield' will be difficult and costly to establish.

\* **Distortion of Reported Profits**

Reported profits of many unlisted firms are understated because of apparently excessive salaries and withdrawals by the owners, motivated primarily by personal tax considerations (Brigham and Smith 1967 :11). The reported profit position of such a firm can therefore not serve as a true criterion to be measured against 'the average earnings yield' propagated by Scheffer.

Another aspect that will tend to affect the real opportunity cost of the unlisted firm is what can be called 'non economic satisfactions.' It seems to be such an important aspect in the cost of capital composition of the small firm that it warrants an in depth investigation.

#### 10.4.4 NON ECONOMIC SATISFACTIONS - AN OPPORTUNITY COST

##### 10.4.4.1 INTRODUCTION

Brigham (1967:114) highlights non economic satisfactions as an important aspect in the composition of the cost of equity capital for the small business. This aspect, he claims, actually tends to lower the effective cost of equity for such a business.

Control is one "non economic satisfaction" identified by him. He asserts that the ability to buy control with a relatively small investment may reduce the cost of equity. He furnishes an example as to how advantages of 'working for oneself' can be translated into cost of capital terms:

"Suppose alternative investments each require an outlay of R25 000. The first consist of the shares of a large, listed company on which the investor expects a return of 10 per cent consisting of dividends and capital gains.

The second consists of all the shares in a small business, and on this the investor expects an 8 per cent return consisting of dividends, capital appreciation and incremental salary. Is it not possible that a rational well informed investor might choose the latter in spite of its lower expected returns, greater risk, and much lower liquidity, simply in order to be his own boss? If this is so, and this feeling is strong among many investors, then it is possible that the cost of capital could be lowered for certain smaller firms."

Brigham (1967:115) warns that this theory should not be pushed too far. He says that although owner/managers may be willing to invest their own funds at a lower return, it is most unreasonable to believe that the owner/manager himself would be willing to accept marginal returns on unlimited increments of investment.

Conradie (1982 : 36) considered a study by Boswell (1973:5) who concurs with Brigham concerning the above theory. He notes that the small businessman's financial motives are often subject to this want for independence.

The allegation that the required rate of return to the owner of the small business is a function not only of economic reward but also of non economic satisfactions was investigated further by Boyer (1978:76-77) in a study on cost of capital of the small firm. The author made an effort to

determine the non economic factors which provide these satisfactions. Her point of departure was summed up as follows (Boyer 1978 : 76 - 77).

"A small businessman has an outside opportunity which would return 12 per cent on his investment. If he continues to own the small business, his monetary rewards on investment will be approximately 8 per cent, yet he chooses to continue ownership. What is suggested is that some of the required return is not of a monetary nature. There are behavioural circumstances which cause the 8 per cent monetary return to suffice, to be valued at least equally to the outside return of 12 per cent. This implies that owners are motivated, by other forces than money and rejects the economic man concept of Adam Smith<sup>5</sup> as being applicable to the small business owner."

In order to isolate the behavioural circumstances which permit a substandard financial return to suffice Boyer (1974:77-90) reviewed a number of motivational approaches.

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5. Adam Smith's 'economic man' concept states that man is a maximizer i.e. men, whether they are engaged in producing or in distributing the fruits of production, seek to gain as much wealth or pleasure as they can (Heilbroner and Thurow 1975 :34).

#### 10.4.4.2 MOTIVATIONAL THEORIES

Initially Boyer (1974:77-90) researched the theories of Maslow (1964:6-19) and Hertzberg, Mausner and Snyderman (1959).

Maslow suggested that there are different levels of needs which act as motivators namely physiological, safety, social, esteem and self-actualization. These needs are arranged in order of prepotency; when one is satisfied the next level becomes the motivating force. Of these needs the most vital are the physiological one's relating to the desire for food, water and sexual activity. Safety and security needs concern protection against threat danger and deprivation. Esteem and ego needs include esteem from others like prestige, status and recognition as well as self esteem like confidence, achievement and knowledge. The need for self-actualization is best described by what a man can be and must be, it concerns the realization of self potential.

Hertzberg, et al. (1959) formulated the motivation-hygiene concept. Hygiene factors could be identified by supervision, interpersonal relationships, physical working conditions, salary benefits and job security. If these factors deteriorate to a point below the acceptable level of the employee he becomes dissatisfied. On the other hand, if these factors are increased the dissatisfaction will be eliminated but the employee will not be motivated. Only motivational factors like recognition, achievement, advance-

ment, responsibility, potential for growth and challenging work will lead to positive attitudes. The reason being that the latter factors satisfy the individuals need for self actualization.

Boyer (1974:79) concluded that the two theories (Maslow's and Hertzberg's, et al.) were not conflicting in terms of the types of needs that individuals perceive. Hygiene factors are similar to physiological safety and social needs whereas motivational factors correspond to the needs for esteem and self actualization.

The difference in the theories rather rests in the motivational aspect of the needs. Maslow alleges that any unsatisfied need can be a motivator and furthermore that once a need is fulfilled the next higher becomes the motivator.

According to Hertzberg, et al. only motivational factors can motivate while adverse hygiene factors act as preventatives.

Boyer (1974:79) furthermore asserts that her study on the cost of equity capital is more concerned with the existence and strength of these needs rather than their emergence as motivators: disagreement over the role of the lower level needs would not alter the analysis of them as providing behavioural reward to the owner of a small business.

Boyer's next step was to determine which needs act most to motivate owner-managers of small firms. However, it was established that no specific study had been made of motivation of persons in this particular role. Consequently it was decided to review works which might be applicable to these individuals, although they were not the subjects in the studies.

The first research project studied was the need hierarchy concept by Porter (1962 : 375-384) relating to job attitudes. Porter proposed five levels of needs:

1. security (related to aspects of the job);
2. social;
3. esteem;
4. autonomy (related to authority, independant thought and participative decision-making) and
5. self actualization.

Porter found that job level influenced the extent to which needs are fulfilled. He found that higher level management received more fulfillment of the higher level needs for autonomy and self actualization than did middle management. In a second study Porter (1961 : 1-10) ascertained that the fulfilment of needs for security esteem and autonomy generated less satisfaction for lower level management than for



middle management. In yet a third study Porter (1963 : 386-397) found that company size did not significantly impact on job satisfaction.

A study was also made by Boyer of the work done by Greunfeld (1962 : 303-314) on the importance of job characteristics to industrial supervisors. The characteristics are ranked decreasing in order of importance:

1. greater opportunity for advancement;
2. better opportunity for education and self development;
3. more opportunity to see concrete results of my own work;
4. a higher degree of personal responsibility;
5. more opportunity for independant action;
6. more opportunity to lead and develop subordinates;
7. greater job security;
8. more opportunity for close association with higher level management;
9. higher wages;
10. more prestige within the company;
11. more frequent and closer contact with workers;
12. more power and authority;
13. fewer people to please, less criticism;
14. fewer worries, tensions and troubles;
15. better fringe benefits;

16. less need for dealing directly with workers;
17. more definite and regular working hours and
18. safer, cleaner, less fatiguing work.

Boyer (1974:82) concluded that relative to Herzberg's theory the first hygiene factor encountered was number seven; above that all are motivational. The most important items appeared to be higher level motivators, whereas the least important items appeared to be hygiene factors. The importance of higher level motivational factors in management positions, Boyer decided, was therefore confirmed.

Boyer (1974:82) then considered a study by Ghiselli (1963: 631-642) on managers in different countries. Ghiselli isolated one common factor that prevailed. This factor was the greater importance of the needs of self actualization and autonomy than prestige, social acceptance or security needs. Ghiselli's common denominator of higher level motivational factors in management positions also emerged in a study by Vroom (1964) on work and motivation. Vroom concluded that:

- \* the level of performance varied directly with the strength of need for achievement, particularly with a challenging task;
- \* individuals performed at a higher level if they believed that the task required abilities which they valued (self esteem) and

\* persons who were permitted to participate in decision making performed at a higher level than those who were not (Boyer 1974:82).

Boyer (1974:83) firstly concluded that all the empirical results examined verified the motivational potency of higher level needs in managerial ranks. It was then assumed by Boyer that although none of the studies deal specifically with owners, the concept would also be valid for owner/managers. Indeed, Boyer suggested that these needs were even more relevant for owner/managers because of a greater opportunity for their fulfilment. They would accordingly be prepared to accept a lesser monetary return than could be obtained through outside investment where ownership and management were separate. It is therefore suggested by Boyer that the cost of equity capital is a function not only of monetary return but also of what is termed behavioural reward (fulfilment of higher level needs such as achievement and self esteem).

Boyer formalized this as follows:

$$k_e = f(y, b)$$

where:

$k_e$  = cost of equity capital

$y$  = monetary return

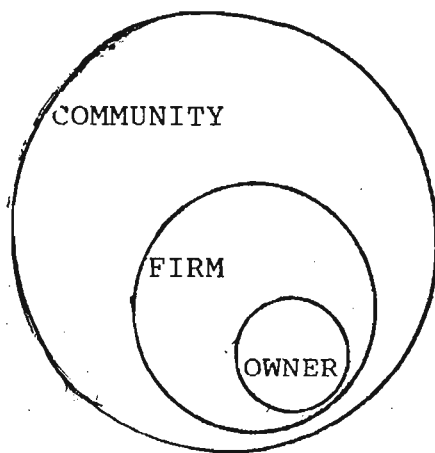
$b$  = behavioural reward

In order to verify this relationship the need to make behavioural reward more specific appeared to be obvious. This, it was decided, could be accomplished through enumeration of specific operating characteristics of the small business which might provide satisfaction and motivate continued investment in small business.

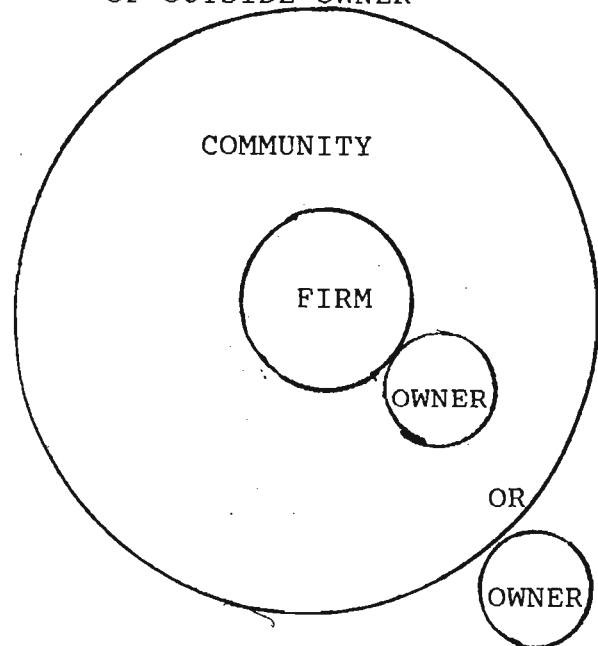
#### 10.4.4.3 THE OPERATING ENVIRONMENT OF THE OWNER-MANAGER

Boyer (1974:84) postulated that the environment in which an owner/manager operates differs from that of an outside owner: the owner manager is operationally oriented not only to himself, but also toward the firm and the community in which it operates. The environment is visualized as follows:

OPERATING ENVIRONMENT  
OF OWNER/MANAGER



OPERATING ENVIRONMENT  
OF OUTSIDE OWNER



The outside owner is identified as an entity which is separate from the firm and could even be separate from the community. Boyer suggests that the following four 'aspects' descriptively label the operating environment of the owner/manager as it differs from that of the outside owner:

1. In the small business the owner manager function as both manager and worker. This dual function allows control over his economic environment. The owner/manager furthermore holds job continuity at his option. These relevant needs are economic in nature and consequently it was decided to refer to the needs as self economic.
2. The position of the owner/manager is essentially dictated by the size of the firm and his share of ownership. Boyer concluded that these two factors could be related to status motivation and specifically one's estimation of one's self.
3. Because of the role that the manager fulfills within the firm he must be regarded as a decision maker. This decision making role creates a number of motivational opportunities in terms of need for achievement (as researched inter alia by Miner (1973 : 146-158), McClelland (1961) and Likert (1961) which are not available to the outside owners.

4. Based on a study by Roth, Ferrari and Ryans (1971:5-6) on the impact of social responsibility on the jobs of financial managers, Boyer states that the owner/manager will, as a representative of the firm, strive for social accomplishment in the community.

#### 10.4.4.4 AN EMPIRICAL APPROACH

Boyer (1974:90) based her empirical approach for determining behavioural rewards on the foregoing four factors, restated as follows :

1. self economic (control over income and job security);
2. self ego (pride in ownership and being one's own boss);
3. firm executive (leadership and participation in decision making) and
4. community (esteem by members of community and contribution to growth).

A questionnaire was structured around these factors and the results are reflected below :

i) Establishment of Current and Expected Future Return on Investment.

As a reference point it was first necessary to establish a platform of existing and expected future financial rewards of the owner/managers included in the study. These results are reflected in Table 10.1:

TABLE 10.1

PRESENT AND EXPECTED FUTURE RETURNS ON EQUITY  
(PER CENT OF RESPONDENTS IN EACH CATEGORY)

Current	Future					
	<4%	4-8%	8-12%	12-16%	16-20%	over 20%
< 4 %	10%		6,7%			3,3%
4-8 %		20 %				
8-12 %			10 %			
12-16 %				13,3%	3,3%	
16-20 %					13,3%	
over 20%						6,7%

Source: Boyer (1974:92)

(Failure to respond to one or both questions 13,4 per cent.)

It is striking that 73 per cent of the respondents expected future rates of returns to be about the same as current returns. Only 13,3 per cent believed that the rate of return would increase.

ii) Returns from Possible Outside Investments

Apart from questions on present and future returns, returns from possible outside investments were queried in an attempt to approximate an opportunity cost.

Only 35,5 per cent of the owners stated that they believed that investments outside the firm offered higher monetary returns. Further questioning elicited the first of many behaviourally oriented responses: 37 per cent of the owners stated that regardless of the outside returns they would not consider alternative investments. Another 32 per cent stated they would switch investments only at a very high return: over 20 per cent. Boyer (1974:93) observes by reference to the results in Table 10.1 that only 10 per cent of the study owner/managers ever expected their returns to reach that figure. These responses, she concludes clearly confirm the theory that non monetary returns influence the actions of the owners.



iii) Relative Importance of Behavioural Factors Relating to  
Ownership Environment

The factors appearing in Table 10.2 were proposed as being important to the owner of a small firm. It was not expected that all characteristics would be equally motivating for all owners. Satisfaction could vary based on the number and roles of owners in management and on the length of time of ownership.

Two determinations for each factor were sought viz. whether the factor has any importance at all and if so its general strength of importance for small business owners. Table 10.2 clearly shows the importance of these operating characteristics of the owner manager environment.

TABLE 10.2

IMPORTANCE OF BEHAVIOURAL FACTORS AS MEASURED BY PER CENT OF OWNERS FOR  
EACH RESPONSE

	DEGREE OF IMPORTANCE			DEGREE OF UNIMPORTANCE			MEAN	SUM OF MEANS	STANDARD DEVIATION
	1. MODERATELY	2. SLIGHTLY	3. VERY	1. MODERATELY	2. SLIGHTLY	3. VERY			
	1	2	3	1	2	3			
FIRM EXECUTIVE	I can play a part in planning and controlling decisions	63,3	20	16,7	-	-	-	1,53	,78
									3,53
	I hold a leadership position	56,7	6,7	26,7	3,3	3,3	3,3	2,00	1,36
SELF EGO	I can be my own boss	50	6,7	33,3	-	-	10	2,23	1,57
									3,90
	I take pride in running my own business	66,7	13,3	13,3	3,3	-	3,3	1,67	1,18
SELF ECONOMIC	I know that my job is secure	40	3,3	26,7	10	6,7	13,3	2,80	1,81
									4,77
	I control my income by my own actions	63,3	6,7	16,7	3,3	3,3	6,7	1,97	1,54
COMMUNITY	Members of my community recognize my position in my firm and hold me in esteem because of it	23,3	6,7	16,7	20	-	33,3	3,45	2,03
									5,92
	I feel that I am contributing to the growth of the community	36,7	20	23,3	10,0	-	10	2,47	1,57

Source : Boyer (1974 :94)

Table 10.2 reveals that participation in planning and controlling decisions was rated as most important by all owners. Second was pride. Boyer (1974:93) points out that these results confirm that motivation toward fulfillment of higher level needs is most pertinent.

Respondents also found a motivating force in the desire to be responsible for their businesses, and to achieve success in them. Also rated as important was control over owner income. Respondents seemed more willing to accept lower profit knowing that they were directly responsible for it.

Boyer observes that when community related needs, which seemed to be the least important, are eliminated, the rating of importance seems to give rankings similar to those of Maslow: economic needs are less important than ego or status needs and these in turn are less important than factors that provide potential fulfillment of the need for self actualization.

iv) Sacrificing Percentage Return on Investment for Non Monetary, Operating Factors

Respondents were asked to indicate whether they would sacrifice large, moderate, small or no returns on investment for behavioural reward. Table 10.3 indicates that owners were very willing to sacrifice return on investment in order to achieve behavioural reward.

TABLE 10.3  
SACRIFICE FOR BEHAVIOURAL REWARD  
(PERCENTAGE RESPONDENTS WILLING TO SACRIFICE RATE OF RETURN  
ON INVESTMENT)

ENVIRONMENTAL CATEGORY	FACTOR	LARGE 1	MODERATE 2	SMALL 3	NONE 4	MEAN	MEAN SUM	STANDARD DEVIATION
Self Ego	I can be my own boss	17,2	20,7	27,5	34,4	2,70	5,43	1,21
	I take pride in running my own business	10,4	27,5	31,0	31,0	2,73		1,11
Firm Executive	I can play a part in planning and controlling decisions	13,8	24,1	17,2	43,7	2,83	5,70	1,23
	I hold a leadership position	13,8	17,2	27,5	40,5	2,87		1,19
Self Economic	I control my income by my own actions	20,7	20,7	27,5	31,0	2,60	5,83	1,22
	I know that my job is secure	6,9	17,2	10,4	64,3	3,23		1,16
Community	I feel that I am contributing to the growth of the community	0,0	27,5	31,0	40,3	3,03	6,56	1,00
	Members of my community recognize my position in my firm and hold me in esteem because of it	3,4	3,4	17,2	74,6	3,53		,97

Source : Boyer (1974 : 97)

According to Table 10.3 top down the ranking of behavioural factors as measured by the mean of degree of sacrifice proved to be as follows:

1. I control my income by my own actions;
2. I can be my own boss;
3. I take pride in running my own business;
4. I can play a part in planning and controlling decisions;
5. I hold a leadership position;
6. I feel that I am contributing to the growth of the community;
7. I know that my job is secure and
8. members of my community recognize my position in the firm and hold me in esteem because of it.

Boyer also encountered a strenuous resistance amongst respondents when it was suggested that they work elsewhere and allow someone else to manage the business.

Questions were also asked regarding willingness to accept an incremental salary by switching to paid employment.

Table 10.4 depicts the outcome of these questions.

TABLE 10.4

WILLINGNESS TO ACCEPT OPPORTUNITY SALARY


---

WOULD TAKE JOB ELSEWHERE FOR THE FOLLOWING MINI- MUM CHANGE IN ANNUAL SALARY	PER CENT RESPONDENTS
No change	6,9
Increase of \$0 to \$2 500	0,0
Increase of \$2 501 to \$5 000	10,4
Increase of \$5 001 to \$7 500	3,4
Increase of \$7 501 to \$10 000	0,0
Increase of over \$10 000	13,8
I would not leave under any circumstances	65,3
	99,8

---

Source: Boyer (1974:103)

A willingness to sacrifice in terms of salary is quite apparent in Table 10.4. No less than 65,3 per cent of the owners would not change jobs no matter how lucrative the salary offer made.

#### 10.4.4.5 RESEARCH CONCLUSIONS

Boyer concluded that the research results strongly support the contention that the cost of equity for the small business is not only a function of required rate of return of a financial nature, but also of returns consisting only of psychological rewards or those behavioural in nature.

In the light of her findings she evolved the following formula:

$$k_e = RoE_o - RoE_b$$

where:  $k_e$  is cost of equity

$RoE_o$  is opportunity return on owners investment

$RoE_b$  is return of a non monetary or behavioural nature

According to the author there is however, a limit to the size of the behavioural return. She makes the rather logical deduction that the overall cost of capital in the long run cannot fall below the weighted cost of debt or the owner will soon experience financial difficulties by accepting projects that are debt financed and on which he is unable to meet the interest payments. Given this limit on the overall cost of capital the minimum cost of equity will be zero. The behavioural sacrifice is limited then to a maximum of the opportunity return.

Boyer further implied that  $RoE_o - RoE_B = RoE_m$  when  $RoE_m$  represents monetary return actually received.

It is further implied that  $RoE_m = k_e$ . It is pointed out however, that the formula  $k_e = RoE_o - RoE_B$  is preferable since it eliminates salary interplay. It cannot be assumed in  $RoE_m$  that all other things are equal. An owner might only be allowing himself a subsistence salary or he may take a large one plus travelling expenses and entertainment allowances. Unless these factors can be equalized  $RoE_m$  might not be comparable from firm to firm. The use of the first equation ( $k_e = RoE_o - RoE_B$ ) consequently eliminates this problem.

#### 10.5 EVALUATION

Like the CAPM the 'opportunity cost' approach to the quantification of an appropriate capitalization or discount rate presents some formidable obstacles.

Firms in the same industry are not necessarily comparable. Their relative sizes differ as well as their capital structures. Firms with larger debt ratios are necessarily more risky, and consequently require a higher capitalization rate than ones with smaller debt ratios. These firms are usually also less liquid than firms with smaller debt ratios.



A further complicating factor is that of distortion of profits viz that not one of two firms have the same withdrawal system concerning salaries and profits. All these limitations make it extremely difficult to quantify the inherent risk of any alternative investment in the process of quantifying an appropriate opportunity cost.

A final factor to complicate the opportunity cost approach concerns the fact that owner/manager's of unlisted small firms seem to have significant behavioural satisfactions that lower the cost of equity or opportunity cost but which are not quantifiable on a standardized basis since it depends totally on the utility values of the different owners concerned.

#### 10.6 SUMMARY

The importance of an appropriate discount rate, to gauge whether proposed investments will increase or decrease the value of the firm, was stressed at the beginning of this chapter.

The problem of the discount rate centres mainly around the establishment of the cost of equity capital, which forms a component of the weighted average cost of capital.

The CAPM is suggested inter alia in literature to overcome this problem. According to this approach it is suggested that the beta of a proxy company on the stock exchange be taken to serve as beta for the firm in question. This beta is then used in the CAPM model in order to calculate the cost of equity of the particular unlisted firm under mention. This approach however, presents some formidable obstacles in that small unlisted firms usually have much more unsystematic risk than the proxy company to account for. The unlisted firm could furthermore have a different capital structure which could increase or decrease its riskiness relative to that of the proxy firm. It was also been shown that small firms usually are less liquid than larger firms. All these factors will, because of their impact on risk, necessitate a change in the beta.

Although van Horne supplies a formula that might accommodate changes in the beta relative to changes in the capital structures of the proxy firm and the unlisted firm the question of differences in unsystematic risk and liquidity presents severe problems of risk quantification.

A second approach propogated by literature is the opportunity cost approach. Scheffer proposes an opportunity cost that equals that of a 'model' undertaking in the industry. The problem however is how to identify the model undertaking. In this context some authors feel that the problem

rather centres around the significance of the project for the specific undertaking involved rather than a representative yield.

It is furthermore a fact that excessive but tax efficient withdrawals of profits and salaries in firms can distort profits to such an extent that opportunity figures are invalidated.

A final objection to the comparison of firms in the same industry in order to quantify an opportunity cost centres around the fact that different firms have different capital structures and liquidity. These facts as we have seen, lead to different capitalization or discount rates.

It has finally been shown that there are significant behavioural or 'non economic' satisfactions derived by the small businessman in his capacity as owner/manager of his own firm that tend to reduce his cost of equity.

All these problems complicate the establishment of an appropriate cost of equity.

It therefore seems that in the absence of listing business enterprises have no option but to adopt related or even apparently unrelated objectives for use in investment decision making.

In chapter eleven a normative model, the elements of which are derived from the material already considered, will be constructed. The purpose is to compare this model against the investment decision making profile of small businesses in the Durban-Pinetown-Pietermaritzburg areas.

## CHAPTER ELEVEN

### AN INVESTMENT DECISION MODEL

#### 11.1 INTRODUCTION

The purpose of this study is to determine the investment decision making profile of small businesses in the Durban-Pinetown-Pietermaritzburg (DPP) areas and to compare that profile against a normative model for investment decision making by unlisted firms.

The elements of such a model are derived from the material already considered. However, some preliminary comments concerning the DCF methods and risk are necessary.

#### 11.2 DISCOUNTED CASH FLOW (DCF) METHODS IN PRACTICAL PERSPECTIVE

Despite some limitations DCF methods are conceptually sound and their use reflects well on the level of management sophistication. Evidence from empirical studies, however, reveals that relatively few listed companies employ the most appropriate DCF method viz the net present value method. It was furthermore established by Lambrechts (1976:27-31) that those investment decision makers in listed firms in South

Africa who do use DCF methods, generally do not link their utilization to the normative objective of the firm which is wealth maximization.

As regards unlisted firms, research both in South Africa and abroad has revealed that they tend to be relatively unsophisticated in their investment decision making. Few make any attempt whatsoever to utilize DCF methods. However, this should not be surprising. If listed firms, many of which are multi million Rand concerns employing skilled financial executives have difficulty in mastering DCF techniques it seems unreasonable to expect unlisted small firms to do so.

Furthermore, DCF techniques have a bias towards listed firms in that they are accommodated by a formal market for their shares. This formal market facilitates the computation of an appropriate discount rate, without which DCF techniques cannot be correctly applied. The unlisted firm is accordingly unable to utilize DCF techniques in a theoretically correct manner.

In light of the above, a normative model for investment decision making in the unlisted firm cannot rest on a DCF foundation: the objective of wealth maximization lies at the heart of the IRR and NPV approaches taken as a whole and the unlisted firm technically cannot pursue this elusive objec-

tive in its investment decision making. And indeed there is considerable doubt as to whether it ought to, given the elements of risk with which it must contend.

### 11.3 RISK FOR THE UNLISTED FIRM

The problems that work together in order to compound the risk of the unlisted firm have been discussed in earlier chapters. In order to construct an appropriate normative investment decision making model for the unlisted firm it is necessary to recall them briefly:

- \* the unlisted small firm is relatively less liquid than the listed firm;
- \* the unlisted small firm is inclined to make liberal use of short term debt in the funding of capital investment;
- \* the unlisted small firm is usually not diversified and
- \* the equity base of the unlisted small firm is initially low.

The above points suggest a high risk profile for the unlisted firm. Faced with the prospect of ruin in the event of an investment not yielding a positive cash flow quickly enough to alleviate liquidity pressures there is no doubt that investment decisions ought to be taken with the utmost caution. Investments which are unlikely to damage liquidity or stretch reliance on outside funds should be favoured over

those which offer higher returns but threaten survival. The investments made must of course also be profitable, otherwise the firm will perish in any event. A satisficing profit must therefore remain in the normative model which needs to give prominence to aspects of both liquidity and leverage.

#### 11.4      A NORMATIVE INVESTMENT DECISION MAKING MODEL FOR THE UNLISTED FIRM

An emphasis on liquidity and limited leverage must necessarily shift the normative decision making model for the unlisted firm away from the accepted conventional DCF methods. Indeed as point of departure, the model specifies some practical and pertinent objectives, in the form of decision rules which inter alia screen out those investments which would significantly increase the risk of insolvency.

##### 11.4.1      PROHIBITIVE CONDITIONS

###### 11.4.1.1      RISK OF INSOLVENCY

Projects that, should they fail, will force the firm into bankruptcy should be avoided. The mere possibility of indigestible losses being incurred will thus render a particular investment alternative unacceptable.



#### 11.4.1.2 UTILIZATION OF SHORT TERM DEBT

Under no circumstances should the unlisted firm make use of short term debt funds in order to finance long term investments. Non adherence to this rule could, in the event of non extension of short term debt facilities, lead to financial embarrassment or even insolvency.

Although this appears to be a financing rather than an investment issue, there may well be investment alternatives of such magnitude (relative to the resources of the firm) which require funds beyond the long term debt raising capacity of the firm. The temptation to use more easily obtainable short term funds can be overcome simply by avoiding the investment.

#### 11.4.1.3 DEBT RATIO

A 'moderate' debt ratio should be maintained at all times. An exact ratio cannot be stipulated since it is bound to vary from industry to industry. Industries where cash flows and profits are relatively certain, such as certain sections of the food industry can afford relatively large debt ratios. In this respect professional advice would need to be sought from people conversant with the industry. The firm's auditor can certainly be consulted in order to determine what might be regarded as 'moderate'.

#### 11.4.2 THE REQUIRED RATE OF RETURN

Where both debt and equity are used in the financing of an investment, the decision maker needs to be conscious of the fact that there is an overall cost of financing to be considered which includes a cost of equity. The equity and debt elements would need to be weighted by the amounts involved in order to arrive at an overall weighted cost of capital.

An estimation of this cost is imperative since it will, as the required rate, be compared against projected returns of the investment alternatives.

In estimating the cost of equity the controlling owners would need to monitor the returns on realistic, equal risk, investment alternatives outside the firm. Opportunity cost is thus the basic determinant of the cost of equity. If debt is used, its after tax cost would need to be determined.

#### 11.4.3 FINANCING MIX

A comprehensive understanding of the component cost of capital and the overall cost of capital is a prerequisite for the understanding of a target capital structure. The decision maker should be aware of the fact that there exists a level of financing which represents an optimum mix between

debt and equity. This optimum level he should comprehend represents the point where the overall cost of capital is minimized.

#### 11.4.4 EVALUATION METHOD

In making an investment the decision maker must give due attention to both profitability and liquidity. He needs to comprehend that an acceptable project must return more than it costs to finance. He must furthermore have an idea as to how the acceptance of a project will affect the firm's liquidity.

Since it is not expected of the decisionmaker of the unlisted small firm to apply DCF methods in the evaluation of investment proposals, the only alternative left is to apply non time related methods.

The small unlisted firm tends also to have only limited access to the kind of information which may be relevant to investment decision making. Accordingly decision makers in such firms will invariably rely heavily on accounting data which is the most readily available and comprehensible source of information.

Against this background it is considered most appropriate that the unlisted firm use the 'average rate of return method' in order to gauge profitability of a project.

#### 11.4.4.1 PROFITABILITY

The 'average rate of return' ratio to be applied in order to assess the profitability of an investment should be the following:

$$\text{Average rate of return} = \frac{\text{ave. profit after depreciation and tax}}{\text{total capital employed}}$$

where :

average profit after depreciation and tax = the average of the projected annual after tax and depreciation profits over the life of the investment

total capital employed = total capital outlay required for investment.

#### EXAMPLE

A project that requires an initial outlay of R100 is considered. The project has an economic life of 5 years, will be depreciated on a straight line basis over this period, and is expected to yield the following after depreciation and tax returns:

YEAR 1	:	R10
YEAR 2	:	R30
YEAR 3	:	R40
YEAR 4	:	R20
YEAR 5	:	R20

$$\text{Average rate of return} = \frac{24}{100} = 24 \text{ per cent}$$

The average rate of return calculated for a project would need to be compared against the firm's overall cost of capital in order to gauge if an investment yielding the rate as per above ratio is acceptable. In this respect the decision maker should at least be able to comprehend some sort of opportunity cost.

The second important criterion to be applied in the decision making process concerns liquidity.

#### 11.4.4.2 LIQUIDITY

The shorter the payback period of an investment the lower the risk will be of a change in environmental circumstances impacting adversely on the actual cash flow of the investment. Accordingly, the small unlisted firm, which usually operates from a fragile liquidity base, will need to specify a 'cut off' payback period, beyond which a proposed investment cannot be accepted. The precise cut off point would

need to be established by each firm within the context of the pace of technological, financial and social change in its industry. For some firms, a two year cut off might be appropriate. In others, a five year cut off might be feasible.

In addition to establishing a 'cut off' point, however, the small firm decision maker needs to project incremental cash flows on a monthly rather than annual basis. Frequently forgotten, is the fact that investments which result in increased turnovers require cash outflows over and above the initial costs involved : negative cash flows to increase working capital. Careful attention thus needs to be given to this aspect when cash flows are projected.

The initial costs of acquiring the capital item might well be financed on a long term basis but the subsequent outflows which usually occur before a positive cash flow materializes, will have to be financed from existing working capital resources. The question then to be answered is whether those resources are adequate.

The traditional current asset ratio and the acid test are not adequate for this task. However, a ratio has been developed by Hamblin (1976 :63) which will assist in determining how much working capital a firm needs given the credit terms given and taken in the industry and the rate of stock turnover. Actual working capital less the current re-

quired working capital as calculated will indicate whether or not a surplus exists. If there is a surplus, it needs to be large enough to carry the working capital needs of the new investment. If there is a deficit, or the surplus is not large enough, it would be necessary to negotiate a loan or overdraft facilities until the eventual positive cash flow from the investment is sufficient to offset the early outflows. If such facilities cannot be arranged the investment should be avoided.

Since liquidity forms such a high priority objective of the unlisted firm it is suggested that the firm should be willing to sacrifice some investment returns, if necessary, in order to stay liquid.

The exact percentage which might need to be sacrificed will differ from firm to firm depending on the investment opportunities available and on the existing liquidity conditions of the firm.

#### 11.4.4.3 SACRIFICING RETURNS FOR LIQUIDITY

The unlisted firm will have to make decisions regarding interdependent investments and mutually exclusive investments. In order to explain the concept 'sacrificing returns for liquidity' hypothetical examples have been constructed in order to accommodate both types of investment proposals.

i) The Independent Investment

Table 11.1 depicts an independent investment I of R50 000 which is expected to yield returns over a period of 5 years. The cost of capital is 20 per cent.

TABLE 11.1  
EARNINGS OF INVESTMENT I

YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
-R50 000	R 100	R 1 000	R 3 000	R 5 000	R66 000

It is assumed that depreciation is deducted from profits according to the straightline method i.e R10 000 per annum.

In the above example investment I yields an average rate of return of 30,04 per cent.

The payback period for investment I being the exact amount of time required for the firm to recover its investment as calculated from cash inflows, is derived from the data in table 11.2.

TABLE 11.2  
PAYBACK PERIOD OF INVESTMENT I

YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
-R50 000	R10 100	R11 000	R13 000	R15 000	R76 000



Investment I has a fairly lengthy payback of 4,12 years. Accordingly, in spite of the fact that its yield is far above the firm's cost of capital, it might be rejected by management on grounds of its weak liquidity prospects. This will of course depend on the payback 'cut off' point decided upon.

Where the liquidity objective is a high priority of management, it could well happen that an independent investment with a quick payback and a relatively small return is accepted. Table 11.3 depicts such a case. Investment I<sup>2</sup> consists of an initial outlay of R50 000 and generates returns over a period of 5 years. The cost of capital is 20 per cent.

TABLE 11.3

RETURNS OF INVESTMENT I<sup>2</sup>

YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
-R50 000	R20 000	R15 000	R12 000	R 8 000	R 5 000

It is assumed that depreciation is deducted from profits according to the straightline method i.e. R10 000 per annum.

According to the 'average rate of return' method investment I<sup>2</sup> has a return of 24,00 per cent

Table 11.4 depicts the payback period for investment I<sup>2</sup>.

TABLE 11.4

PAYBACK PERIOD FOR INVESTMENT I<sup>2</sup>

YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
-R50 000	R30 000	R25 000	R22 000	R18 000	R15 000

According to table 11.4 investment I<sup>2</sup> has a relatively fast payback period of only 1.8 years and a return of 24,00 per cent, only 4 per cent more than the firms cost of capital. In this case management might, because of the liquidity prospects, accept investment I<sup>2</sup> in spite of its minimal return above the cost of capital.

Liquidity preference can consequently also enjoy priority over returns where mutually exclusive projects are concerned.

ii) MUTUALLY EXCLUSIVE PROJECTS

Table 11.5 depicts two mutually exclusive investment projects M and E each requiring a R10 000 outlay. Investment M is expected to generate earnings over a period of 5 years with the bulk of its earnings accruing in its early years. Investment E is expected to generate earnings over a period of 5 years with larger earnings in years 4 and 5. The cost of capital is 20 per cent.

TABLE 11.5

EARNINGS OF TWO MUTUALLY EXCLUSIVE INVESTMENTS M & E

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
M	-R10 000	R5 000	R3 000	R2 000	R1 000	R 10
E	-R10 000	R1 000	R1 000	R1 000	R3 500	R7 000

Depreciation is assumed to be deducted from profits according to the straightline method i.e. R2 000 per annum.

Project M has an average rate of return of 22,02 per cent and project E has an average rate of return of 27 per cent.

Table 11.6 depicts the payback period of the two investments.

TABLE 11.6

PAYBACK PERIOD ON INVESTMENTS M & E

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
M	-R10 000	R7 000	R5 000	R4 000	R3 000	R2 010
E	-R10 000	R3 000	R3 000	R3 000	R5 500	R9 000

On the basis of payback period however, project M is most acceptable since it has a payback period of 1.6 years whereas project E has one of 3,18 years.

It is therefore quite possible for an unlisted firm with a high liquidity priority to sacrifice 4,98 percentage points in returns in order to ensure a faster payback. In order to do this their choice of investment will be M. The choice

furthermore ensures flexibility in that more funds will be available at a relatively early stage for reinvestment in more lucrative investments if and when available.

It is however necessary to realise that it will be unreasonable to expect the decision maker of the unlisted firm to sacrifice unlimited returns for liquidity. This tradeoff will depend on the liquidity position of the specific firm as well as the utility values of the decision makers.

Another important factor that could modify the perspective of the decision maker concerns inflation.

#### 11.4.5 INFLATION

Decision makers must take inflation into account when they make their investment decisions. In this respect it is suggested that they calculate depreciation according to replacement value and not according to historical book value.

Decision makers should furthermore take cognizance of salaries and drawings.

#### 11.4.6 SALARIES TO OWNERS

Owner/Managers should limit their salary withdrawals to an amount approximately equal to the salaries paid in the industry for equivalent work performed. Excessive drawings would distort return on investment calculations and could even impair liquidity.

A final point to be made concerns the very important factor of 'non economic' satisfactions.

#### 11.4.7 NON ECONOMIC SATISFACTIONS

Owners should be aware that 'non economic' satisfactions can lower their cost of equity i.e. allow them to accept a sub standard financial return (one that is lower than alternative investments of similar risk). The cost of their non economic satisfactions is thus directly measurable and some limiting cost should be specified by the rational owner.

#### 11.4.8 CONCLUSION

The normative model presented specifies some profitability conditions, some financing guidelines, and certain decision criteria relating to profitability, liquidity and non economic satisfactions which the decision maker must pre-set.

It is now necessary to formulate a set of hypotheses which will utilize this model to place investment decision making in small businesses in the DPP metropolitan areas in rational perspective and permit the structuring of an appropriate research programme.

#### 11.5 RESEARCH HYPOTHESES

The first or central hypothesis needs to be substantiated in order for the remaining hypotheses to be of any relevance at all. This hypothesis may be formally stated as follows:

'Non listed business enterprises in the DPP metropolitan areas do not apply an objective of wealth maximization in the sense that wealth is measured in terms of expected cash flows from investments that are discounted at a rate that reflects the risk class of the firm.'

A number of subsidiary hypotheses have been formulated in order to probe various dimensions contained in the normative model.

These hypotheses are listed below:

- a) Investment projects that have the remotest probability of failing and in the event force the firm into insolvency will be avoided.

- b) Because unlisted small firms have limited access to capital markets they make liberal use of short term debt to finance their investments. (Such action is, of course, regarded as unwise in the normative model).
- c) Unlisted small firms, because of a shortage of equity capital have high debt ratios. (This too is regarded as being unwise).
- d) Owner/managers of unlisted small firms are not aware of opportunity yields on investments that are in a risk class similar to the business. (They ought to be).
- e) The cost of financing a project is considered on a pre tax basis. (It ought to be after tax).
- f) Owner/Managers of unlisted small firms do not consider the cost of equity capital when making investments and they do not calculate the weighted average cost of capital when they make investment decisions.
- g) Owner/managers of unlisted small firms do not raise capital for the funding of investments according to a target capital structure. (They should)
- h) Inflation is not taken into consideration by owner/managers of unlisted small firms when they make investment decisions.
- i) There exists a working capital shortage in most unlisted firms in the area. This will have the following affects on the decision maker's investment evaluation method:
  - \* independant investments with high returns but slow payback periods are rejected;

- \* independant investments with fast payback periods but minimal returns are accepted and
  - \* when mutually exclusive investments are considered there will be a bias towards an investment with a fast payback and lower returns relative to one with a slower payback and better returns.
- j) Returns will be sacrificed for liquidity only up to a certain point. After this 'cut off' point returns will have precedence over liquidity.
  - k) Owner/Managers do not link their salaries and drawings to those of others working in the industry. (They should)
  - l) Non economic satisfactions induce owner/managers to accept sub-standard returns relative to other possible investments of similar risk.
  - m) Owner/managers in the study area are relatively risk averse.

#### 11.6 SUMMARY

Evidence from empirical studies reveals that relatively few listed companies employ DCF methods. These studies have furthermore shown that those who do employ DCF do not relate their benefits to the normative objective of the firm viz. wealth maximization.



Since unlisted small firms display an unsophisticated profile regarding professional and academic expertise relative to the listed firm it was felt that it would be unreasonable to expect them to use DCF methods in investment decision making. This argument is strengthened by the fact that the unlisted small firm has no formal market in which its shares are traded. Add to this, the absence of an appropriate discount rate and the ingredients necessary to correctly utilize DCF methods are absent.

It is consequently necessary to consider the investment decision making procedures of the unlisted small firm against the background of the problems that surround it. These problems mostly focus on risks which can directly or indirectly result in liquidity shortages. The liberal use of short term debt in the funding of capital expenditure, a non diversified investment profile and a low equity base render the small unlisted firm particularly vulnerable to liquidity shortages.

In constructing a normative investment decision-making model for the unlisted small firm it is therefore suggested that:

- \* insolvency risks should be avoided;
- \* short term debt should not be utilized to fund investments;

- \* a 'moderate' debt ratio should not be exceeded. The ratio should preferably be not more than the industry average;
- \* the decision maker should ensure that he is be aware of opportunity yields so that the cost of equity can be determined;
- \* the cost of a project should be considered in terms of both borrowed funds (on an after tax basis) and equity funds;
- \* the decision maker should calculate a weighted average cost of funds to be used as a criterion when deciding on prospective investments;
- \* the decision maker should take due cognisance of profitability and liquidity when making investment decisions. In order to gauge profitability the 'average rate of return' method should be used whilst the 'payback period' method should be used to assess one aspect of liquidity. Short term additional working capital needs would also need funding.

Since liquidity forms such a high priority objective of the unlisted firm it is suggested that these firms should sacrifice some level of returns, if necessary, in order to stay liquid. The exact percentage to be sacrificed will depend on the utility values of the decision makers and

- \* decision makers should not sacrifice unlimited increments in return for liquidity;

- \* owner/managers should refrain from making excessive drawings by means of salary or other means that could erode return on investment;
- \* capital should be raised for the funding of investments according to a target capital structure and
- \* account should be taken of inflation when making investment decisions.

The hypotheses of the study have consequently been formulated to permit an evaluation of investment decision making practices in unlisted small businesses in the DPP area in terms of a normative model. The research programme designed to probe these practices will now be considered.

## CHAPTER TWELVE

### RESEARCH METHODOLOGY

#### 12.1 INTRODUCTION

The focus of this study has been specifically orientated toward the unlisted firm. Most unlisted firms are small by any standards and do not qualify for a listing on any formal market for shares. Those unlisted firms which do qualify for a listing can overcome the difficulties of correctly determining their cost of capital by simply having their shares listed. It is accordingly the small unlisted firms, which cannot obtain a listing for their shares, which will be probed in this study.

By operationally defining as 'small', those firms which do not conform to the most accommodating listing requirements, it will be possible to avoid any confusion. Accordingly, it will be 'small' firms in the DPP area that will be included in the research sample. In order to classify a firm as 'small' it would be necessary to apply the listing requirements of the Johannesburg Stock Exchange (JSE) to firms in the sample.

## 12.2 CRITERIA FOR JSE LISTING

The requirements for a primary listing on the JSE are the following:

- \* a subscribed capital of at least R1 000 000 in the form of not less than 1 000 000 shares in issue;
- \* a satisfactory profit history for the preceding 3 years, with a current audited profit level of at least R1 000 000 before taxation;
- \* the public shall hold 30 per cent of the first 1 000 000 shares, and an agreed percentage of the balance and
- \* the number of shareholders shall be at least 300 (Uliana, et al. 1987:390).

The Development Capital Market (DCM) of the JSE, however, has a set of listing requirements which are more lenient. They are as follows:-

- \* share capital and reserves must amount to R500 000;
- \* there must be at least R1 000 000 shares in issue;
- \* an acceptable trading record for two years with a current audited profit level of at least R250 000;
- \* a minimum of 10 per cent of the first 1 000 000 shares issued shall be held by the public, and an agreed percentage of the balance and

- \* the number of shareholders shall at least be 75 (Cairns 1989:63).

Even more lenient in some respects are the JSE requirements for a listing on its recently launched Venture Capital Market. Unfortunately the requirements are in many respects not as clearly defined as those of the DCM: the listings committee has greater discretion in reaching a decision. However, the following criteria are considered:

- i) A venture capital conglomerate must have as its dominant business the professional operation of a company which holds, and will in the future hold, a portfolio of investments into ventures each of which is characterised by the fact that the venture capital conglomerate:
  - a) has an investment in each underlying venture which is substantially an equity one;
  - b) is able to support its underlying venture projects with added value by virtue of support services and proper financial disciplines;
  - c) has done adequate research into the management strength and commercial viability of each of its underlying ventures;

- d) has drawn up a business plan for the next three years in respect of each underlying venture, and of the combined portfolio, with forecast balance sheets, profit and loss accounts and cash flows.
  
- ii) A single venture company must have drawn up an analysis of its prospects based on market segment growth, competitive analysis and market share. From this it should present a three year business plan with forecast balance sheets, profit and loss accounts and cash flows.
  
- iii) A venture capital conglomerate or a single venture company:
  - a) should in its analysis of future earnings indicate credible returns on capital which, on a time weighted basis, are above average;
  - b) need have no profit history but must have issued capital and reserves (excluding intangibles and reserves arising from asset revaluations) of more than R1.6 million at the time of listing;

- c) will enjoy the concessions as to the number of shareholders and advertising awarded to companies in the DCM. A further concession will also be made in that only 5 per cent of the number of shares in issue need to be held by the public;
  - d) will give an undertaking to the JSE that any disposition of assets to any party associated with the control of the company will require the consent of the company in general meeting with the controlling shareholders not voting at the meeting;
  - e) should have directors and management, the majority of which have successful records of achievement in their respective roles;
  - f) will have in bold block letters at the beginning of its prospectus or pre-listing statement a warning of the speculative nature of investment in such a company.
- iv) Because of the nature of the venture capital market it is not possible to give final finite requirements for a listing in this sector and the JSE reserves the right in its sole discretion to add to, to alter, or to exempt any of its requirements if it is of the opinion that this would be in the interest of investors or potential investors in the company (Johannesburg Stock Exchange News Release, 31st January 1989:1-5).



Although the listing requirements for the 'Venture Capital Market' might yet prove to be the least stringent of all listing requirements its lack of certainty at this stage necessitates the adoption of the requirements of the DCM as the operational limit of a 'small' business.

### 12.3 DURBAN-PINETOWN-PIETERMARITZBURG AREA (DPP AREA)

The DPP area has been chosen for study because it houses a large number of small industrial enterprises across a broad spectrum. The study was restricted to manufacturing firms in this area since capital budgeting is an issue of central importance in these firms whereas other issues are more important in the case of retailers.

### 12.4 LIMITATIONS OF THE STUDY

It is acknowledged that by confining attention to small manufacturing firms in the DPP area, the research findings will not necessarily be of general validity among all businesses. However, depending on the results obtained, the limitations can be lifted in further studies aimed at generalizing the findings at least for small manufacturing businesses elsewhere in South Africa.

## 12.5 SAMPLE SIZE

At the time of the study the DPP area housed 660 manufacturing firms which qualified as 'small' in terms of the operational definition (these firms were obtained from the 1988-89 yearbook and directory of the Natal Chamber of Industries). Since it was envisaged that statistical tests would be utilized in relation to some hypotheses it was deemed necessary to have a sample of at least 30 firms included in the study. Such a number would be adequate to permit the effective application of certain non parametric techniques.

On the other hand the research programme would require analysis of many 'open ended' responses, to be obtained by means of personal interviews with respondents.

A sample greater than 30 would thus become unwieldy. It was accordingly decided that the sample size should be 30.

## 12.6 RANDOM SELECTION

According to Kidder (1981:428) a random sample is selected by a process that not only gives each element in the population an equal chance of being included in the sample, but also makes selection, of every possible combination of the desired number of cases equally possible.

Manheim (1977:277-280) indicates that the fundamental type of probability sample is the simple random sample (SRS) typified by the familiar procedure of putting each individuals' name on a separate slip of paper, mixing them all in a bowl, and then selecting the desired number by blindly drawing slips from the bowl. Clearly, the total population is represented by all the slips from the bowl and each element is represented by a single slip. However, Manheim stresses that in actual practice, because of the physical labour of transcribing all elements onto separate slips of paper and then mixing them thoroughly, this type of random sample is rarely used.

In this study it was decided to use a SRS variant of 'systematic sampling' which is described by Manheim as the simplest, most foolproof and most widely known modification

of SRS. In this procedure the population, size  $N$  is divided by the sample size,  $n$ , in order to yield the sampling interval  $k$ .

Then, one selects a random number  $r$ , from 1 to  $k$ . The  $n$ th element on the list or frame then becomes the first element selected for the sample, and thereafter, going down the list, every  $k$ th element from  $r$  is included in the sample.

In the DPP area there are 660 unlisted small businesses each of which was numbered for the study,  $N$  is therefore 660. The sample size is 30,

$$\begin{aligned} \text{therefore } n &= 30 \\ \text{therefore } k &= \frac{660}{30} \\ &= 22 \end{aligned}$$

A random number between 1 and 22 was selected, which happened to be 10. The sample accordingly included firms numbered 10 and every 22nd element thereafter: 10, 32, 54, 76, 98, 120, 142, 164, 186, 208, 230, 252, 274, 296, 318, 340, 362, 384, 406, 428, 450, 472, 494, 516, 538, 560, 582, 604, 626 and 648.

In the event of a selected firm refusing to cooperate, the firm with the following number would be approached for interview.

Having selected the firms to be included in the sample, it now remains to discuss the interview technique to be employed as well as the structure of the questionnaire to be completed by the interviewer.

#### 12.7 ADMINISTRATION AND STRUCTURE OF QUESTIONNAIRE

The most common form of data collecting used by researchers in the social sciences is asking questions from people, the data being the oral or written responses.

This situation, irrespective of the way in which administered (viz. by telephone or face to face), is known as an interview (Manheim 1977:210). Manheim further observes that interviews may vary on a continuum from structured to relatively unstructured.

At the one extreme is the completely structured interview. In this type of interview the exact same stimuli is presented to every respondent. This means that the precise wording and sequence of the questions will be specified in advance, with no deviation permitted. It also implies that

the respondent's replies will be in terms of fixed alternatives, a limited number of predetermined responses of which the respondent selects one. Furthermore, in a structured interview the interviewer strives to avoid giving any additional information or explanation to the respondent.

The converse is true of the unstructured interview. In this type of interview, the interviewer is encouraged to vary the manner and wording of the questions in order to suit the peculiarities of the situation and he may follow up on opportunities suggested by the respondent's replies (Manheim 1977:212). Most often the form of interview adopted is somewhere on the continuum between these two extremes.

Since interviewing implies the asking of questions from people the structuring of these questions need now be scrutinized.

#### 12.7.1 CLOSED-ENDED QUESTIONS

Closed-ended questions are synonymous with the structured interview in that a respondent has to select an alternative from a fixed number of predetermined responses. The respondent is furthermore not given the opportunity to elaborate on his reply.

Closed-ended questions can be administered in several ways.

#### 12.7.1.2 CLOSED-ENDED QUESTIONS ADMINISTERED BY MAIL

Closed-ended questions administered by mail is a form of data collection which is known as the mail questionnaire. Warwick and Linninger (1975:31) observes that the mail questionnaire has the advantage of being subject to a low cost. Manheim (1977:215) indicates that the mail questionnaire furthermore has the advantage of being practical where a population is scattered over a wide area.

A disadvantage of the method is however its poor response rate.

Closed-ended questions can also be administered by telephone.

#### 12.7.1.3 CLOSED-ENDED QUESTIONS ADMINISTERED BY TELEPHONE

Telephone interviews must be quite brief since respondents may become impatient or suspicious and/or give inaccurate responses in prolonged interviews. It is therefore suitable only for structured or relatively superficial questions. Probably its most common use has been in audience surveys for television and radio.

As indicated, interviews tend to be relatively structured since there is very limited opportunity for the interviewer to probe into any subconscious or personal factors, and almost no opportunity to establish rapport with the respondent.

An advantage is that telephone interviews are very inexpensive since no travel costs are involved, and because one interviewer can complete many interviews in a relatively short period. However, sampling problems are involved since not all households or businesses have telephones (Manheim 1977:214).

Another method to administer closed-ended questions is by means of a face to face interview.

#### 12.7.1.4 CLOSED-ENDED QUESTIONS ADMINISTERED BY FACE TO FACE INTERVIEW

Closed-ended questions administered by the face to face interview is highly structured and rigid. These questions do not permit the respondent to give his own replies and there is no assurance that the predetermined responses will include the one he believes is correct (Manheim 1977:212).



It has been noted in section 8.2.6.2 that closed-ended questions administered by face to face interview in empirical studies on capital budgeting elicited unsatisfactory answers. Respondents were for example asked to select a capital budgeting method used by them. They did just that but when asked to describe it they failed.

Kidder (1981:149) observes the following disadvantages related to face to face interviews:

- \* relatively high cost involved;
- \* a slow procedure and
- \* interviewer bias not easily avoided.

The opposite of closed-ended questions are open-ended ones.

#### 12.7.2 OPEN-ENDED QUESTIONS

Where closed-ended questions implied selection from fixed alternatives, open-ended one's enables the respondent to reply in exactly his own words.

Instead of asking a closed-ended question like: "Which of the following do you think is the most serious health problem facing our nation today?" and supplying fixed alter-

natives from which the respondent must choose, the question can be open ended: "what do you think is the most serious health problem facing the nation today (Manheim 1977:212)?"

Warrick and Linninger (1975:134) however point out that open-ended questions, with all their merits, have the drawback that they can generate an enormous variety of responses. Respondents furthermore vary greatly on the length of their responses to open-questions, and interviewers differ with regard to the extent to which they probe for more information.

Open-ended questions can be administered by telephone.

#### 12.7.2.1 OPEN-ENDED QUESTIONS ADMINISTERED BY TELEPHONE

It was noted in section 12.7.1 that since telephone interviews must be brief it is suited for structured interviews. The opportunity for the interviewer to probe into any subconscious or personal factors is therefore limited and there is almost no opportunity to establish rapport with the respondent. It is consequently relatively inappropriate to administer open-ended questions by telephone.

Open-ended questions administered in a face to face interview have some appealing merits.

#### 12.7.2.2 OPEN-ENDED QUESTIONS ADMINISTERED IN A FACE TO FACE INTERVIEW

Kidder (1981:149) mentions that this method of interviewing has the following advantages:

- \* the likelihood exists of establishing good rapport with the respondent;
- \* the interviewer can ask complex questions at length and in depth and
- \* the interviewer can obtain full detailed answers through clarification and probing questions.

Having reviewed the literature on the administration and structure of the questionnaire it is now necessary to decide on an approach to be followed with the study at hand.

#### 12.7.3 APPROACH SELECTED

Some of the questions to be administered in the DPP area, especially those of a confidential financial nature will be administered on a closed-ended basis. This was decided upon after respondents, when initially contacted, expressed reluctance to participate if they had to disclose financial information, especially financial statements. Other questions however, contain terminology that will have to be ex-

plained. Full benefit will furthermore be derived from the merits of as many open-ended questions as possible as well as the advantages of the unstructured interview.

The type of questionnaire selected for the study at hand will consequently be partially open-ended to be administered by personal interview.

## 12.8 CONSTRUCTION OF QUESTIONNAIRE

A total of 48 questions were posed and each of them will now be considered in turn. Where statistical testing of hypotheses was envisaged the hypotheses as well as the test concerned will be specified.

### 12.8.1 OBJECTIVES

Q1 What are the objectives of your firm? State shortly.  
main objective  
secondary objective

The objectives of a firm determine decision criteria. Accordingly it was of prime importance to determine as a point of departure the degree to which a respondent was profit orientated. The question was furthermore intended to be open-ended so that a variety of expression could be accom-

modated. The responses would accordingly require some interpretation on an individual basis to enable each to be labelled either predominantly profit orientated or not.

#### 12.8.2 INVESTMENT DECISION PROCEDURES

Question 2 addresses the hypothesis that profit orientated firms will tend to have formal investment evaluation procedures.

Q2 Does your firm have formal procedures for evaluating investment proposals?

Yes Describe

No Describe how investment decisions are made.

This question should establish on the degree of sophistication of investment decision making employed and again the question was open ended to permit individual assessment.

In order to test the hypotheses the chi square test was to be adopted [see Sprent (1981:155-167)]. This test was to be applied to verify whether there are any significant differences between profit orientated groups on the one hand

and non profit orientated groups on the other hand regarding their investment evaluation procedures. The groups in this instance were those derived from question 1.

### 12.8.3 RISK OF INSOLVENCY

The following question concerns the hypothesis that investments which are perceived to have the slightest possibility of failing should be avoided, if failure would force the firm into insolvency.

Q3 Assuming all other decision criteria are satisfied will you accept an investment with the following probabilities?

	PROFITS	LOSSES	PROBABILITY OF OCCURRING
a	R50 000		40 per cent
b	R75 000		20 per cent
c	R80 000		15 per cent
d	R85 000		10 per cent
e	R90 000		5 per cent
f)		A LOSS THAT COULD LEAD TO INSOLVENCY	10 per cent
	Yes	Explain	
	No	Explain	

The answers to this question should reflect on the extent to which respondents exercise caution when making an investment. It has been noted that literature suggests that small firms generally do not have the resources to weather losses as large as their listed counterparts.

In the event that any respondent should choose to accept the risky investment a statistical test will be applied to ascertain whether these respondents are less risk averse than their counterparts who refused the risky investment. Since risk aversity is also indicated by debt ratios and certainty equivalents it seems appropriate to use a statistical test to determine whether a positive correlation does exist between:

- i) the debt ratios of investors who accepted the risky investment on the one hand and the debt ratios of investors who rejected the risky investment on the other hand and
- ii) the certainty equivalents of investors who accepted the risky investment on the one hand and the certainty equivalents of investors who rejected the risky investment on the other hand. There is however a genuine dichotomy with one of the variables in that the variable 'investors having to decide on the choice of a risky investment' must be reduced to 2 categories viz.

investors who accepted the risky investment and those who refused it. Where a situation like the above one exists Guilford (1973:297) suggests the use of the 'point bi serial correlation coefficient test.'

In order to test the hypothesis viz. investments which are perceived to have the slightest possibility of failing should be avoided the large sample sign test (see Freund and Williams (1977:30) was adopted. This type of test typically suits the type of question where the outcome on accepting or rejecting the risky investment hinges on 'yes' and 'no' answers. It is expected that 'no' answers will predominate.

#### 12.8.4 USE OF SHORT TERM FINANCE

Questions 4 to 7 are meant to probe the hypothesis that unlisted business firms which do not have access to capital markets make liberal use of short term debt in their funding of capital expenditures. Questions 8, 9 and 10 provide an elaboration of attitudes toward financing.

Q4 Which form of financing do you use when you invest (expand or replace capital equipment or acquire a new firm)?



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FORM OF FINANCE IN ORDER OF PREFERENCE

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REASON

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This question should provide an accurate picture of the form of finance respondents actually prefer when they invest. It should furthermore reflect on their usage of short term debt.

Q5 Do you try to link long term sources of financing (3 years and longer to maturity) directly to proposed investments?

Yes Explain

No Explain

Indifferent Explain

The answer to this question should verify whether decision-makers do in fact follow the approach recommended by financial theory, namely to use long term financial resources (long term debt, equity) for the financing of capital expenditures.

Q6 If you do try to raise long term sources of finance for a proposed investment and you still experience a shortage of funds would you abandon the project or would you push ahead and use short term sources?

Examples of short term sources:

(bank overdrafts, trade credit, factoring, short term loan)

Continue: What kind of short term monies would you prefer and why?

Discontinue:

Question 6 will reflect whether the decision maker, when he experiences a shortage of permanent financing will expose himself to the risk of supplementing these long term sources with short term sources.

Q7 Do you prefer to use short term sources (1 year maturity) to finance investments?

Yes Explain

No Explain

This question calls for a motivation by the decision maker for his preference of using or not using short term sources to finance investments.

If the responses in question 4 are interpreted as 'yes' and 'no' with respect to short term funding there will be consistency in the responses of questions, 4 - 7 (all questions will permit 'yes' and 'no' categorization).

The responses in question 4 were converted to 'yes' and 'no' on the following basis : if the answer for example was 'long term debt' it was interpreted as 'no' because it indicated non usage of short term funds whereas answers like 'bank overdraft' and 'trade credit' indicated usage of short term funds and were consequently interpreted as 'yes'.

It should further be noted that the 'no' answers in question 5, in terms of the statistical test, should actually be treated as 'yes' since 'no' would in fact indicate usage of short term funds and vice versa.

It is therefore possible to implement the chi square test to verify whether 'yes' answers will predominate.

12.8.5 MEDIUM TERM FINANCE

Q8 Do you prefer to use medium term sources (1-3 years) to finance investments?

Yes Explain

No Explain

This question calls for a rationale for the preference to use or not use medium term sources to finance investments.

12.8.6 RISK ATTITUDE TOWARDS USAGE OF SHORT TERM FUNDS

Q9 If you do use short term sources to finance investments, are you not afraid that these debts will have to be paid before there is a sufficient cash flow from your investment?

Yes Explain

No Explain

In this instance the object is to ascertain whether decision makers are actually aware of the dangers involved (overdrafts can be called up and/or extension of short term loans can be refused.) in the utilization of short term funds for investment decision making.

12.8.7 PREFERENCE OF FINANCING SOURCE

Q10 Which of the following sources of financing would you prefer to utilize to finance an investment? Tick the 3 favoured most in order of preference by inserting 1, 2 and 3 alongside the respective source of finance:

Owner supplied funds

Retained earnings

Bank overdrafts

Leasing

Long term loans (longer than 3 year duration)

Medium term loans (1 to 3 years)

Short term loans (1 year)

Hire purchase agreements

Mortgage bonds

Personal bank loan (longer than 3 years)

Personal bank loan (1 to 3 years)

Personal bank loan (1 year)

Small Business Development Corporation Financing:

i) Mini Loan (R5 000 and less)

ii) Comprehensive assistance program (R30 000 and less)

iii) General finance Program (R500 000 and less)

Guarantees from private individuals

Lease backs

Loans by private individuals

Any other means of financing (specify)

REASONS FOR CHOICES:

Question 10 is supposed to show which funds a firm will actually prefer use if it had command over a wide spectrum of alternative financial resources.

The forms of finance preferred will be rated on a points scale from 3 (most preferred) to 1 (least preferred).

#### 12.8.8 ATTITUDE TOWARD FINANCIAL LEVERAGE

Questions 11 to 14 relate to respondents' attitudes toward leverage. Question 11 probes the hypothesis that unlisted firms, because of a shortage of equity capital tend to have high debt ratios.

Q11 Do you think you are making use of a disproportionate amount of debt in your total capitalization? (Total financing)

Yes

No            Why do you say that?

The answer to question eleven should indicate whether decision makers, according to their own perception, make use of excessive debt in their total capitalisation.

Since the acceptance or rejection of the hypothesis in this question hinges on 'yes' and 'no' responses the large sample sign test will be implemented to determine whether 'yes' answers will predominate.

Q12 What is your debt (including shareholders loans)/equity (owner supplied funds) ratio?

For example : Debt : Equity

.5 : .5

or

.3 : .7

Answers to question 12 should reflect the actual situation regarding debt ratios in the study area. The position of shareholder's loans in some circumstances can for purposes of establishing leverage be considered as part of equity. This is particularly so where such loans have been waived in favour of creditors. However for the purposes of the study and to ensure consistency in responses shareholders' loans were regarded as debt.

In this question the range of the debt ratios will be determined as well as their mean value and standard deviation.

Q13 What do you think this ratio could go to without causing financial embarrassment?

This question was asked to ascertain whether firms in the DPP area are not already on the verge of financial embarrassment as result of large debt ratios.

In this respect the range and mean value of the estimated debt ratios will be calculated.

Q14 If you need additional capital and both debt and equity is available which would you choose?

Debt                      Explain

Equity                    Explain

Answers to question 14 should reflect on the relative extent of caution exercised by decision makers when raising finance for capital expenditures. It should inter alia also reflect on the advantages/disadvantages of leverage contrary to more conservative capital structures.



12.8.9 OPPORTUNITY COST

Questions 15 and 16 relate to opportunity costs.

Question 15 probes the conjecture that decision makers of unlisted firms are not generally aware of opportunity yields on investments in a risk class similar to investment in their own firms.

Q15 Are you aware of an opportunity or opportunities where you/your shareholders can earn a higher return on investment than in the firm?

Yes

No

Question 15 was asked in order to ascertain whether decision makers are actually aware of opportunities outside the firm where they can get a higher return on their investment than in the firm.

Since the acceptance or rejection of the hypothesis in this instance will be determined by the outcome of 'yes' and 'no' answers the large sample sign test will be adopted to test whether 'no' answers will predominate.

Q16 If the answer to question 15 was 'no' don't answer question 16. If the answer to question 15 was 'yes' explain why the shareholders don't liquidate the investment and reinvest in the better opportunity.

The answers to question 16 should reveal why decision makers, if they are aware of better opportunities, do not liquidate their investment in the firm and invest in the better opportunity. This should highlight possible non economic returns.

#### 12.8.10 VALUATION OF SHARES

Question 17 probes the valuation problem of the shares of the unlisted company.

Q17 If you were to liquidate your investment in the firm by selling shares how would you calculate the minimum acceptable price for the shares?

Answers to this question should shed some light on the methods implemented by decision makers to value the shares of unlisted companies.

#### 12.8.11 COST OF CAPITAL

Question's 18 to 22 probed respondents' views regarding the cost of capital.

Q18 When considering the cost of borrowed funds, how is the cost assessed?

The question is asked in order to establish whether respondents perceive the cost of debt in Rands or in percentage terms. It will also serve as a control for question 2 in that firms which use DCF methods correctly, should also perceive the cost of debt as a percentage. If they do not they have a problem in calculating a discount rate.

Question 19 concerns the hypothesis that the cost of debt is not generally measured on an after tax basis when making a decision on the funding of an investment.

Q19 Do you calculate the cost of debt on a before or after tax basis?

Before Tax

After Tax

Question 19 should elicit direct answers as to whether decision makers calculate the cost of debt on a before tax or after tax basis.

In order to test the hypothesis the large sample sign test will be used. 'Before tax' responses will be allotted + signs and 'after tax' responses - signs. The test will be conducted to determine whether + signs predominate.

Question 20 will probe the hypothesis that decision makers of unlisted firms do not consider the cost of equity when making investments.

Q20 Do equity funds (owner supplied funds - money, goods or retained earnings) have a cost?

Yes

No Explain

Question 20 should indicate whether the decision maker really perceives equity to have a cost.

Since responses in this case, which should determine whether the hypothesis should be accepted or rejected again hinges on 'yes' and 'no' responses, the large sample sign test will be adopted to determine whether 'no' answers will predominate.

Q21 If 'yes' which of the following best describe your concept of this cost?

- a) net profit after taxes as a percentage of book value of equity (owner supplied capital + reserves + retained earnings)
- b) net profit after taxes plus interest as a percentage of book value of total investment;
- c) net profit after taxes as a percentage of market value of equity;
- d) net profit after taxes plus interest as a percentage of market value of equity;
- e) net profit after taxes plus interest as a percentage of market value of total investment;
- f) opportunity cost (what owners could earn elsewhere);

- g) none of these (please describe).  
Answers to question 21 will reveal how respondents who actually perceive equity to have a cost, conceptualize this cost.

Q22 What rate would you say approximates the cost of equity in this firm?

Question 22 requests the respondent to directly come up with the cost of equity according to his perception of it in question 21.

A mean value for equity cost will be calculated in this instance.

#### 12.8.12 TARGET CAPITAL STRUCTURE

Question 23 verifies the hypothesis that firms do not raise finance for new investments according to a target capital structure.

Q23 If debt and equity are used in the funding of a proposed capital expenditure, are these two forms of finance applied in a specific ratio for example:

Debt : Equity

50% : 50%

Yes

No

Question 23 requires a direct answer from the respondent as to whether investments are funded according to the proportions of a target capital structure. The 'large sample' sign test will be applied, to establish whether 'no' answers will predominate.

#### 12.8.13 WEIGHTED AVERAGE MARGINAL COST OF CAPITAL

Question 24 tests the hypothesis that decision makers of unlisted firms do not calculate a weighted average marginal cost of capital when they make investment decisions.

Q24 If debt and equity were used in the funding of a capital expenditure, how is the overall cost determined? Describe shortly.

Answers to question 24 should reveal whether respondents use a weighted average marginal cost of capital when making investment decisions.

If the costs of finance in this instance is weighted properly and a weighted average marginal cost is calculated it would constitute a 'yes' answer, if not a 'no' answer. The large sample sign test will be used to determine whether 'no' answers will predominate.

#### 12.8.14 INFLATION

Questions 25 and 26 regard inflation in the investment decision-making process.

Questions 25 concerns the hypothesis that inflation is not taken into account by decision makers of unlisted firms when making investment decisions.

Q25 Do you consider inflation in investment decisions?

Yes                      How is this done?

No

Question 25 endeavours to elicit direct answers as to whether decision makers actually consider inflation in their investment decisions and if they do how they go about it.



The large sample sign test will be implemented to determine whether 'no' answers will predominate.

Q26 Depending on the answer to the previous question being 'yes' what rate do you use?

Question 26 tries to establish whether a rate, if used by a decision maker to account for inflation, is applied formally or informally.

#### 12.8.15 LIQUIDITY

Due to the confidential nature of liquidity aspects direct questions which required reference to financial statistics were not posed.

Questions 27 to 38 regard liquidity. Questions 27 to 34 regard the actual liquidity position of respondents whereas questions 35 to 38 regard their attitudes toward liquidity.

Questions 27 to 34 test the hypothesis that there exists a relative liquidity shortage in most unlisted firms in the area.

Q27 Do you experience difficulty with collections from debtors?

Yes

No

A positive answer to this question will reveal relative illiquidity.

Q28 Do you stretch payments to creditors on principle? Why?

Stretching payment to creditors on principle whilst risking supplies being cut off as result of this action indicate liquidity problems.

Q29 If you have one or two major customers do you find that they put pressure on you when money generally is tight?

Yes

No

An affirmative answer to question 29 will reveal that the respondent is relatively unable to weather large amounts of outstanding debt and consequently indicates a state of illiquidity.

Q30 Has the frequency of the response 'the cheque is in the post' increased lately?

Yes

No

The objective of question 30 is just to prepare the respondents mind for question 31. An affirmative or non affirmative answer will consequently have no significance on the question of liquidity.

Q31 Have you tried that answer?

Yes

No

An affirmative answer to question 31 indicates that the respondent has stalled payment to creditors and consequently indicates relative illiquidity.

Q32 Has your bank manager ever made mention of a current asset ratio of 2:1?

Yes

No

If the respondent's bank manager has made mention of a current asset ratio of 2:1 (the liquidity ratio required by banks from business firm's) it more than likely indicates that his firms illiquid position has been discussed.

Q33 Has your bank manager ever made mention of an 'acid test' ratio of 1:1?

Yes

No

If the 'acid test' ratio (current assets - stock/current liabilities) has been mentioned by the bank to the respondent it indicates strongly that his firm's 'acid test' ratio did not conform to the norm of 1:1.

Q34 Which of the following investments would your firm prefer? Investment A and B both have a cost of R1 000. Each investment has the following after tax cash flows (returns plus depreciation):

---

	A	B
YEAR 1	500	0
YEAR 2	800	0
YEAR 3	1 000	3 200

---

A Give detailed reasons for your selection.

B

A firm choosing investment A with its regular cash flow pattern obviously has liquidity problems since investment B has a much higher profitability.

Each of the 7 questions concerning liquidity will carry a weight of 14,29 per cent. The weighting of each question will indicate whether a firm displays liquidity or illiquidity in a certain respect. For each question a 'yes' answer will indicate illiquidity, and score 14,29 per cent whereas a 'no' answer will indicate liquidity and score nil. In question 34 firm A, with its regular cash flow, will be associated with a 'yes' answer and firm B with a less regular cash flow but higher profitability with a 'no' answer. The higher the score a respondent achieves therefore, the more illiquid his firm will be. The distribution of percentages scored by various groups of respondents will be presented in the form of a bar chart. The skewness in the distribution, if any, should reveal whether a state of illiquidity exists or not. A chi squared test will furthermore be applied to test whether the operational hypothesis should be accepted or rejected in that it will determine whether 'yes' answers will predominate.

A rank correlation test will furthermore be applied between debt ratios and liquidity scores in order to establish whether any positive correlation exists between high debt ratios and illiquidity.

12.8.16 ATTITUDES TOWARD LIQUIDITY

Questions 35 to 38 test the decision maker's attitude towards liquidity.

Question 35 tests the hypothesis that if a liquidity shortage does exist independent investments with relatively high returns and slow paybacks could be rejected.

Q35 You are considering an investment of R100 000 with an expected after tax return of 35 per cent. Your invested capital (R100 000) will however only be paid back (time when investment will be recovered as calculated from cash inflows) after 6 years. (Assume a cost of funds of 20 per cent). Will you accept this investment?

Yes Explain

No Explain

This question will test whether the illiquid firms' respondents will in fact reject investments with relatively high returns and slow paybacks.

In order to test the hypothesis the large sample sign test will again be implemented to determine whether answers 'no' will predominate.

Question 36 tests the hypothesis that investments with fast paybacks and minimal returns could be accepted.

Q36 You are considering an investment of R100 000 with an expected after tax return of 25 per cent. Your invested capital (R100 000) will be paid back after 2 years.

(Assume a cost of funds of 20 per cent). Will you accept this investment?

Yes                      Explain

No                        Explain

This question was posed to ascertain whether respondents will actually give preference to investments with fast paybacks and minimal returns.

The large sample sign test will be implemented to test whether 'yes' answers will predominate.

Question 37 relates to the hypothesis that when mutually exclusive investments are considered there will be a bias towards an investment with a fast payback and lower returns relative to one with a slower payback and better returns.

Q37 You have the choice between two investments A and B, each of R100 000. Investment A has an expected after tax return of 25 per cent and a payback period (time when investment will be recovered as calculated from cash inflows) of 2 years. Investment B has an expected after tax return of 40 per cent and a payback period of 6 years. (Assume a cost of funds of 20 per cent) Which investment will you choose? Explain.

Question 37, although similar in nature to questions 35 and 36 will also serve to check out the consistency of answering in the latter two questions.

The large sample sign test will be utilized to verify whether any significant differences exist between 'yes' and 'no' answers. A will be associated with a 'yes' and B with a 'no' answer. It is expected that 'yes' answers will predominate.



Question 38 relates to the hypothesis that returns will be sacrificed for liquidity up to a certain point. After this 'cut off' point returns will have precedence over liquidity.

Q38 Consider the following mutually exclusive (acceptance of one eliminates the other from further consideration) investments A and B. Each investment amounts to R100 000 and has a life of 10 years. (Assume the cost of your funds to finance this project is 20 per cent). Indicate your choice of investment with reasons.

INVESTMENT	PROFITABILITY PER CENT (after tax)	LIQUIDITY (TIME TAKEN TO RETURN INVESTED CAPITAL)	CHOICE	REASON
A	(1st	23	2 YEARS	
B	alternative	26	4 YEARS	
A	(2nd	25	2 YEARS	
B	alternative	40	4 YEARS	

Question 38 was asked to check whether respondents will in fact sacrifice liquidity for returns up to a certain level, after which level returns will have precedence over liquidity. Investment A will be associated with a 'yes' answer and investment B with a 'no' answer.

The large sample sign test will be implemented to determine:

- a) whether 'yes' answers will predominate in the choice between investments A and B in the 1st alternative and
- b) whether 'no' answers will predominate in the choice between investments A and B in the 2nd alternative.

#### 12.8.17 SALARIES

Question 39 tests the hypothesis that owner/managers are not aware of the nature of salaries drawn by other owner/managers in the similar industry as their own.

Q39 Are you aware of the nature of salaries drawn by other owner/managers in the same industry as you?

Yes

No

Question 39 was asked to verify whether owner/managers are in fact ignorant as to the premium that the market places, in monetary terms, on the amount of work that is done in a specific industry by an owner/manager.

The large sample sign test will be used to determine whether 'no' answers will predominate.

12.8.18 NON ECONOMIC SATISFACTIONS

Questions 40 to 47 test the conjecture that there exist certain non economic satisfactions in the firm which could induce owner/managers of unlisted firms to accept sub standard returns relative to other investments of similar risk outside the firm. If this situation does exist it will lower the cost of equity of the unlisted firm.

Q40 What increase in your current earnings would induce you to sell whatever shares you might have in this business and accept a position elsewhere in a large organization? Your earnings will consist of salary plus income from invested capital. You are free to invest your capital wherever you like.

- a) an increase of R5 000 p.a;
- b) an increase of R5 001-R10 000 p.a.;
- c) an increase of R10 001-R20 000 p.a;
- d) any other increase (specify);
- e) no increase at all. Explain.

This question tests whether owner/managers of unlisted firms put a premium on elements of job satisfaction which are non economic in nature.

Q41 What premium do you put on the fact that you are your own boss? In other words, what do you think being your own boss is worth in monetary terms elsewhere?

Question 41 requires from the respondents to put a monetary value on one element of non economic satisfactions namely, 'being your own boss'.

Q42 The owner(s) of a business has a unique relationship to that business. Each of the following has been suggested as a reason why some owners prefer to invest in own companies.

How important is each of the following factors in your decision to invest in this company? Most important is +3 and most unimportant is -3.

	IMPORTANT				UNIMPORTANT		
	+3	+2	+1		-3	-2	-1
1.	-	-	-	I can play a part in planning and controlling decisions	-	-	-
2.	-	-	-	I hold a leadership position	-	-	-
3.	-	-	-	I can be my own boss	-	-	-
4.	-	-	-	I know my job is secure	-	-	-
5.	-	-	-	I control my income by my own actions	-	-	-
6.	-	-	-	I take pride in running my own business	-	-	-
7.	-	-	-	Members of my community recognize my position in the firm and hold me in esteem because of it	-	-	-
8.	-	-	-	I feel that I am contributing to the growth of the community	-	-	-

Question 42 has the objective of isolating some specific non economic satisfactions in order to ascertain on a points scale in which order of importance they can be categorized.

Q43 Would you be willing to sacrifice some return on your investment in order to retain any of the factors mentioned in question 42?

Please select your answer from the following responses and tick the grid provided in the appropriate place.

- a) would sacrifice a large percentage of return to maintain this characteristic;
- b) would sacrifice a moderate percentage of return to maintain this characteristic;
- c) would sacrifice a small percentage of return to maintain this characteristic;
- d) would not sacrifice return to maintain this characteristic.

	<u>a</u>	<u>b</u>	<u>c</u>	<u>d</u>
<u>1</u>				
<u>2</u>				
<u>3</u>				
<u>4</u>				
<u>5</u>				
<u>6</u>				
<u>7</u>				
<u>8</u>				

Question 43 will test whether respondents are in fact prepared to sacrifice returns in order to maintain any or all of the non economic satisfactions listed in question 42. The question will furthermore test whether the returns that respondents are prepared to sacrifice

are indeed in conformance with the points scored by the individual's above mentioned non economic satisfactions.

Q44 Are there other factors which were important in your decision to invest in your own company and for which you would sacrifice return?

Yes Specify

No

Question 44 probes whether any other non economic satisfactions which could have been overlooked in question 42 does exist and for which respondents are prepared to sacrifice return.

Q45 Do you feel you are currently sacrificing return in order to maintain any of the characteristics mentioned in questions 43 and 44?

Yes Which

No

Question 45 tries to establish whether respondents are aware of the fact that they are forfeiting return in order to maintain certain non economic satisfactions.

Answers to questions 46 and 47 will indicate the value of non economic returns.

Q46 Viewing the factors in questions 43 and 44 collectively, what maximum return on your investment would you sacrifice to maintain them?

Question 46 requires from respondents to put a monetary value on non economic satisfactions in a collective sense.

In this instance a mean value of returns to be sacrificed will be calculated.

Q47 For what approximate return on your funds would you consider removing them from the firm?

- a) less than 4 per cent;
- b) 4 - 8 per cent;
- c) 9 - 13 per cent;
- d) 14 - 16 per cent;
- e) 17 - 20 per cent;



- f) over 20 per cent;
- g) no return at all.

Respondents are required to state what percentage return on an alternative investment (where non economic satisfactions will not be prevalent) would entice them to sell their firm and invest in the said alternative.

No statistical test will be employed to test the hypothesis concerning non economic satisfactions in that these satisfactions will either be prevalent or not.

Question 48 relates to the hypothesis businessmen in the study area are relatively risk averse.

#### 12.8.19 RISK AVERSITY

Q48 You are bidding on a contract to supply 1 000 units of a component that you are manufacturing. You have to decide on a bid price. One uncertain factor is the possibility of a strike by your workers. If this were to happen it would mean delays and penalties associated with meeting the deadline on the contract.

How much are you willing to pay for insurance against losses due to a possible strike.

The objective of question 48 is to elicit certainty equivalents from respondents in order to gauge their degree of risk aversity.

The distribution of certainty equivalents (percentages) will be depicted in the form of a bar chart. The nature of its skewness should give an indication of the degree of risk aversity of the respective respondents in the study area.

## 12.9 SUMMARY

Chapter twelve dealt with the research methodology of the study at hand.

Unlisted firms are small by any standards and do not qualify for a listing on a stock exchange. These firms cannot therefore, according to theoretical standards, calculate a cost of capital. By operationally defining as 'small' those firms which do not conform to the most accommodating listing requirements, it will be possible to avoid any confusion. Accordingly it will be 'small' firms in the DPP area that will be included in the research sample. In order to classify a firm as 'small' it would be necessary to apply the listing requirements of the Johannesburg Stock Exchange.

The listing requirements of the JSE were outlined, as well as the more lenient listing requirements of Development Capital Market (DCM). A study was furthermore conducted on the even more lenient listing requirements of the JSE's most recently launched Venture Capital Market. However, the requirements are in many respects not as clearly defined as those of the DCM and although the listing requirements for the Venture Capital Market might yet prove to be the least stringent of all listing requirements its lack of certainty at this stage necessitates the adoption of the requirements of the DCM as the operational limit of a 'small business'.

The DPP area has been chosen for study because it houses a large number of small industrial enterprises across a broad spectrum. The study was restricted to manufacturing firms since capital budgeting is an issue of central importance to these firms. These firms were all selected from the 1988-89 yearbook and directory of the Natal Chamber of Commerce.

Because attention has been confined to small manufacturing firms in the DPP area, the research findings will not necessarily be of general validity to all small firms in South Africa. However, depending on the results obtained, the limitations can be lifted in further studies aimed at generalizing the findings.

Since it was envisaged that statistical tests would be utilized in relation to some hypotheses a sample size of 30 was deemed necessary. Such a number would be adequate to permit the effective application of certain non parametric techniques.

It was decided because of its merits, to use a 'random sample'. The best form of random sampling namely the Simple Random Sample variant of 'systematic sampling', because of its widely acclaimed merits in literature, was eventually decided on.

The concept of the structured and unstructured interview is explored as well as the merits of closed ended versus open ended questions.

Closed ended questions are furthermore discussed in context of its administration by mail, by telephone and in face to face context, whereas open ended questions are discussed in terms of its administration by telephone and in face to face context.

The approach selected in the view of the foregoing research is a questionnaire that will be partially open ended to be administered by personal interview.

In the second half of chapter twelve the questions in the questionnaire were discussed in respect of:

- \* how each question reflects on the central hypotheses.
- \* the reason for asking each question and
- \* the statistical tests, if any, to be applied in different questions.

In chapter thirteen, a report will be made on the findings in the study. Data collected in the field study in the DPP area will be analyzed and interpreted and statistical tests performed, where necessary, in order to test the validity of the relevant hypotheses.

## CHAPTER THIRTEEN

### RESEARCH RESULTS

#### 13.1 INTRODUCTION

During the implementation phase of the research programme each firm selected in terms of the sampling procedure was approached with the request that an interview of approximately one hour be granted. Most of those approached were willing to co-operate. In those few instances where the request was denied the next firm (according to the sampling system adopted in section 12.6) of the population was approached. The interviewee in each case was the chief executive officer, who in almost all cases was also sole or controlling shareholder.

A total of 30 respondents were interviewed all of whom were fully co-operative. Indeed, many expressed a keen interest in the questionnaire and wished to be advised of final results. The sample size was adequate for all the envisaged statistical tests to be employed. The responses obtained on each questionnaire were recorded on a large spreadsheet to facilitate analysis. The results of that analysis are

reported in this chapter together with an interpretation thereof. The headings correspond with those utilized in the construction of the questionnaire.

## 13.2 ANALYSIS AND INTERPRETATION

### 13.2.1 OBJECTIVES

#### Question 1

Respondents to this question permitted a differentiation between firms that are primarily profit orientated and those that are not primarily orientated toward some other objective. However, it was expected that there would be some respondents who would in a 'knee jerk' reaction respond in the affirmative and yet in reality utilize decision criteria which were not consistent with a profit orientation. Secondary objectives were accordingly probed in order to determine whether the stated primary objectives would be substantiated.

The respondents who identified their main objective as profit maximization totalled 23 (77,3 per cent). Additionally one specified wealth maximization as the primary objective. The latter firm was immediately placed in the profit orientation category.

Of the 23 respondents who had as main objective profit maximization 8 had contradictory secondary objectives. Typical answers were: to create opportunities for employees, to provide employment, to be socially responsible and to serve the industry. On these grounds they were categorized as non profit orientated firms. The remaining 6 firms were placed in the non profit category as they stated as the main objective the following: to grow and provide employment (3 firms), to manufacture rubber products (1 firm), to improve sales volume (1 firm) and earning a living (1 firm).

Secondary objectives which supported the main objective of profit maximization were inter alia to provide quality service, to grow, to be market leaders, to create job satisfaction, to build a successful business, to run the business efficiently, to update plant and equipment and to secure retirement. These responses taken in conjunction with a primary stated objective of profit maximization, were accepted as an endorsement thereof.

At the end of this analysis, 16 firms were categorized as being primarily profit orientated and 14 as being primarily orientated towards a non profit objective.



### 13.2.2 INVESTMENT DECISION PROCEDURES

#### Question 2

In relation to this question it was hypothesized that profit orientated firms will tend to have formal procedures of investment decision making and non profit orientated firms will have informal or subjective procedures. Responses will accordingly be cast in a dichotomy : formal procedures and non formal procedures. Formal procedures included payback period, DCF and accounting rate of return.

The respondents who used formal investment decision making methods numbered 11 (37 per cent). Only one of those respondents indicated that his firm used a discounted cash flow method, more specifically the NPV method. Respondents who made use of a form of accounting rate of return numbered 2 whereas 8 respondents indicated that they used a form of payback method.

Examples of subjective investment methods were the following:

- \* equipment and machinery bought as and when required;
- \* plant and machinery bought on an ad hoc basis;
- \* investments made on gut feel;

- \* replace old machinery when we can afford it;
- \* buy machinery through contacts in Europe when bargains are available;
- \* decisions at board meetings in relation to future earnings and
- \* even if no return is made on the machine at least the machine itself appreciates.

A few respondents seemed to have difficulty in comprehending the long term nature of investment. Some respondents also seemed unable to differentiate between capital expenditure and operating expenditure. One respondent said he 'invests' in raw materials whenever price increases were expected.

Some respondents indicated specifically why they do not use DCF methods in their investment decision making. One of those, a plastic bag manufacturer, inter alia for the fertilizer industry, said he had tried to use DCF methods but was frustrated. According to him forecasting is extremely difficult for the following reasons:

- \* volatility of the South African economy;
- \* the unpredictability of interest rates;
- \* droughts and floods which especially affect the fertilizer industry;
- \* changing tax rates and

\* trade unionism - especially strikes and their consequences.

All these factors he asserted dissuaded him from using DCF methods. They had also forced him to limit his 'long range' forecasting to 1 year.

Another respondent asserted that his firm had used DCF methods in the past but experience showed that projected income was invariably better than actual income.

Another respondent in the tea blending industry, said that DCF methods yield 'alarming results' if applied in a 5 to 10 year period, due to forecasting difficulties. He could not elaborate on what he meant by 'alarming results'.

In testing the hypothesis that profit orientated firms will tend to have formal procedures and non profit orientated firms informal procedures the results were cast in a two by two cross break and the chi squared test ( $x^2$ ) was applied. The relative cross break is reflected in table 13.1.

TABLE 13.1

INVESTMENT PROCEDURES ACCORDING TO PRIMARY OBJECTIVE

	FORMAL		INFORMAL		ROW TOTAL
Primary	Profit	4 5.9	12	10.1	16
Objective	Non Profit	7 5.1	7	8.9	14
	Column Total	11	19		30

Chi square was calculated to be 2,09 which was not significant at the ,05 level for a one tailed test. Accordingly the hypothesis could not be substantiated.

13.2.3 RISK OF INSOLVENCY

Question 3

The question probes the hypothesis that investments which have the slightest possibility of failing and in the event forcing the firm into insolvency will be avoided by a significant number of firms.

There were 7 respondents who indicated that they would accept an investment that had a 90 per cent probability of profits but a 10 per cent probability of a loss that could

had to insolvency. Their reasons for accepting this investment were that the probability of making profits (90 per cent) outweighed in their view the probability of making a loss (10 per cent) that could lead to insolvency. The 23 (67,7 per cent) respondents who refused to accept the investment all said they could not risk a 10 per cent chance of going insolvent. This result unquestionably supported the hypothesis evidenced by the large sample sign test.

Freund and Williams (1977:30) observe that when the sample size is large ( $n > 20$ ) the decision rule is based on the fact that the test statistic namely  $Z = \frac{y - n/2}{\sqrt{n/4}}$

follows a normal standard distribution where:

$y$  = number of positive responses

$n$  = sample size

If the 'yes' and 'no' responses are substituted into the above equation it becomes:  $\frac{7 - 30/2}{\sqrt{30/4}}$   
 $= -2,92$

At the ,05 level of significance the critical value is -1,645. Since the observed value of the test statistic is less than -1,645 there is a 95 per cent chance that the operational hypothesis can be accepted.

In order to provide some rationale for the reason why 7 respondents would accept the risky investment, an effort was made to isolate some points which seemed common to these respondents.

As point of departure it was posited that these 7 respondents were relatively less risk averse than their 23 counterparts and that they would accordingly also expose themselves to higher risk and financial leverage than the cautious group. It was accordingly decided to apply a test of correlation between the nominally measured results under this heading and those interval measured results obtained in response to questions 12 (debt ratios) and 48 (certainty equivalents). To test for correlation the point - biserial correlation coefficient test was adopted.

The correlation coefficient between high debt ratios and acceptors of the risky investment proved to be 0,406. The correlation coefficient with certainty equivalents was 0,239. Neither coefficient provides adequate support for the hypothesis which must accordingly be rejected.

#### 13.2.4 USE OF SHORT TERM FINANCE

Questions 4 to 7 examine the extent to which respondents make use of short term debt in the financing of capital expenditure.

##### Question 4

Respondents were asked to indicate which forms of financing they actually use when they invest. Table 13.2 records the answers to this question. The total is more than 30 as respondents indicated more than 1 form.

TABLE 13.2

FORMS OF FINANCE USED BY RESPONDENTS WHEN INVESTING

<u>FORMS OF FINANCE</u>	<u>NUMBER OF RESPONDENTS</u>	<u>PER CENT</u>
Equity	17	37
Leasing (3-5 years)	11	24
Hire purchase (3-5 years)	7	15
Bank overdrafts	4	8
Long term Loan	3	6
Short term Loan	2	4
Medium term Loan	1	2
Bond finance	1	2
Trade credit	1	2

Long term sources of finance namely long term loans, leasing, hire purchase and equity represents 82 per cent of the forms of financing utilized. Only 28 per cent of the responses indicated use of funds of a short term nature.

Typical reasons for using different forms of finance were the following:

1. Long term loan : fixed interest (this perception is questionable).
2. Medium term loan no specific reason.
3. Short term loan : one year's profit will repay loan (this is clearly a question of confusing long term with short term).
4. Leasing :
  - \* general sales tax is spread over the term of the lease;
  - \* capital expenditure is spread over the life of the asset and
  - \* tax benefits (not specified).
5. Hire purchase :
  - \* general sales tax is paid only once (reasoning not clear);
  - \* ownership gives stronger balance sheet (this statement is questionable) and
  - \* tax benefits (not specified).



6. Equity :

- \* no interest charges;
- \* no cost;
- \* low cost (the reasoning in all 3 cases above is surely unqualified and faulty);
- \* do not like borrowing;
- \* have a big supply available;
- \* no outside pressure to repay and
- \* depreciation tax benefits (not specified).

7. Bank overdraft :

- \* flexible (the fact that they are repayable on demand overlooked) and
- \* interest is charged on daily balance.

8. Bond financing:

- \* no specific reason.

9. Trade credit :

- \* cost free (only cost free if discounts are taken).

One respondent who used 5 years leasing as a source for investment financing indicated that he uses retained earnings for working capital purposes.

These responses clearly reveal that there are some misconceptions about several of the issues. Nonetheless a note of conservatism emerges as there seems to be a slight preference towards the usage of equity.

### Question 5

Respondents were asked to indicate whether they try to link long term sources of financing (3 years and longer) to proposed investments. The respondents who replied in the affirmative numbered 24 (80 per cent). Respondents who indicated that they do not make the attempt numbered 6 (20 per cent).

A total of 21 respondents (70 per cent) declined to give concrete reasons for their answers. Reasons given by respondents who did try to link long term sources of financing to proposed investments included the following:

- \* try to match DCF forecasts with term of finance;
- \* resulting cash flow will pay off loan;
- \* due to inflation ability to pay off instalments is improved with time;
- \* profit will help to repay loan and
- \* try to reduce monthly cash outflows.

Few of these respondents seemed to comprehend the significance of matching cash flows over the life of the investment with finance of the same term.

Most respondents in the total sample who preferred to link short term sources of finance to investments were in the construction industry. According to them long term planning in this industry, because of the volatility of the economy is impossible. When there is an economic downturn, according to them, the construction industry is affected first.

#### Question 6

This question tries to establish whether respondents would supplement long term sources of finance with short term sources if they experience a short fall.

Respondents who indicated that they would indeed supplement long term sources of finance with short term sources in order to finance an investment if the need arises, totalled 22 (73,3 per cent). Of these, 20 indicated that they would use overdraft facilities for the purpose. Those who supplied reasons for this choice said inter alia that overdraft facilities were convenient, flexible, easily obtainable and are not normally called up. One respondent however, said he would only use short term sources if an immediate return is expected from the investment.

Two of the 22 respondents chose trade credit as their form of short term funds. They declined to give reasons.

Of the 8 respondents who indicated that they would not go ahead with the investment, 7 declined to give reasons and 1 said he did not use short term funds for long term investments under any circumstances.

The responses to this question reinforced the observation made previously that the majority of respondents do not really comprehend the danger of using any short term funds for long term projects.

#### Question 7

This question directly probed the preference of decision makers for the utilization of short term funds to finance investments.

Respondents indicating that they would prefer to use short term sources totalled 8 (27 per cent). Of these 7 supplied reasons. Their reasons were the following:

- \* prefer short term financing since long term planning in the construction industry is difficult;
- \* overdraft facilities are flexible (3 respondents);
- \* overdrafts are cheap (2 respondents) and
- \* it is company policy to use short term sources to finance investments.

Of the 22 (73 per cent) respondents who indicated that they do not prefer to use short term sources to finance investments, 17 supplied reasons as follows:

- \* prefer to match cash flows with the life of the investment (2 respondents);
- \* a sudden downturn in the economy could have a 'magnified effect' on the usage of short term funds;
- \* prefer to use cash;
- \* too costly (3 respondents);
- \* investment will be too large;
- \* 'normally' prefer not to use short term sources;
- \* bank can recall overdraft;
- \* prefer to use short term funds for working capital;
- \* banks object to advancing short term sources for investment purposes (no reason given as to why banks should so object);
- \* have ample equity available;
- \* only use short term sources in emergencies and
- \* not enough cash flow to service short term interest charges (3 respondents).

The responses to this question reinforce conclusions in the previous 2 questions that most respondents are not aware of the real implications of the usage of short term debt for

the funding of investments. Of the responses to this question only those underlined truly reflect some understanding. The rest appear to be either erroneous or intuitive.

A chi squared test ( $\chi^2$ ) was adopted to test the hypothesis underlying questions 4 to 7 namely that most decision makers are prepared to make use of short term debt in their investment decision making. Questions 5, 6 and 7 allowed for definite 'yes' and 'no' responses. It should be noted however that the 'no' answers in question 5, in terms of the statistical test, should actually be treated as 'yes' since 'yes' would indicate usage of short term funds and vice versa.

Question 4 required from respondents to state which forms of financing they use when they invest and more than one response was permissible. In order to obtain uniform 'yes' and 'no' responses, the responses in question 4 was also converted to 'yes' and 'no'. If the respondents first answer for example was 'long term debt' it was interpreted as 'no' because it indicated non usage of short term funds whereas answers like 'bank overdraft' and 'trade credit' indicated usage of short term funds and were consequently interpreted as 'yes'. This system was consequently implemented and

revealed that 7 (23,3 per cent) respondents indicated that they used short term debt (therefore allocated 'yes' answers) whereas 23 (76,7 per cent) said 'no'.

In this way it was possible to implement an appropriate statistical test. Table 13.3 depicts the chi squared ( $x^2$ ) test applied.

TABLE 13.3

USAGE OF SHORT TERM DEBT TO FINANCE INVESTMENT

RES- PONSES	Q U E S T I O N S				ROW TOTAL
	Q4	Q5	Q6	Q7	
Yes	7 (10.8)	6 (10.8)	22 (10.8)	8 (10.8)	43
No	23 (19.3)	24 (19.3)	8 (19.3)	22 (19.3)	77
Column Total	30	30	30	30	120

$x^2 = 24.60$

The one tailed critical value at a ,05 level of significance is 7.82. However the significant difference is in the opposite direction to that hypothesized. This in effect means that the operational hypothesis that unlisted business firms make liberal use of short term funds when investing should be rejected. Indeed it is far more likely that they do exactly the opposite. The pattern was only disrupted by question 6 and that question could be interpreted as relating more to an emergency situation than a normal investment situation.

Perhaps the reasoning and understanding of past experience may sometimes be faulty; perhaps they do the right thing for the wrong reasons. They nonetheless do the right thing and that is important.

Contrary to expectations, small unlisted firms in the DPP area generally finance capital investment with long term funds.



13.2.5 MEDUIM TERM FINANCE

Question 8

In response to the question as to the use made of medium term sources in the funding of investments, 10 (33,3 per cent) of the respondents answered that they do use medium term sources and 20 (66,7 per cent) said that they did not. Of the respondents answering 'yes', 7 supplied reasons for the usage of these funds:

- \* prefer 3 year leasing. In that way cost of asset is 'eliminated' sooner than a 5 year lease (2 respondents);
- \* prefer medium term funds when the investment 'requires' it (3 respondents);
- \* able to redeem debt commitment sooner than in the case of a 5 year lease (2 respondents) and
- \* profits can be used to redeem lease commitment.

Of the respondents who answered 'no' 18 gave reasons why they didn't use meduim term funds:

- \* prefer to match cash flows with life of the investment : (generally the same as those who preferred long term funding);

- \* prefer to have the cost of the investment eliminated quickly (short term preference);
- \* prefer to fund investment with cash
- \* interest rates are too high;
- \* repayments are too big (long term preference) and
- \* not 'company policy'.

Medium term sources of financing are less vulnerable than short term sources and these responses, taken together with earlier answers endorse the view that most respondents were conservative in financing.

#### 13.2.6 RISK ATTITUDES TOWARD USAGE OF SHORT TERM DEBT

##### Question 9

Question 9 endeavours to assess the attitudes of respondents specifically in respect of the risk embodied in short term debt, when used for investment purposes.

Respondents were required to indicate whether they were not afraid that if short term debt is used for investment decision making, these debts will have to be paid before there is sufficient cash flow from the investment. Respondents who did not answer this question numbered 10 (33,3 per cent) since they did not make use of short term funds in the fund-

ing of their capital expenditures. Of the 20 (67,7 per cent) who did answer the question 6 (30 per cent) respondents answered 'yes' i.e. they were afraid and 14 (70 per cent) answered 'no' i.e. they were not afraid. Those who were not afraid gave the following reasons:

- \* the plant generates enough cash flow to meet any emergencies in respect of the servicing of any short term debt (8 respondents);
- \* overdraft facilities form a very small portion of total funding;
- \* in an emergency situation, my firm would have no other choice but to make use of overdraft facilities and
- \* overdrafts are not normally called up.

The majority of 'fearless' responses to this question indicated that the respondents concerned are liquid enough to handle situations where cash flows from an investment cannot be utilized to service the financing source that was applied to that investment.

13.2.7 PREFERENCE OF FINANCING SOURCE

Question 10

This question probes the conceptual preference of respondents as to different forms of financing in the investment process. Unlike question 4 where respondents had to indicate the forms of finance they actually use when they invest, this question required them to indicate the 3 kinds of funding favoured most, in order of preference. The results are reflected in table 13.4.

TABLE 13.4  
MOST FAVOURED FORM OF FINANCING FOR INVESTMENT

SOURCE OF FUNDS (IN SEQUENCE OF PREFERENCE)	POINTS SCORED
Owner supplied funds	63
Retained earnings	46
Bank overdrafts	15
Long term loans	14
Leasing	13
Medium term loans	10
Hire purchase	8
Mortgage bonds	4
Trade Credit	3
Short term debt	1
Bankers acceptances	1
Comprehensive assistance program	1

The forms of finance preferred were rated on a points scale from 3 (most preferred) to 1 (least preferred).

The reasons given for the choice of owner supplied funds and retained earnings were mostly that these forms of finance were less costly, less risky and carried no interest charges. One respondent said he would give it priority because he wanted to stay independent. All the respondents who preferred bank overdrafts did so because they were flexible and fairly easily obtainable. Leasing's relative popularity stemmed from the fact that lease payments were tax deductible and would be spread over 5 years.

The fact that such a high number of respondents selected equity as their number one preference for funding investment indicates an attitude of conservatism.

#### 13.2.8 ATTITUDES TOWARD FINANCIAL LEVERAGE

##### Question 11

Question's 11-14 relate to respondents' attitudes toward leverage.

Question 11 was very direct and probes the hypothesis that unlisted firms, because of a shortage of equity capital, have large debt ratios.

The respondents who thought their debt ratios were disproportionately high totalled 6 (20 per cent) whilst 23 (76,6 per cent) said that their debt ratios were within limits. One respondent would not answer the question.

In order to test the operational hypothesis, the large sample sign test was again implemented. In this instance the test statistic yielded an answer of -3,2. This was significant at the ,05 level for a one tailed test. However this significant result was precisely opposite to the direction predicted. Respondents did not consider themselves to be under capitalized and were quite comfortable with the debt utilized.

#### Question 12

This question called for an exact specification of the respondent's debt ratio, including shareholder's loans as debt. One respondent declined to answer the question. The debt ratio of the other 29 respondents ranged from 5 - 90 per cent with a mean of 36 per cent and a standard deviation of 21. The standard deviation, which is quite large, indi-

cates that there were very low debt ratios and some very high ones. These debt ratios in actual fact reveal that debt ratios in the sample are indeed conservative in comparison with many listed companies. It can therefore be concluded that respondent's perceptions of their debt ratios corresponded with reality.

### Question 13

Respondents were required to state what they thought was the maximum debt ratios their firms could sustain without being financially embarrassed.

A total of 7 respondents were unable to answer the question. The debt ratios mentioned by the other 23 respondents ranged from 25 per cent to 90 per cent with a mean value of 50 per cent. This was substantially above the mean calculated in question 12. It however indicates a relatively low maximum, a fact that reinforces previous conclusions of a conservative attitude towards debt.

### Question 14

This question attempted to establish attitudes towards the composition of a financial mix.

Respondents were asked which form of finance they would prefer if they needed additional capital and had to choose between debt and equity.

A number of 22 (73,3 per cent) respondents indicated that they preferred equity and 7 (23,3 per cent) preferred debt. The remaining respondent replied that his choice would depend upon the state of the economy namely that if interest rates drop he would consider borrowing, if not he would choose equity. This respondent seemed to be aware of the profits to be reaped as result of the favourable employment of leverage.

A significant factor that emerged from the interpretation of the responses from this question was that 6 respondents who chose equity gave as their reason that it was a form of finance with no interest charges and no financial costs. These 6 confirmed this belief in responses to a later question which asked specifically whether equity has a cost.

Comment which reinforced a clearly emerging attitude of caution included, 'am afraid of large debt ratios, 'don't like to pay interest' 'don't like working for the bank' and 'am conservative'. Many observed that a firm which borrows heavily in the RSA could soon find itself in dire straits due to the volatility of the interest rates.



One respondent who chose debt, had a relatively low debt ratio of 25 per cent. The reason for his choice was that he felt he had room for leverage in his financial mix. Another respondent chose debt because he favoured the tax deductibility of interest charges. Other respondents who chose debt felt it was their choice because it was flexible or was the cheapest form of finance. These answers indicated that many respondents often had rational reasons for choosing debt for funding investment. However not one respondent justified his answer by reference to establishing an optimal cost of capital.

#### 13.2.9 OPPORTUNITY COST

##### Question 15

Questions 15 and 16 relate to opportunity costs. More specifically question 15 probed the hypothesis that owner/managers are not generally conscious of outside opportunity yields on investments in a risk class similar to investment in their own firms.

Respondents were asked whether they were aware of opportunities where they could earn a higher return on investment in a risk class similar to investment in their own firms.

Any one who answered 'no' were further asked whether any attempts had been made to establish returns on alternative investments. A uniformly negative response was obtained.

There were 20 (66,7 per cent) of the respondents who answered 'no' and 10 (33,3 per cent) who answered 'yes'. In order to test the hypothesis as to whether owner/managers of small unlisted firms are generally aware of opportunity yields on investments in a risk class similar to investment in their own firms a large sample sign test was again applied.

In this instance the statistical test yielded a value of -1,83. Since -1,83 is less than the critical value of -1,645 at the 0,5 significance level of a one tailed test it can be concluded that there were significantly more 'no' than 'yes' answers. This in effect means that there is a 95 per cent chance that the operational hypothesis is valid.

#### Question 16

This question required reasons from those 10 respondents who were aware of better opportunities, why they did not invest in such opportunities instead of the firm. They were asked

more specifically to explain why they don't liquidate their present investment in the firm and invest the proceeds in the better opportunity.

The following reasons were given by the 10 respondents.

- \* my firm has better future prospects (2 respondents);
- \* outside opportunities are short term and fluctuating (4 respondents);
- \* job satisfaction and responsibility toward employees (3 respondents) and
- \* starting up costs at a later stage would be too expensive (1 respondent). By this the respondent meant that if the alternative opportunity in which he invested proved to be a failure, starting from scratch the form of business he presently owns would be too expensive.

The responses indicated that respondents did not really evaluate outside opportunities in terms of those having the same risk as that of the firm. They rather visualized comparative opportunities in terms of risk free short term investments in financial institutions. They definitely seemed to have a problem in comprehending the concept of risk quantification or alternatively of actually quantifying the risk

in an alternative opportunity. If the latter alternative is true it is a situation which is indeed problematic and recognized as such in financial literature (section 10.4.2).

#### 13.2.10 VALUATION OF SHARES

##### Question 17

This question was aimed at establishing how respondents would go about valuing their shares in the business.

Respondents were required to state how they would go about calculating a minimum acceptable price for their shares if they were to liquidate their interest in the firm.

There were six of the respondents who said they had no idea. Table 13.5 categorizes the responses of the other 24. The columns headed net assets and earnings reflect responses which featured primarily net asset or earnings criteria specifically.

TABLE 13.5

SHARE VALUATION METHODS

CRITERIA		NO. OF RESPONDENTS
Refer to Auditors for Valuation		4
Primarily Net Assets Cri- teria	based on net assets; net assets at book value + 3 years after tax earnings; net assets at market value + goodwill; net assets value + super profits method; net assets at market value; net assets at book value	1 2 5 1 1 1
Primarily Earnings Criteria	3 years after tax earnings + equity divided by number of shares; 3 years after tax earnings plus asset value; 4 to 5 times annual after tax profits; annual after tax profits X 10 + 3 times after tax annual earnings	1 1 1 1 2
Other Criteria	40 per cent asset value + 60 per cent goodwill and patent holding; valued in relation to plant on hand; replacement value of assets + goodwill.	1 1 1

Due to a variety of meanings probably associated with some of the key words involved there is clearly some overlapping in the responses and the categorization is tentative at best. Verbatim responses only were recorded and clarifying questions were posed only in relation to certain issues. Where 'goodwill' was mentioned, the respondents were unable to say how goodwill should be valued. Similarly the 'super profits' method could not be explained. In all cases 'after

tax profits' were said to refer to historic audited figures but when asked if this referred only to the last audited years results, an average of the last 2 years or to the anticipated current year's results confusion was evident.

The only general conclusion that could be reached was that none of the respondents considered opportunity cost or any discount of future profits. There was merely a vague idea that price should relate somehow to net asset values and to proven profitability.

#### 13.2.11 COST OF CAPITAL

##### Question 18

Questions 18-22 relate to the cost of capital. Question 18 sought to establish the way in which respondents understood the cost of debt.

Respondents were asked how they regarded the cost of borrowed funds.

There were 10 (33,3 per cent) respondents who viewed the cost of debt in terms of Rands, 13 (43,3 per cent) who viewed the cost as a percentage and 7 (23,4 per cent) who

viewed the cost in terms of Rand and percentage. These responses indicated once again that the role of the cost of debt in investment decision making was poorly understood.

Apart from the fact that this question was supposed to reflect respondent's conception of the cost of borrowed funds it also served as a control for question 2. The rationale for this was explained in section 12.8.11. As a control this question served its purpose in that the respondent who had indicated that his firm used the net present value method for investment decision making expressed the cost of debt in terms of Rands. When asked how his firm was able to calculate a discount rate if they do not assess the cost of debt percentage wise, he could not respond. It was then admitted that although he believed that the NPV approach was correct, his firm did not in fact use it.

Since the real cost of debt is the after tax cost, the next question probed respondent's comprehension of this aspect.

#### Question 19

The hypothesis was made that the cost of debt is not generally measured on an after tax basis when a decision on the financing of an investment is made.

Respondents were simply asked whether they calculate the cost of debt on a before tax or after tax basis.

There were 23 (77 per cent) respondents who assessed the cost of debt on a before tax basis whereas 7 (23 per cent) assessed the cost on an after tax basis. It was indicated by 1 respondent that he assessed the cost on a before tax basis because the tax benefit only comes 1 year later. Some respondents gave the impression that they were not even aware of the tax benefit that involves the deductability of interest before tax is paid.

In order to test the hypothesis formally the large sample sign test was again implemented. The respondents who viewed the cost of debt on a before tax basis were allotted plus(+) signs and the ones who viewed the cost on an after tax basis minus(-) signs.

In this case the observed value of the test statistic proved to be 2,9 for a one tailed test which was significant at the ,05 level. The hypothesis was accordingly sustained.



## Question 20

This question was designed to test the hypothesis that owner/managers do not consider the cost of equity when making investments.

The question was posed as to whether equity funds (owner supplied funds - money, goods or retained earnings) have a cost. It was hypothesized that a significant number of respondents would claim that equity funds have no cost.

Respondents who regarded equity as having a cost totalled 22 (73,3 per cent) whereas 8 (26,7 per cent) said that it had no cost. Of the latter group, 7 said that equity was 'cost free'. On further questioning they indicated that it had no cost because no interest was payable on it, unlike debt. The other respondent in this group answered that only directors' loans have a cost but equity had none.

If the large sample sign test in this instance is applied to test the hypothesis it reveals an observed test statistic of 2,56. Although the critical value at the ,05 level of significance is 1,645 for a one tailed test the result is in the opposite direction to the hypothesis, which must accordingly be rejected.

In the following question relevant respondents were requested to elaborate on their concept of the cost of equity.

Question 21

The 22 respondents who indicated in the previous question that they perceived equity to have a cost were requested to indicate from a choice of 7 categories which best described their concept of this cost.

The various categories from which respondents had to choose as well as the number of respondents who chose a specific category were as follows:

- a) net profit after taxes as a percentage of the book value of equity - 5 respondents
- b) net profit after taxes plus interest as a percentage of book value of total investment - 1 respondent
- c) net profit after taxes as a percentage of market value of equity - 1 respondent
- d) net profit after taxes plus interest as a percentage of market value of equity - 1 respondent
- e) net profit after taxes plus interest as a percentage of market value of total investment - 1 respondent
- f) opportunity cost (what owners could earn elsewhere) - 10 respondents

g) none of these (please describe): (overdraft rate) - 1 respondent (The prevailing prime overdraft rate was 21 per cent).

There were 2 respondents who indicated that they were not sure.

It is obvious from the above responses that confusion existed among respondents about the cost of equity capital. However, a substantial number did select 'opportunity cost'. Indeed, the number is significant at the ,05 level for a two tailed test.

#### Question 22

Respondents who said that equity had a cost were asked which rate they thought approximated the cost of this form of finance in their respective firms. Of the 22 respondents, 16 responded to this question. (The other 6 indicated that they did not know the cost of equity in their firms.) The cost of equity estimated, ranged from 15 to 35 per cent with a mean value of 20 per cent. It is interesting that this mean value was lower than the prevailing prime overdraft rate (21 per cent). This finding is not consistent with the suggestion

made by Weston and Brigham (1978:796) that the cost of debt should generally be lower than the cost of equity. Boyer (1974 :9) explains this view as follows:

"There is firstly a tax advantage on debt which reduces the cost and secondly the cost of equity is generally supposed to be higher than that of debt because of the risk factor it reflects."

It should however, also be borne in mind that if non-economic satisfactions are relevant, the relative cost of equity might be further depressed. This thought will be explored further when the responses to questions 42-47 are considered.

#### 13.2.12 TARGET CAPITAL STRUCTURE

The next question was intended to establish whether respondents considered target capital structures in their financial decision making.

#### Question 23

The hypothesis to be tested through this question was that finance for new investments would not be raised according to a target capital structure.

Subjects were asked to indicate whether debt and equity (if used in the funding of proposed capital expenditure) are raised according to a specific ratio.

Of the respondents 28 (93,3 per cent) said that they did not raise funds in a specific ratio whereas 2 (6,7 per cent) respondents indicated that they did.

In this case there is overwhelming evidence in favour of acceptance of the hypothesis.

#### 13.2.13 WEIGHTED AVERAGE MARGINAL COST OF CAPITAL

##### Question 24

This question tests the hypothesis that owner/managers of unlisted small firms do not attempt to calculate a weighted average marginal cost of capital when they make investment decisions.

They were asked : "if debt and equity were used in the funding of capital expenditures how would you go about determining the overall cost?"

- \* There were 6 (20 per cent) subjects who said they did not know;
- \* another said that he disregards the cost of funds when he invests and rather makes sure that the cash flow is sufficient;
- \* 3 respondents said they visualized an average cost;
- \* another respondent indicated that since he never uses debt he only takes cognizance of the cost of equity;
- \* the respondents who considered only the cost of borrowed funds numbered 18 (60 per cent). Amongst these respondents were 11 who did recognize a cost of equity;
- \* the respondent who had indicated that his firm used DCF, calculated the overall cost of capital as follows : debt in Rands and equity on an ROI basis. He however answered previously that he regarded the cost of equity as being an opportunity cost. There was clearly some inconsistency in the responses of this subject. It is suspected that although he knew something about DCF techniques and knew that they were considered 'right', he did not use them, but did not wish to acknowledge the fact.

A weighted average marginal cost of capital is clearly a concept which plays no part in the investment decision making of the firms in this study.

#### 13.2.14 INFLATION

Questions 25 and 26 explored the way in which inflation is dealt with in the investment decision making process.

##### Question 25

This question concerns the hypothesis that inflation is ignored by owner/managers when they make investment decisions.

Respondents were asked bluntly whether they consider inflation when they make investment decisions.

The respondents who answered that they do consider inflation in their investment decision making numbered 22 (73,3 per cent) whereas 8 (26,7 per cent) indicated that they did not. The 22 respondents who did consider inflation described their methods of how this is done as follows:

- \* respondents who said they account for inflation 'according to their perception of future values' numbered 4;
- \* there were 2 respondents who said they take cognizance of rising costs of labour and raw materials;
- \* the respondents who said they considered replacement values of equipment at a later stage numbered 4;

- \* some respondents, 4 in total, said the only way they adjust for inflation is to buy machinery as soon as possible because the sooner it is bought, the sooner it appreciates;
- \* there were 5 respondents who said they applied a projected inflation rate to estimate the future prices of machinery. They were very 'vague' about this 'rate';
- \* another respondent said he adjusts for inflation according to the consumer price index. He could not say what it was he adjusted.
- \* another respondent adjusted for inflation according to 'gut feel' and
- \* another one said he adjusted for inflation by building a rate of escalation into future prices (he was unable to elaborate on this rate).

If the large sample sign test is employed to test the hypothesis that owner/managers of small unlisted firms do not take inflation into account in their investment decision making it reveals an observed test statistic of 2,56. Although the critical value at the ,05 per cent level of significance is 1,645 for a one tailed test the result is in the opposite direction to the hypothesis, which must accordingly be rejected. However, although the above hypothesis is rejected on a basis of a closed ended question, the methods



described by respondents are so subjective and vague that an in depth test on these methods could very well prove the hypothesis to be effectively true.

In the following question more information was required concerning the inflation rate used by respondents.

#### QUESTION 26

Respondents who answered in the previous question that they do consider inflation in their investment decision making were required to state the rate used.

Only 1 respondent used a rate according to the cost price index which he stated as between 15 and 17 per cent. The price index to all knowledge does not exist. When the respondent was asked how he applied this index he could not respond.

There were 2 respondents who used an arbitrary rate of 20 per cent and 2 respondents who used a rate of 15 per cent. Other responses were inter alia the following: built into forecast, informally, perception, gut feel, prime rate plus, per cent, rate advised by financial institutions and no fixed rate.

The diversity of subjective methods and their vagueness puts a question mark on the validity of these rates and the way in which they are said to be applied.

#### 13.2.15 LIQUIDITY

Subjects were most unlikely to admit to a liquidity problem to a researcher and accordingly, indirect questioning was needed. Questions 27-38 test liquidity aspects of firms in the study. Questions 27 to 34 relate to the probable actual liquidity position of respondents whereas questions 35 to 38 probe attitudes toward liquidity.

Questions 27 to 34 concern the hypothesis that there exists a liquidity shortage amongst unlisted firms in the study. Each of seven questions viz. 27, 28, 29, 31, 32, 33 and 34 carry an equal weight of 14,29 per cent in order to establish an overall probable liquidity rating. Question 30 does not form part of the weighted series of questions relevant to the hypothesis. It serves merely as a prompt towards question 31.

For each question a 'yes' answer will indicate illiquidity and will score 14,29 per cent, whereas a 'no' answer will indicate liquidity and the score will be nil. The higher the score a respondent achieves therefore, the more illiquid his

firm will be. Each respondent thus had 7 scoreable questions, with a maximum possible score of 100,0 per cent. The terms of each of the questions are briefly restated for ease of reference:

Question 27 endeavours to ascertain whether a respondent experiences any difficulty with collection from debtors.

Question 28 requires respondents to indicate whether they stretch payments to creditors on principle.

Question 29 seeks to ascertain whether major customers who are slow payers put pressure on the firm when money generally is tight.

Question 30 asks whether the frequency of the cynical debtors control excuse: 'the cheque is in the post,' has increased lately. This question does not form part of the hypothesis but serve to prepare the respondent's mind for the next question.

Question 31 seeks to ascertain whether the respondent has himself tried 'the cheque is in the post' answer to queries from the debtors control of suppliers.

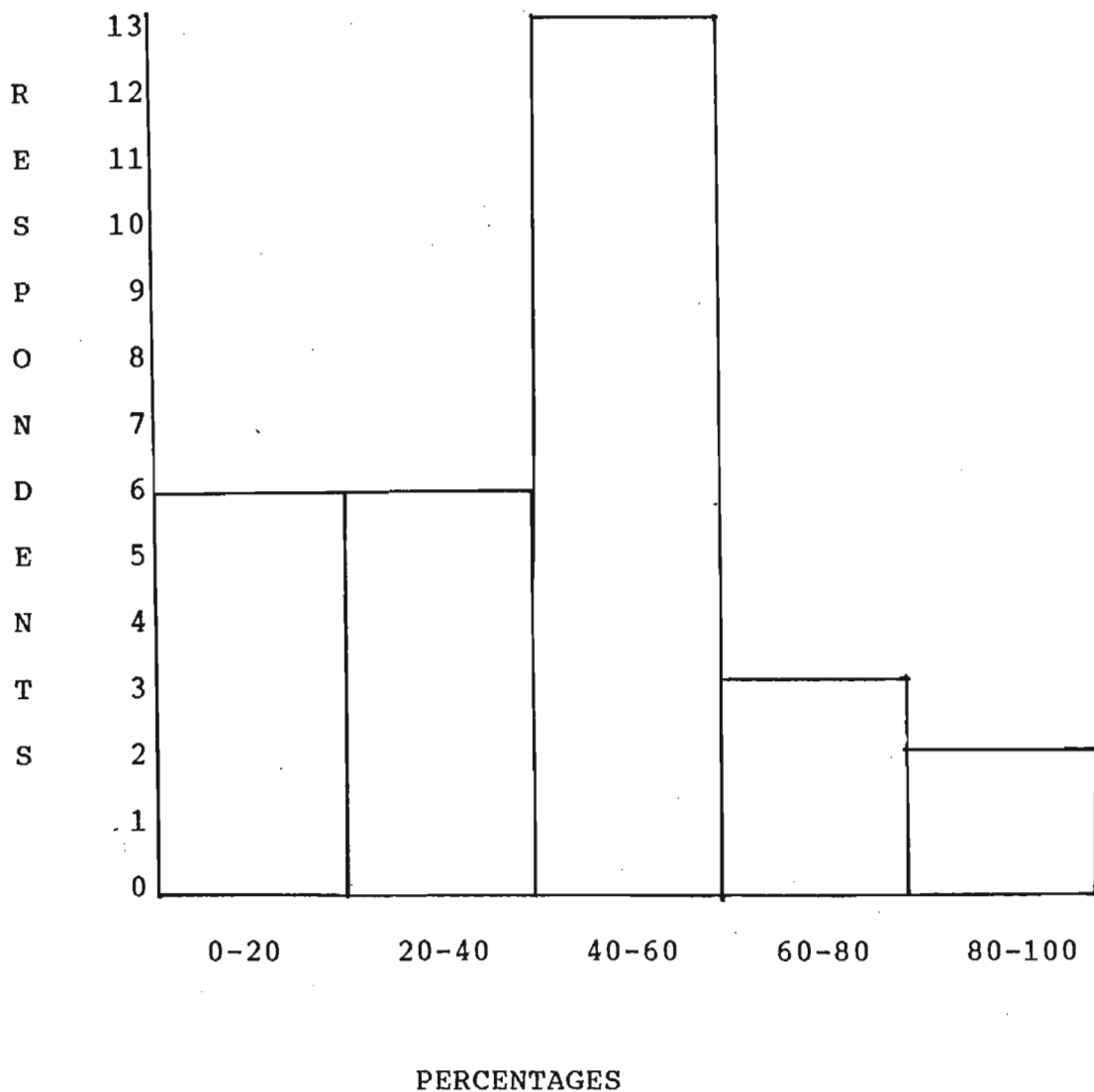
Question 32 tries to establish whether the bank manager has ever made mention of a current ratio of 2 to 1. This is something he is likely to have said if he felt the firm had a liquidity problem.

Question 33 tries to establish whether the bank manager has made mention of an acid test ratio of 1:1. This is likely if stock seemed to be slow moving.

Question 34 provides the respondent with a choice between two investments A and B, each having a cost of R1 000. Investment A has an after tax cash flow of R500, R800 and R1 000 in years 1, 2 and 3 respectively whereas investment B only has a R3 200 after tax cash flow in the third year. A respondent choosing alternative A is regarded as illiquid and will be associated with a 'yes' answer whilst one choosing alternative B is regarded as liquid and will be associated with a 'no' answer. Figure 14.1 is a bar chart which depicts the percentages scored by the various groups of respondents.

FIGURE 13.1

LIQUIDITY SCORES EXPRESSED AS PERCENTAGES



The distribution has a mean value of 50 per cent and a standard deviation of 20.68. The distribution furthermore reveals that there is a bias towards the middle ranges of liquidity in the study.

The correlation coefficient between liquidity scores and debt ratios is  $-.018$ . This statistic reveals that there is no significant relationship between illiquid firms and firms with high debt ratios amongst the sample firms.

Table 13.6 depicts the results, arranged in a format to permit a chi square test.

TABLE 13.6  
LIQUIDITY OF UNLISTED BUSINESS FIRMS

		Q U E S T I O N S							
RES- PONSES		Q27	Q28	Q29	Q31	Q32	Q33	Q34	ROW TOT
Yes	14 (11.8)	12 (11.8)	14 (11.8)	8 (11.8)	8 (11.8)	9 (11.8)	18 (11.8)	83	
No	16 (18.14)	18 (18.14)	16 (18.14)	22 (18.14)	22 (18.14)	21 (18.14)	12 (18.4)	127	
Col- umn total	30	30	30	30	30	30	30	210	

$$x^2 = 15,29$$

The one tailed critical value at a ,05 level of significance is 12.59. However, the significant difference recorded is in the opposite direction to that hypothesized. This in effect means that the operational hypothesis that there exists a relative liquidity shortage in most unlisted firms in the study should be rejected. Indeed, the firms involved in the study generally appeared to have adequate liquidity.

The evidence supplied by the above test reinforces the observations relating to leverage which suggested conservatism in financial management among subject firms.

#### 13.2.16 ATTITUDES TOWARD LIQUIDITY

Questions 35 to 38 probe the attitude of respondents towards liquidity.

##### Question 35

This question tests the hypothesis that if a liquidity shortage does exist, independent investments with high returns but slow paybacks would be rejected.

The respondents were asked if they would accept an investment of R100 000 with an expected after tax discounted return of 35 per cent that will however only be received after 6 years. (The cost of capital is assumed to be 20 per cent).

There were 25 respondents (83,3 per cent) who would refuse to accept the investment and 5 (6,7 per cent) who would accept it.

The respondents who refused the investment on grounds of a low return totalled 4. The remainder (21) of the respondents rejected it on grounds of relative illiquidity.

Respondents who accepted the investment indicated that 'return takes precedence over liquidity.'

If the large sample sign test is applied in this instance 'yes' answers would total only 21 because these were the number of respondents who rejected the investment on grounds of the negative impact that acceptance would have on liquidity.

The test statistic yielded an answer of -3,66. Since -3,66 is less than the critical value at the ,05 per cent level of significance of 1,645 for a one tailed test it can be concluded that there were significantly more 'no' answers than 'yes' answers. This means that the operational hypothesis that investments with high returns and slow paybacks are rejected has a ninety five per cent chance of being correct.

#### Question 36

The next question concerns investments with fast payback periods and minimal returns.



The question endeavours to verify the hypothesis that investments with fast payback periods and marginal returns are favoured.

Respondents were asked whether they would accept an investment of R100 000 with an expected after tax return of 25 per cent and a payback period of 2 years. (The cost of capital is assumed to be 20 per cent)

The respondents who said 'yes' to the investment totalled 15 (50 per cent) whereas 15 (50 per cent) said 'no'. The 15 who indicated that they would accept the investment indicated that they would do this on grounds of its liquidity. These were the same respondents who rejected the investment in the previous question on grounds of illiquidity. Those who rejected the investment indicated that the return was too low.

Since it is quite clear that no difference exists between 'yes' and 'no' answers the operational hypothesis can be rejected. However, the results certainly endorsed the findings under the previous question by virtue of the identity and reasoning of respondents.

### Question 37

This question probes liquidity preferences in circumstances of mutually exclusive investment opportunities.

It relates to the hypothesis that when mutually exclusive investments are considered there will be a bias towards an investment with a fast payback and lower returns relative to one with a slower payback and better returns.

Respondents were given a choice between two investments A and B. A has an expected after tax return of 25 per cent and a payback period of 2 years. Investment B has an expected after tax return of 40 per cent and a payback period of six years (the cost of capital is 20 per cent). A, the liquid investment is associated with a 'yes' answer and B the illiquid investment with a 'no' answer.

The respondents who accepted investment A on grounds of liquidity numbered 22 (73,33 per cent) whereas 6 (20 per cent) respondents rejected the investment on grounds of a low return. These 6 respondents also rejected the investment in question 36 on grounds of a low return and proved to be the same six who were return orientated in question 35. Their responses in the following question will be closely scrutinized in order to see whether they remain return

orientated. Another respondent did not know how to choose and another indicated that he first had to do a NPV calculation before he could decide.

The large sample sign test in this instance reveals a critical value of 1,645 for a one tailed test at the ,05 per cent level of significance. Since the observed test statistic of 2,56 is bigger than the critical value it indicates that 'yes' answers predominated significantly. The operational hypothesis is therefore sustained.

#### Question 38

This next question tries to establish whether respondents would prefer liquid investments irrespective of higher incremental returns.

More specifically it probes the hypothesis that returns will only be sacrificed for liquidity, up to a certain point. After this 'cut off' point returns will have precedence over liquidity.

Respondents were firstly required to choose between 2 investments A and B. A has an expected after tax return of 23 per cent and a payback period of 2 years and B had an expected after tax return of 26 per cent and a payback period of 4 years.

Investment A will be associated with a 'yes' answer and investment B with a 'no' answer.

There was 1 respondent who did not know how to choose. Another respondent indicated that he would decide after he made a NPV analysis. The other 28 (93,3 per cent) respondents all chose investment A being the more liquid one.

The second part of the question however introduces an incremental return. Respondents were requested to indicate whether they would prefer investment A with an expected after tax return of 25 per cent and a payback period of 2 years or an investment B with an expected after tax return of 40 per cent and a payback period of 4 years. There were 20 (66,7 per cent) respondents who chose the more liquid, lower return investment.

The respondents who chose investment B on grounds of its high return numbered 10 (33,3 per cent). Of these, 6 proved to be the same respondents who gave precedence to return over liquidity in the previous 3 questions.

A closer look at these 6 respondents' liquidity scores reveals that they were all relatively liquid and indeed in a position to give return priority over liquidity.

Their liquidity scores were as follows:

0 - 20 per cent - 2 respondents  
20 - 40 per cent - 2 respondents  
40 - 50 per cent - 2 respondents.

The last two respondent's liquidity score (42,86) were well below the mean liquidity score (50) calculated previously from questions 27-34.

The fact that 20 respondents preferred a liquid investment with a minimal return over a less liquid investment with a much higher return indicates a very high preference for liquidity. It certainly indicates great caution in investment decisions. The large sample sign test rendered an observed statistic of 1.831. Since 1,831 is more than the critical

value of 1,645 for a one tailed test at a ,05 per cent level of significance there is evidence that 'yes' answers predominate that is, a preference for liquidity.

### 13.2.17 SALARIES

#### Question 39

The following question endeavours to determine the awareness of owner/managers regarding opportunity salaries.

Question 39 in particular, tests the hypothesis that owner/managers are not aware of the nature or extent of salaries and/or drawings from other firms in the industry.

Owner/Managers were asked directly whether they were aware of the nature or extent of salaries and/or drawings from other firms in the industry.

There were 11 (36,6 per cent) of the respondents who answered 'yes', they were aware of salaries drawn by other owner/managers in the same industry, and 19 respondents answered that they did not know.

In order to test the hypothesis the large sample sign test was chosen. This test rendered an observed statistic of -1,46. Since the critical value of the ,05 per cent level of significance is -1,645 for a one tailed test the hypothesis must be rejected.

#### 13.2.18 NON ECONOMIC SATISFACTIONS

Questions 40 to 47 test the hypothesis that there exists certain non economic satisfactions which can induce owner/managers of unlisted business firms to accept sub-standard returns relative to other investments of similar risk outside the firm. If this situation does exist it would effectively lower the cost of equity for the unlisted firm.

##### Question 40

Question 40 requested respondents to indicate what increase in their current earnings would induce them to sell whatever shares they might have in their particular business and accept a position elsewhere in a large organization. Their 'earnings' consist of salary plus income from invested capital. They would be free to invest the capital released wherever they liked.

Table 13.7 depicts the categories from which subjects had to choose as well as their respective choices.

TABLE 13.7

INCREMENTAL EARNINGS REQUIRED TO SURRENDER BUSINESS OWNER-  
SHIP

CATEGORIES OF INCREMENTAL RETURNS	NUMBER OF RESPONDENTS
R0 - R 5 000 p.a.	0
R 5 001 - R10 000 p.a.	2
R10 001 - R20 000 p.a.	5
Any other increase (specify)	8
No increase at all, explain	15

Respondents who indicated 'any other increase' specified the following:-

R 40 000	-	1 respondent
R 50 000	-	1 respondent
R 80 000	-	1 respondent
R 100 000	-	1 respondent
R 500 000	-	1 respondent
R1 000 000	-	1 respondent
R2 000 000	-	1 respondent
4 day work week-		1 respondent



Respondents who indicated 'no increase at all' had the following reasons:

- \* job satisfaction cannot be bought - 12 respondents
- \* want to stay in business - 2 respondents
- \* too used to being owner/manager - 1 respondent

It appears from the above analysis that owner/managers, place a very high premium on 'non economic satisfactions.'

#### Question 41

This question probes what monetary premium owner/managers put on the fact that they are their own 'bosses'.

Respondents were asked what they thought being their own boss is worth in monetary terms elsewhere (they were required to state one single payment). Table 14.8 depicts the responses on this question.

TABLE 13.8

VALUE PLACED BY OWNER/MANAGERS ON "BEING THEIR OWN BOSS"

CATEGORIES OF VALUES			RESPONDENTS
R 0	-	R 10 000	2
R 10 001	-	R 20 000	1
R 20 001	-	R 50 000	4
R 50 001	-	R 100 000	3
R 100 001	-	R 500 000	4
R 500 001	-	R1 000 000	6
R1 000 001	-	R2 000 000	1
R2 000 001	-	R3 000 000	1
<u>OTHER:</u>			
Interest on invested capital plus R3 000 per month			1
No value whatsoever			1
Undecided			6

The high values placed by respondents on being their own boss indicate that autonomy is a much cherished non economic satisfaction.

### Question 42

Question 42 probes the relative importance of different factors as being motivators for owner/managers to invest in an own business.

Respondents were asked how important certain factors were in their decision making to invest in their own company. These factors will now be evaluated on a points basis ranging from +3 (most important) to -3 (most unimportant), in order to establish the ranking of importance:

Table 13.9 depicts the results of this ranking.

TABLE 13.9

FACTORS IN ORDER OF IMPORTANCE INDUCING OWNER/MANAGERS TO INVEST IN OWN COMPANIES

NO.	FACTORS	RESPONDENTS RATING (POINTS) IN TERMS OF +3 TO -3
1	I can play a part in planning and controlling decisions	86
6	I take pride in running my own business	75
3	I can be my own boss	69
5	I control my income by my own actions	65
8	I feel that I am contributing to the growth of the community	59
2	I hold a leadership position	52
4	I know my job is secure	27
7	Members of my community recognize my position in the firm and hold me in esteem because of it	19

Independence and the ability to control one's destiny emerge clearly as the most important considerations.

Question 43

Question 43 seeks to establish whether respondents would be willing to make sacrifices in order to retain any or all of the factors mentioned in question 42.

Respondents were requested to indicate whether they would be prepared to sacrifice a large percentage of return, a moderate percentage of return, a low percentage of return or no return in order to retain any of the factors mentioned in question 42.

Table 13.10 depicts a grid where respondents had to indicate the nature of the return they were willing to sacrifice in order to retain any of the factors mentioned in question 42.

In order to obtain a significant comparison factors (a) (b) (c) and (d) depicting large returns, moderate returns, small returns and no returns respectively and were weighted 4, 3, 2 and 1.

TABLE 13.10  
SACRIFICES IN TERMS OF RATE OF RETURN

NO	NON ECONOMIC SATISFACTIONS	a	b	c	d	TOTAL
1	I can play a part in planning and controlling decisions	10	10	7	3	87
2	I hold a leadership position	4	7	9	10	65
3	I can be my own boss	9	9	7	5	82
4	I know my job is secure	8	6	9	7	75
5	I control my income by my own actions	7	10	9	4	80
6	I take pride in running my own business	3	8	13	6	68
7	Members of my community recognize my position in the firm and hold me in esteem because of it	3	4	4	19	51
8	I feel that I am contributing to the growth of the community	2	4	9	15	53

In both questions 42 and 43 factor number 1 scored the highest points which reveals that the factor 'I can play a part in planning and controlling decisions' is the most

coveted non economic satisfaction for which the greatest return will be sacrificed in order to retain it. It can furthermore be established that factors 1, 3 and 5 featured in the first four most popular non economic factors for which return will be sacrificed, both in questions 42 and 43, although not in the same sequence. A further observation to be made is that factors 2 and 7 featured 6th and 8th in both questions. This points to consistency in the responses.

#### Question 44

This question was intended to establish whether respondents were willing to sacrifice return for any other non economic satisfactions not mentioned in question 42.

Respondents were asked whether there were any other non economic satisfactions which they enjoyed in their firms, for which they would be willing to sacrifice return.

There were 27 (90 per cent) respondents who said that there were no other factors for which they would sacrifice return in order to stay in the firm.

There were 2 respondents who indicated that they were, willing to sacrifice for 'job enjoyment.'

One respondent indicated that he was prepared to sacrifice return for 'social responsibility.'

#### Question 45

Question 45 tested whether respondents were aware of making sacrifices for staying in business.

Respondents were asked whether they felt that they were currently sacrificing return in order to maintain any of the characteristics mentioned in questions 43 and 44.

There were 24 (80 per cent) of the respondents who said 'no', they were not currently sacrificing return in order to retain any of the factors mentioned in questions 42 and 43 and 6 (20 per cent) who answered 'yes'.

Of the 6 who answered 'yes' 1 respondent said he felt he was sacrificing in order to maintain factor number 1 (I can play a part in planning and controlling decisions) whereas 3 respondents felt they sacrificed return in order to retain all the factors collectively. Another respondent said he sacrificed return in order to retain factor number eight and another one said he sacrificed return in order to maintain factors 1 to 5. Those who said 'no' were clearly satisfied

that they were making more money by being in business for their own account than they would earn by working for someone else and investing their assets elsewhere.

#### Question 46

The objective of this question is to try and put a monetary value on non economic satisfactions.

Respondents were requested to indicate what maximum return on their investment they would be willing to sacrifice in order to maintain the factors mentioned in question 42. There were 28 of the respondents who indicated that they were willing to sacrifice some return. Only 1 respondent was undecided and another one indicated that he was not prepared to sacrifice anything. Of the 28 respondents who were willing to sacrifice, one was prepared to sacrifice his total return, the nature of which he did not disclose. The range of percentages of net after tax earnings the other 27 respondents who were prepared to sacrifice ranged from 3 per cent to 25 per cent with a mean value of 6,72 per cent.



Question 47

The objective of this question was to determine what percentage return on an alternative investment (where non economic satisfactions will not be available) would induce respondents to sell their firms and invest in the said alternative.

Respondents were required to indicate the approximate returns they would consider for removing non economic satisfactions from the firm.

Table 13.11 depicts the return categories and preferences of respondents for a specific return category:

TABLE 13.11

APPROXIMATE RETURNS FOR WHICH RESPONDENTS WOULD CONSIDER  
REMOVING NON ECONOMIC SATISFACTIONS FROM THE FIRM

<u>RETURN CATEGORIES</u>	<u>RESPONDENTS</u>
Less than 4 per cent	0
5 - 8 per cent	0
9 - 12 per cent	0
13 - 16 per cent	0
17 - 20 per cent	2
Over 20 per cent	18
No return at all	10

The respondents to questions 42 to 47 indicate quite clearly that the operational hypothesis concerning these questions can be accepted: non-economic satisfactions are important.

#### 13.2.19 RISK AVERSITY

The final question in the questionnaire probed the risk aversity of respondents.

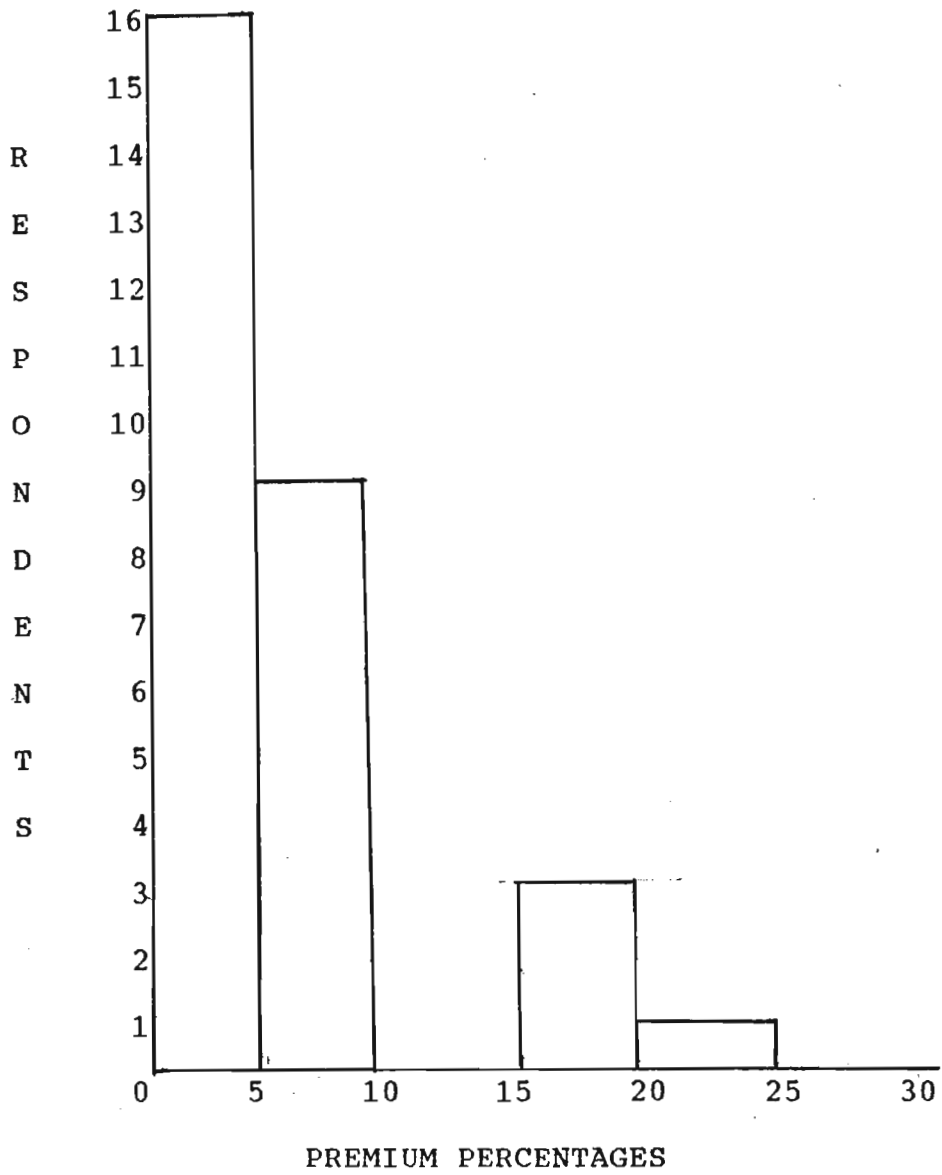
This question relates to the hypothesis that the businessmen in the study are not risk seekers. The question was put to respondents that if they were bidding on an uncertain contract, the outcome of which could be jeopardized by strikes and delays, what insurance premium were they willing to pay against possible losses.

They were required to state the value of the insurance premium percentage-wise in terms of the total value of the contract.

Figure 14.2 is a horizontal bar chart that indicates the distribution of the certainty equivalent's of respondents in percentage form.

FIGURE 13.2

CERTAINTY EQUIVALENTS' PROFILE



Only 1 respondent declined insurance against the risky contract and 1 was undecided.

It is evident from figure 14.2 that 28 respondents preferred to relinquish different percentages of the contract price for insurance against losses. It can therefore be concluded that all of them are relatively risk averse.

The operational hypothesis, namely that businessmen in the study area are relatively risk averse, can therefore be accepted.

#### 13.2.20 SUMMARY

With regard to the objective of the firm it is clear that there are many firms which are not primarily profit orientated. It is furthermore evident that few firms use formal methods of investment decision making. However, the hypothesis that profit orientated firms will use formal procedures and non profit orientated firms will use informal procedures could not be substantiated.

It is furthermore apparent that forecasting problems, due to the volatility of the South African economy, particularly fluctuating interest rates, changing tax rates and trade unionism could play a role in deterring many decision makers from using formal DCF methods even if they were fully familiar with such methods.

There were a surprising number of decision makers who are prepared to risk insolvency through accepting risky investments. Nonetheless, the operational hypothesis in this respect namely that decision makers will not accept investments that could fail and in the event force the firm into insolvency, was however upheld since a significantly greater number of respondents rejected this type of investment.

In contrast to allegations in the literature regarding the excessive use of short term debt by small firms in the funding of capital expenditures, there seemed to be a preference for equity financing amongst decision makers in the study. This is an indication of an apparently conservative approach towards investment decision making. There are, however, severe misconceptions especially with regards to the cost of equity and trade credit. There is furthermore no comprehension of the fact that overdrafts can at any time be called up.

Although a large number of respondents indicated that they do link long term sources of financing to proposed investments there seems to be confusion as to the implication of matching long term sources of finance with long term investments. The confusion in this respect warrants further

research. An examination of financial statements of the firms concerned would, of course, have provided insight into the problem but they were unavailable to the researcher.

Although the majority of respondents preferred not to use short term debt for investment purposes only a few supplied reasons that truly reflected some understanding. In spite of the operational hypothesis that unlisted small firms make liberal use of short term sources of finance in the funding of their investments they seem to be doing exactly the opposite.

The usage of medium term finance (which is less vulnerable than short term sources) endorses the view that decision makers in the unlisted small firms of the study are conservative in their investment decision making.

The majority of those respondents who did make use of short term funds in the funding of their investments seemed to be unperturbed by the possibility that these debts might fall due before enough cash flow has been generated from the investment. They all appeared to have a sound liquidity backing and were thus perhaps justified in their complacency. .

Owner supplied funds and retained earnings seemed to be by far the most preferred forms of finance for the funding of investments. This fact further underlines a conservative approach towards investment decision making.

Despite the supposition that high debt ratios would prevail in the study, the research revealed generally moderate to low debt ratios. Respondents' perceptions of their debt ratios furthermore seemed to correspond with reality, which effectively reflects a conservative attitude towards the use of debt.

Respondents again revealed a conservative attitude when they expressed preferences as to the composition of a financial mix. The majority preferred equity. However not one respondent justified his answer by reference to establishing an optimal cost of capital.

The hypothesis that owner/managers of unlisted small firms were not conscious of outside opportunities in a risk class similar to that of investment in their own firms was validated. Respondents who indicated that they were aware of better opportunities seemed unable to quantify the risk of these opportunities since they regarded comparative outside opportunities in terms of short term risk free investments in financial institutions.

The variety of responses relating to the valuation of shares in the unlisted small firm were evidence of confusion. Not one respondent considered any discounting of future profits neither did any one consider any form of opportunity cost. There is no uniform way in which the cost of debt is viewed. Some respondents conceptualize this cost in form of Rands and other in the form of percentages whereas others regarded it in both forms. Furthermore, supposition that the cost of debt is measured on a before tax basis seemed accurate.

A notable fact that emerged during the study was that several respondents regarded equity to be cost free. And among those respondents who did regard equity as having a cost, there seemed to be confusion and only a very few regarded it as being an opportunity cost. It is furthermore evident that some respondents underestimate their cost of equity since as a group the mean value of the estimate of this cost was below the prime overdraft rate which is contrary to principles enunciated in literature. Underestimation of cost of capital would possibly lead to acceptance of investments which would decrease shareholder wealth while overestimation of cost of equity would result in rejection of appropriate investments.



The concepts of target capital structures and weighted average marginal cost of capital were clearly concepts which play no part in the investment decision making of firms in the study.

The hypothesis that owner/managers of unlisted small firms do not take inflation into account was rejected on the basis of a closed ended question. However the methods described by respondents were so subjective and vague that an in depth questioning on this matter might well prove that although these respondents thought that they had taken inflation into account in their investment decision making they in fact had not.

Responses regarding liquidity in the study confounded earlier reported findings viz. that small firms are usually illiquid. Indeed, the firms appeared to be particularly liquid. Furthermore, investments with relatively high returns and slow payback periods were rejected in favour of investments with fast paybacks and lower returns. What also appears to be evident is that respondents who do prefer investments with high returns and slow payback periods above investments with lower returns and faster payback periods can afford to do so since they are indeed very liquid. It may well be that small firms in South Africa today, have

learned their lessons from past severe liquidity squeezes and know only too well the threat to survival that illiquidity poses.

Non-economic satisfactions were much in evidence. The most coveted non economic satisfactions appeared to be:

- \* planning and controlling decisions;
- \* pride in running own business;
- \* being own boss and
- \* control of income by own actions.

Respondents were furthermore, willing to deliberately sacrifice financial returns for non economic satisfactions. This means that they can be content with substandard financial returns which in turn means that their cost of equity can be lowered.

It is finally observed that the respondents tendered to be relatively risk averse since they would be prepared to insure against losses resulting from a risky venture. This further endorsed the conservative profile of the firms concerned.

In the final chapter conclusions will be drawn from the study and recommendations made. These conclusions and recommendations will be focussed toward the normative investment decision making model.

## CHAPTER FOURTEEN

### CONCLUSIONS AND RECOMMENDATIONS

#### 14.1 INTRODUCTION

The literature that served as a background to this study painted a gloomy picture of small firms in general. They were inter alia described as:

- \* undiversified
- \* being illiquid to such an extent that their total survival depended on meticulous cash management;
- \* making use of an inordinate amount of debt in their capital structures;
- \* making extensive use of short term debt in their investment decision making and
- \* using extremely unsophisticated investment decision making techniques.

Furthermore, because they are unlisted, they are in practical terms also unable to use 'approved' methods for capital budgeting.

The above mentioned points suggest an extremely high risk profile for small firms. A normative model for investment decision making was consequently developed in recognition of the need to exercise the utmost caution and in doing so to minimize the risk of insolvency.

Since the investment decision making profile of the small firm in the study area has now been established it becomes necessary to compare these results against the normative model and to draw conclusions and make recommendations.

#### 14.2 THE NORMATIVE MODEL VERSUS THE INVESTMENT DECISION MAKING PRACTICES OF UNLISTED SMALL FIRMS IN THE DURBAN-PINETOWN-PIETERMARITZBURG METROPOLITAN AREAS

##### 14.2.1 PROHIBITIVE CONDITIONS

##### 14.2.1.1 RISK OF INSOLVENCY

The risk of insolvency principle stipulates that projects having the slightest possibility of failing should be avoided. The mere possibility of an indigestible loss being incurred should render a particular investment unacceptable.

Although a number of respondents in the study area would risk insolvency by accepting such an investment a significant majority of respondents appeared to be very responsible in their attitudes towards risk. These respondents indicated most emphatically that they would under no circumstances accept an investment that has the slightest possibility of failing and in the event lead to insolvency. On further questioning they explained that their firms were not able to weather losses brought about by 'gambling' with uncertainty. This leaning towards risk aversity was confirmed when it was found that 28 out of 30 respondents were prepared to take out insurance against possible losses incurred in a risky contract.

It could thus be concluded that the research sample to a great extent conformed to this aspect of the normative model.

#### 14.2.1.2. UTILIZATION OF SHORT TERM DEBT

The normative model states that under no circumstances should the unlisted firm make use of short term debt funds in order to finance investments. Non adherence to this rule could, in the event of non extension of short term debt

facilities, lead to financial embarrassment or even insolvency. The unlisted small firm should instead of yielding to the temptation simply avoid the investment.

Research in the study area suggested that by and large the firms do adhere to this stipulation laid down by the normative model. Relatively few respondents made use of short term sources in the funding of their investments.

Those who did make use of short term funds supplied rationale for their actions which were to say the least, suspect. Builders for example claimed that the construction industry is so business cycle sensitive, that planning (and funding) extend only one year into the future.

Although most decision makers seemed to have a preference for equity in the funding of investments, several misconceptions regarding the usage of different forms of finance emerged. There was for example, a lack of awareness that bank overdrafts can at anytime be called up. In addition trade credit was generally regarded automatically as cost free without consideration of the discount position. Finally, most respondents regarded equity as a form of finance without cost. Collectively these misconceptions point to an information 'gap' which can potentially lead to investment decision making below the optimal level.

On the other hand, the bias towards the use of equity as well as medium term finance for investment funding points to an attitude of conservatism on the part of owner/managers of unlisted small firms in the study area. It indeed represents some exciting good news that refutes the allegations of Conradie that small firms make excessive use of short term sources of funds in the funding of investments.

#### 14.2.1.3 DEBT RATIOS

The normative model stipulates that a 'moderate' debt ratio should be maintained at all times. Since such a ratio is industry specific an exact general ratio could not be prescribed. It was recommended that advice be obtained from people who are conversant with the industry, such as the firm's auditors.

Notwithstanding the lack of clearly defined ratio criteria it was clear that firms in the sample were generally conservatively funded: the mean debt ratio was a low 36 per cent. This is particularly low when compared against the results of the study by Conradie in which 66,7 per cent of bank manager respondents deemed a 49 per cent debt ratio as the upper limit and 33,3 per cent a 60 per cent ratio.



The 36 per cent debt ratio furthermore compares extremely favourably against a British study by Wilson (1979 :57) a study by the Bureau of Financial Analysis of the University of Pretoria and that of Conradie (1982 :212), whose research results on debt ratios for small firms all revealed debt ratios of around 60 per cent. The firms in this study clearly do not fit the mould proposed by Weston and Brigham (1978 :953) that small businessmen borrow beyond their means.

Respondent's perceptions of their debt ratio positions corresponded in most cases with the actual ratios. The opinion of respondents as to how high this ratio could be without causing financial embarrassment centered around 50 per cent. This indeed reflects a 'moderate' ratio if judged by the standards of the Conradie study. In comparison with many JSE listed companies the mean debt ratio in the study can also be regarded as conservative.

Respondents generally did not consider themselves undercapitalized and were quite comfortable with the debt utilized. Many consciously adopted a conservative stance in order to accommodate the volatility of the South African economy and the resultant unpredictable interest and tax rates.

## 14.2.2 THE REQUIRED RATE OF RETURN

The normative model is prescriptive concerning the required rate of return.

### 14.2.2.1 COMPONENT COSTS OF CAPITAL

#### i) Cost of Equity

In estimating the cost of equity the controlling owners would need to monitor the returns on realistic, equal risk, investment alternatives outside the firm. Opportunity cost is thus the basic determinant of the cost of equity.

It is disturbing that several respondents viewed equity to be cost free. Most of them felt it was free because there were no interest charges payable on it. Only a third of the respondents regarded the cost of equity to be an opportunity cost. Amongst the rest a great deal of confusion was evident as to what determined the cost of equity.

These research results coincide with those of the studies by Soldofsky and Boyer, both of whom established that a significant number of firms regarded equity as not having a cost.

Respondents who acknowledged the cost of equity, estimated such cost at ratios varying from 16 to 35 per cent with a mean value of 20 per cent. As this was below the prevailing prime overdraft rate and probably well below the overdraft rate which would be applicable to subject firms, it is likely that most respondents underestimated the cost. In this regard both Weston and Brigham (1978 :796) and Boyer (1974:9) argue that the cost of equity should generally be higher than the cost of debt.

On the other hand the cost of equity might genuinely be lower than opportunity cost as a result of the presence of non economic satisfactions : nearly all respondents were prepared to sacrifice returns in order to retain non economic satisfactions.

The majority of respondents furthermore seemed unaware of better opportunity yields in a risk class similar to that of investment in their own firm. These respondents seemed unable to quantify risk or alternatively they were not able to comprehend the concept of risk quantification since they regarded comparative outside opportunities only in terms of risk free short term deposits with financial institutions.

Risk quantification in alternative investment opportunities is in any event problematic (Meij and Willems 1966 : 156).

## ii) COST OF DEBT

The normative model required that the cost of debt should be measured on an after tax basis.

Most respondents in the study assessed the cost of debt on a before tax basis. This was a distinct deviation from the model. Many respondents gave the impression that they were not even aware of the deductability of interest on debt from taxable income. As a result, many respondents were inadequately informed on the concept of financial leverage and its beneficial effect on returns when applied appropriately.

### 14.2.2.2 OVERALL COST OF FINANCING

The normative model requires that when both debt and equity are used in the financing of an investment, the decision maker needs to be conscious of the fact that there is an overall cost of financing to be considered which includes a cost of equity. The equity and debt elements would need to be weighted by the amounts involved in order to arrive at an overall cost of capital. The estimation of this cost is imperative since it will, as the required rate, be compared against projected returns of the investment.

In this respect research findings revealed that the sample firms deviated completely from the principle laid down by the normative model. The weighting of capital costs in order to obtain a weighted average cost of capital clearly played no part in the investment decision making of respondents in the study. In this respect Soldofsky, in a survey on capital budgeting practices of small firms, came to the conclusion that the weighting of capital costs was beyond the comprehension of most of the respondents interviewed by him.

A significant observation during the survey was that a substantial number of respondents only considered the cost of debt when determining an overall cost against which expected returns of an investment were to be measured. This observation was consistent with the findings of Gray, et al. (1972: 29-38) that the most popular method of evaluating an investment proposal was to compare the expected rate of return on an investment against the cost of a single source of funds.

The 'information gap' seems to be very pertinent in respect of an overall cost of financing.

### 14.2.3 FINANCING MIX

A comprehensive understanding of the component costs of capital and the overall cost of capital is a prerequisite for the understanding of the concept of a 'target capital structure.'

According to the principle laid down by the normative model the decision maker should be aware of the fact that there exists a level of financing which represents an optimal mix between debt and equity. This optimal level, the normative model specifies, will be that proportion between debt and equity where the overall cost of capital is minimized.

Decision makers in the study did not raise finance for the funding of investments according to a target capital structure. The impression was gained during the survey, that the concept of a target capital structure and its significance lay beyond the general realm of comprehension of respondents.

#### 14.2.4 EVALUATION METHOD

In prescribing an evaluation method for investments to be explored by the unlisted small firm the normative model takes due cognizance of DCF. The normative model however, provides the following rationale for not prescribing discounted cash flow:

- \* investment decision makers in listed firms in South Africa who do use DCF methods generally do not link their utilization to the normative objective of the firm which is wealth maximization;
- \* listed firms with skilled financial executives have difficulty in mastering DCF techniques. It is consequently unreasonable to expect unlisted firms to do so and
- \* since the unlisted small firm has no formal market where its shares are traded the calculation of an appropriate discount rate is not facilitated. These firms are accordingly unable to utilize DCF techniques in a theoretical correct manner;.
- \* although opportunity cost provides a possible alternative for the calculation of an appropriate discount rate, theoretical and practical obstacles prevent its utilization.

Consequently the only alternative left for the decision maker of the unlisted small firm, is to utilize non time related methods in the decision making process.

The normative model accordingly stipulates that the decision maker should give balanced attention to both liquidity and profitability without losing sight of the fact that an acceptable project should return more than its cost of financing. Clearly, decision makers will need to be made aware of the issues involved and encouraged to apply the model appropriately.

#### 14.2.4.1 PROFITABILITY

Since the small unlisted firm has limited access to the kind of information relevant to decision making these firms' decision makers should rely heavily on accounting data.

Against this background it is considered most appropriate that the unlisted small firm makes use of the accounting rate of return.



#### 14.2.4.2 LIQUIDITY

The normative model observes that the unlisted small firm usually operates from a fragile liquidity base and will need to specify a 'cut off' payback period beyond which a proposed investment cannot be accepted. In the light of this high priority objective the normative model suggests that the firm should be willing to sacrifice some investment returns, if necessary, in order to stay liquid. The exact percentage which might need to be sacrificed will differ from firm to firm depending on the investment liquidity conditions of the firm.

The normative model however recognizes that it will be unreasonable to expect the decision maker of the unlisted firm to sacrifice unlimited returns for liquidity. This trade off will depend on the liquidity position of the specific firm as well as the utility values of the decision makers.

It is dissapointing that in general decision makers in the study area do not make use of formal accounting related investment decision making methods like accounting rate of return or payback period. Thirty three and one third per cent (10 respondents) indicated a method based on accounting

rate of return and payback. When asked to describe it however they were so vague that not one of these so called 'hybrids' could be defined.

Informal methods described were extremely unsophisticated. When questioned on the use of these so called 'methods' respondents replied that they were utilized on grounds of practical experience and have proved themselves through the years. Decision makers in general put a high premium on 'practical experience' in their approach to investment decision making and gave the impression that it was something of supreme value which cannot be replaced.

It was observed that very few respondents have the remotest knowledge of the rather unsophisticated but theoretically accepted investment evaluation methods like 'accounting rate of return' or 'payback period.'

Similar research results were disclosed by Soldofsky when he conducted a survey on the capital budgeting practices amongst small manufacturing enterprises in the USA. Many respondents, Soldofsky found, described their investment evaluation methods as both vague and flexible, indicating a lack of a formalized decision making criterion. The conclusions of Soldofsky were confirmed in a later study by Gray, et al. (1972 :29-38). Although the Boyer study (1974 :12)

suggests that there may be confusion with regards to the investment evaluation methods used in the USA, the general pattern that emerged from all studies seems to be that the smaller the business the more unsophisticated the investment evaluation method.

A further disturbing observation that became evident in the survey is that some respondents seem to confuse capital expenditures with operating expenses.

These observations collectively endorse previous conclusions that a severe information 'gap' exists between theory and practice in the investment decision making of unlisted small firms in general.

Respondents who comprehend DCF provided rationale for the non usage of these methods. According to them the volatility of the South African economy, ever changing tax rates and interest rates make forecasting and the establishing of interest rates virtually impossible. It is consequently quite understandable that some respondents, especially those in the business cycle sensitive industries limit their forecasting to 1 year.

The above practice coincides with observations from Weston and Brigham (1987 :501) who state that small business managers feel uncomfortable when called upon to make forecasts beyond a year or two. Since DCF techniques require explicit estimates of cash flows small business managers feel they cannot risk insolvency on what they call 'guesstimates'.

Pike (1982 :36) also defends book value methods, more specifically payback period, against DCF. He observes that managers don't understand DCF, that DCF is not necessary when payback periods are rapid and finally that, it is no easy task to estimate the 'correct' discount rate.

Carsberg and Hope (1985 :45-46) note that the uncertainty associated with business undertakings makes it extremely risky to rely on single valued forecasts. They do state however that DCF forecasts can improve the chances of optimal decisions.

The above evidence on the application of DCF in investment decision making endorses the stance of the normative model in this respect.

Respondents in general seem to prefer investments with minimal returns and fast payback periods to investments with relatively higher returns and slower paybacks. It could however not be established whether liquidity would have precedence over further incremental returns beyond the ones presented in the questionnaire. Further research in this respect seems necessary. The few respondents who did prefer profitability over liquidity seemed to be so liquid that they could indeed afford to sacrifice liquidity for profitability. The liquidity preferences of respondents in the study area were endorsed by their actual liquidity position : firms generally seem to be relatively liquid.

A further observation that reinforced the conclusion of a sound liquidity position that exists amongst respondents was their cool reaction to the possibility of overdrafts being called up at any time, or extension of short term loans being refused. A number of respondents indicated that they were liquid enough to weather any such event.

The high preference for liquidity in the area refutes allegations in literature (section 9.1.4.5) that small firms are illiquid and that their basic objective is one of survival which hinges on meticulous cash management.

The high preference for liquidity reinforces previous conclusions that there exists a trend of conservatism regarding investment decision making in the study area.

#### 14.2.5 INFLATION

The normative model requires from decision makers to take inflation into account when they make their investment decisions. This should be done by writing off depreciation according to replacement value and not according to historical book values.

Although it is recognized that decision makers do take note of inflation in their investment decision making their methods are so subjective and unsophisticated that further research into these 'methods' could very well 'show up' their inefficiency.

#### 14.2.6 SALARIES TO OWNERS

In respect of salaries that are paid to owner/managers the normative model suggests that these withdrawals be limited to an amount approximately equal to the salaries paid in the industry for equivalent work performed. Excessive drawings could distort return on investment calculations and could even impair liquidity.

The above norm could not be probed properly due to the confidential nature of the question.

#### 14.2.7 VALUATION OF SHARES

The valuation process of the unlisted small firm is complex. This complexity is further compounded by the impact of non economic satisfactions on the cost of equity. A norm was consequently not constructed for the purpose of valuation.

The variety of responses which this question elicited is evidence that confusion exist between respondents in this respect.

There is little likelihood that any normative model of general validity can be constructed to accommodate this problem.

#### 14.2.8 NON ECONOMIC SATISFACTIONS

The point of departure of the normative model concerning 'non economic' satisfactions is that owners should be aware that 'non economic satisfactions can lower their cost of equity i.e. allow them to accept a sub standard financial return (one that is lower than alternative investments of

similar risk). The cost of their non economic satisfactions is thus directly measurable and some limiting cost should be specified by the rational owner.

Responses to these questions indicated that respondents value 'non economic' satisfactions very dearly. They put a premium on autonomy and they are prepared to sacrifice financial return in order to retain certain non economic satisfactions. These non economic satisfactions were also measurable in 29 cases, meaning that owners are aware of the financial return they are sacrificing.

The existence of 'non economic satisfactions' and the resultant monetary value placed on it by respondents in the study area confirms the study by Boyer (1974 :112).

A quite interesting conclusion is that the four most coveted non economic satisfactions in the study area namely "I can play a part in planning and controlling decisions," "I take pride in running my own business", "I can be my own boss" and "I control my income by my own actions" also featured in the first four in the Boyer study, however in exactly the opposite sequence. The rating furthermore corresponds to the theory of Maslow namely that the need for self actualization. (I can play a part in planning and controlling decisions) is the most important, followed secondly by status needs (I take pride in running my own business and I can be



my own boss) and thirdly by economic needs (I control my income by my own actions. A number of features which emerged from the study namely the non economic satisfactions, desire for independence, control of one's destiny and a preference of moderate risk levels conform closely with the need for achievement profile researched inter alia by McClelland and Burnham (1976 :100-110). These factors also prove to be consistent with entrepreneurial activities.

The comparison of monetary returns between this study and that of Boyer poses problems in that there is a discrepancy of fifteen years between the two studies.

What was furthermore evident, however, was that 50 per cent of the respondents of the DPP area indicated that they would not leave their businesses under any circumstances (irrespective of how lucrative the outside offer might be) whereas in Boyer's study the percentage proved to be 65,3 per cent).

The existence of non economic satisfactions in the study area in effect means that the cost of equity as well as the overall cost of capital will be lowered by the monetary value respondents put on the non economic satisfactions. The

lower discount rates of equity and the overall cost of capital will therefore impact on the value of owner's equity and the total value of these firms respectively.

### 14.3 CONCLUSION

Although investment evaluation methods of respondents in the study area's are far removed from those accepted as valid in financial literature the methods they employ seem to have the desired results.

Respondents' behaviour towards investment decision making is furthermore enhanced by their cautious approach towards the form of financing they employ (which is generally long term) and their management of working capital. Although they generally do not have rationale for doing the right thing (utilizing long term funds) they are in fact doing it, and that is the only important thing.

The general impression of the survey was that these respondents placed a very high premium on their 'practical experience', something that has been moulded in a hard school, that of a volatile South African economy, with tax rates and interest rates changing dramatically from one period to another. There is, however, an information 'gap' between theory and practice.

Respondents seem to be unaware of some basic theoretical principles, concepts and practices.

#### 14.4 RECOMMENDATIONS

##### 14.4.1 INTRODUCTION

Recommendations regarding investment decision making in the unlisted small firm should hinge on the objective of the firm, namely wealth maximization. These recommendations should therefore be aimed at those aspects of the normative model where the small unlisted firm falls short. These recommendations should furthermore be instrumental in bridging the information 'gap' that exists between theory and practice. If this can be done successfully it can serve to enhance the vision of decision makers of unlisted small firms, which will, when coupled with their practical experience, lead to increased profitability.

##### 14.4.2 INVESTMENT EVALUATION

It is imperative that decision makers comprehend that an acceptable project should return more than it costs to finance. He must furthermore have an idea as to how the acceptance of a project will affect the firm's profitability, liquidity and solvency.

#### 14.4.2.1 PROFITABILITY

Profitability of an investment should be gauged according to the average rate of return method. There are virtually no respondents who utilize this method and since it is so simplistic and applicable with readily available accounting data it should be mastered and applied accordingly. There is thus a need for appropriate training and education. The attention of tertiary educational institutions should be drawn to the need and suitable programmes developed.

#### 14.4.2.2 LIQUIDITY

The unlisted small firm which operates from a fragile liquidity base will need to specify a 'cut off' payback period beyond which a proposed investment cannot be accepted.

Respondents are generally ignorant of the above principle. It is imperative that they master the concept of 'payback period' and apply it. In addition to establishing this 'cut off' point, however, the decision maker needs to project incremental cash flows on a monthly rather than annual basis.

Attention should furthermore be given to cash flows needed over and above those concerning the initial costs namely cash flows needed to increase working capital. In this

respect the ratio developed by Hamblin (1976:63) could assist in determining how much working capital a firm needs given the credit terms given and taken in the industry and the rate of stock turnover. Actual working capital less the required working capital as calculated will indicate whether or not a surplus exists. If there is a surplus, it needs to be large enough to carry the working capital needs of the new investment. If there is a deficit or the surplus is not large enough, it would be necessary to negotiate a loan or overdraft facilities until the eventual positive cash flow from the investment is sufficient to offset the early outflows. If such facilities cannot be arranged the investment should be avoided.

#### 14.4.3 COST OF CAPITAL

##### 14.4.3.1 AWARENESS OF OPPORTUNITY YIELDS

Owner/managers should be aware of opportunity yields on investments in a similar risk class as that in their own firms. In order however, to be able to make a comparison between the return they are receiving and that of outside opportunities it is imperative that owner/managers be able to quantify the cost of capital on an opportunity cost basis. Too many respondents employ the wrong method to calculate this cost, others don't even know about its existence.

#### 14.4.3.2 COST OF DEBT

The cost of debt should be measured on an after tax basis. Too many respondents are not aware of the tax benefits of debt and its resultant impact on financial leverage.

#### 14.4.3.3 OVERALL COST OF FINANCING

Decision makers should realize that an overall cost of financing is imperative in the decision making process. They should further be able to realize that if debt and equity is used in the funding of an investment that these two costs should be incorporated in an overall cost according to their weights. If the 'average rate of return' method is used this 'weighted cost' should act as an acceptance criterion against which the 'average rate of return' should be measured.

#### 14.4.4 FINANCING MIX

The decision maker should realize that there exists an optimal financing mix which represents a level of financing consisting of part debt and part equity. This optimum level he should comprehend represents the point where the overall cost of capital is minimized.

#### 14.4.5 INFLATION

Adjustments to account for inflation should be made via inflation accounting. Depreciation should for example be calculated and accounted for on the basis of replacement cost and not historical book values.

#### 14.4.6 CONCLUSION

It is recognized that the unlisted small firm is a cornerstone of the freemarket economy in that it serves to increase competitiveness amongst undertakings in the industry in which it serves. If it were not for these firms oligopolies and its concomitant dangers such as informal price fixing and cartel forming could very well undermine the South African free market economy.

It is therefore imperative, in order to ensure the managerial efficiency of these firms, that they be noticed by academicians and their decision makers 'educated', in order for them to form a bulwark against creeping socialism.

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