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The Expectations Of Stock Market Participants For Selected Stocks

John Telesephore Bart

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THE EXPECTATIONS OF STOCK MARKET
PARTICIPANTS FOR SELECTED STOCKS

by

John Telesephore Bart

School of Business Administration

Submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Graduate Studies
The University of Western Ontario
London, Canada

July, 1974

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ABSTRACT

This study investigates the nature of investors' expectations of financial return from common stocks. Three research questions are embodied in the scope of the study. (1) Do investors expect a higher rate of return from higher risk stocks? (2) Do the risk return characteristics of investor expectations differ according to whether the investor is a buyer, seller, or owner of the stock? (3) Are the expectations of investors consistent with the proposition that all publicly available information is fully reflected in the price of a stock?

Empirical data for this research were obtained from a sample of four types of stock market participants (buyers, sellers, owners, and security analysts) for three selected common stocks (a utility, a petroleum based stock, and a mineral resource stock). During the period March 19 to April 13, 1973, approximately 800 individual investors and 15 security analysts responded to a mail questionnaire that measured their price and dividend expectations for the stock that they had just brought or sold, owned, or followed (analysts). Expectations were obtained in the form of discrete probability distributions.

Inter- and intra-stock comparisons of the parameters of measured expectations led to the conclusions that: investors expect a higher return from higher risk stocks; sellers of a stock expected a lower return than either buyers or owners of the stock; and, that all publicly available information was not fully reflected in the price of the three stocks at the time of the study. However, these conclusions are subject to qualifications regarding their applicability to different types of return (price, dividend, and total return), to different expectations time horizons, and to different parameters of return expectations.

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I am also indebted to Mr. Huntly W.F. McKay, Vice-President of the Toronto Stock Exchange for his enthusiasm and assistance during the data collecting phase of this research. The investment dealers and selected companies involved in this study are also thanked for their critically important cooperation in making this thesis possible.

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My wife, Eleanor, has shared in this experience and in my entire graduate program. For her encouragement and perseverance it is fitting that this thesis be dedicated to her.

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CHAPTER I

INTRODUCTION

This study investigates the nature of investors' expectations of financial return from common stocks. The purpose of the research was to empirically investigate whether or not investor expectations are consistent with theoretical propositions which underlie much of the theory of value.

The study focussed on an analysis of the price, dividend, and total return expectations of four types of stock market participants - buyers, sellers, owners, and security analysts - for three selected common stocks. These market participants provided price and dividend expectations for the selected stocks in terms of subjective probability distributions. Inter- and intra-stock comparisons of the parameters of these distributions were made to determine if the nature of investor expectations was consistent with that proposed in financial theory.

1.1 EMPIRICAL PERSPECTIVE

The concept of investor expectations is central to the theory of capital asset valuation. The theory of asset valuation attributes two generalized properties to a financial asset; its "lucrativity" and "risk".¹

¹J. Marschak, "Money and the Theory of Assets," Econometrica, 6, (October, 1938), p. 311.

For a particular asset these properties are "a function of investor expectations about the underlying real or financial flows . . . associated with a particular instrument".² In the case of equity investments Van Horne³ and other authors have modeled an investor's future financial return expectations as involving a set of multi-outcome, probabilistic, future cash flows that might accrue to the investor as the result of capital appreciation (realized or unrealized) and dividend income.

In empirical valuation studies investors' financial return expectations are traditionally represented by proxies that have been developed from published financial data. Keenan has very clearly summarized the shortcomings of this approach to obtaining measures of investors' expectations and in particular has concluded

²M. Keenan, "Models of Equity Valuation: The Great Sperm Bubble" The Journal of Finance, (May 1970), p. 259.

³J.C. Van Horne, Financial Management and Policy, 2nd ed. (Englewood Cliffs: Prentice-Hall, 1961), p. 20.

If measure variables of investor expectations are to be developed we may have to engage in survey sampling of transactors. Although there has been some classroom experimentation on economic perception, decoding of data masses, and wealth directed decision making, there has been relatively little field work done. It does not seem likely that in this uncertainty situation we will be able to sharply specify investor expectations without having some data inputs from investors.⁴

Robichek has indicated a similar concern for empirical investigations of the valuation process.

A common impediment to researchers is the disparity between the theory of valuation and practice. Theoretical models may or may not be appropriate representatives of real life... we must attempt to become more familiar with the manner in which investors approach the stock valuation problem in practice and then relate these approaches to theoretical models.⁵

More recently Friend has pointed to the need for data inputs from investors to advance the development of the concept of the cost of equity capital.

~~The problem is to estimate the required rate of return on common equity since it is relatively easy to measure the required rate for senior securities. Unfortunately we can have little confidence in the estimates of the required return on equity or on total capital generated by these models since there is no ultimate check in the form of a figure known to be reasonably reliable at any point in time. To achieve any real progress in this area in the near-term future, it seems to me to be necessary to survey a comprehensive sample of investors to determine the anticipated rates of return on individual stocks which they buy,~~

⁴Keenan, op. cit., p. 262

⁵A. Robichek, "Risk and the Value of Securities", Journal of Financial and Quantitative Analysis, (December, 1969), p. 531.

sell or otherwise follow. Currently a high proportion of the managers of large investment portfolios regularly make such estimates in their decision making process. It is of course the ex ante required rates of return rather than the ex post realized rates which are relevant to the measurement of the cost of capital.⁶

Thus Keenan, Robichek, and Friend have indicated the need to obtain data inputs from investors in order to strongly specify investors' expectations in terms of the range of variables employed in the valuation process and the actual measurement of those variables.

1.2 RESEARCH OBJECTIVE

The objective of this research is to investigate the nature of investor expectations of financial return through the use of data inputs provided by individuals who buy, sell, or otherwise follow (owners, analysts) selected common stocks. The scope of this investigation centers on the ability of the parametric representation of investor expectations to distinguish among various stocks. In essence, the scope of this study involves an investigation of the risk-return properties of selected stocks as reflected in the magnitude and shape characteristics of investors' expectations regarding the future price and annual dividends of these stocks.

⁶Irwin Friend, "Mythodology in Finance", The Journal of Finance, (May, 1973), p. 270.

Three research questions are embodied in the scope of this study.

- (a) Do investors expect a higher rate of return from higher-risk stocks in relation to the return expected from relatively low-risk stocks?
- (b) Do the risk-return characteristics of investor expectations for a stock differ according to whether the investor is a buyer, seller, or owner of the stock?
- (c) Are the expectations of investors, who are associated with a particular stock, consistent with the proposition that all publicly available information is fully reflected in the market price of that stock?

1.3

METHODOLOGY

The foregoing research objective involves inter- and intra-stock comparisons of investors' expectations of financial return; as a prerequisite to these comparisons the financial return expectations of investors must be measured. Three methodological approaches to the measurement of expectations are generally recognized.

- (a) One can assume "that expectations are based in a particular way on what has happened in the past; for instance, expected risk might be assumed to be some function

of historical risk defined in a particular way This method is open to the objection that there is no way to check these assumptions".⁷

(b) One could "deduce people's expectations and preferences from their actual decisions on the assumption that they act rationally in accordance with their beliefs and preferences. The trouble with this... method is that it is usually impossible to separate the effects of their expectations from their preferences".⁸ Additionally, this presumes observation of individuals in a choice situation which effectively restricts the methodology to experimental situations.

(c) One could use the "direct approach, and... seek information from investors themselves by

⁷C.M. Sprenkle, "Warrant Prices as Indicators of Expectations and Preferences" in R.H. Cootner, ed., The Random Character of Stock Market Prices, (M.I.T. Press, 1964), p. 413.

⁸Loc. cit.

means of interviews, questionnaires and
the like".⁹

The research methodology adopted in this study was direct measurement of expectations by means of a mail questionnaire. Given the research objective, the above methodology for obtaining investors' expectations leads to three primary operational considerations; the operational definition of financial return expectations, the sampling frame of investors to be surveyed, and the selection of stocks for inclusion in this study. Each of these considerations is discussed in the following subsections.

1.3.1 The Operational Definition of Expectations

An operational definition of an expectation must identify the subject(s) of the expectation and describe the content (uncertain consequences) of the expectation. In the case of common stocks, the subjects of financial return expectations are clearly future price change and dividend income. At question in an operational definition of expectations is the manner in which uncertain consequences are described.¹⁰

In this study, three possible representations of uncertain consequences were pretested on a sample of investors. As a result of this test uncertain consequences in price and dividend expectations were defined as interval-

⁹ J.W. Angell, "Uncertainty, Likelihoods and Investment Decisions," The Quarterly Journal of Economics, (February, 1960), p.3.

¹⁰ K.J. Arrow, "Alternative Approaches To The Theory of Choice in Risk Taking Situations," Econometrica, (May, 1951), 406.

outcomes qualified by a discrete (versus continuous) subjective probability assessment.

1.3.2 The Sampling Frame

The sampling frame of investors selected for this study was defined as including all owners of, and transactors (buyers and sellers) in a particular stock during a given period of time. This population of investors was selected primarily because such investors could reasonably be expected to hold expectations for a stock that they owned or had recently traded. As Van Horne has noted:

...the demand schedule for the stock is determined by the values interested investors ascribe to it. We use the word "interested" rather than "all" investors because only a limited number of investors form judgements on a particular stock. An investor is able to follow only a portion of all stocks available in the market. For any given stock, most investors in the market simply have no judgements; consequently they cannot be considered potential buyers.¹¹

Lintner makes an even more restrictive assessment regarding the 'following' of particular stocks based on the fact that information is not instantaneously and costlessly available to everyone. "Even major institutional investors with large staffs only attempt to 'follow' two or three hundred stocks out of the many thousands available, and 'small' investors are entirely ignorant of

¹¹ Van Horne, op. cit., p. 23.

all but a very small number of stocks".¹²

Operationally, investors were identified as being buyers or sellers of particular stocks through the cooperation of sixteen investment dealers. Owners of the selected stocks were identified from the current shareholder lists of the selected companies. In addition to this sampling of individual investors, a sample of security analysts who 'followed' the selected stocks was also surveyed.

1.3.3 Stock Selection

To investigate the three research questions presented in Section 1.2 common stocks selected for this study had to represent different, a priori risk situations. Furthermore, the stocks had to meet a number of criteria¹³ to avoid biasing responses. The most constraining criteria was that the stocks generate a sufficient number of trades during a relatively short period of time.

Three stocks were ultimately selected for this study; all were among the twenty most active stocks on the Toronto Stock Exchange in 1972: one was a utility stock

¹² John Litner, "The Aggregation of Investors' Diverse Judgements and Preferences in Purely Competitive Security Markets", Journal of Financial and Quantitative Analysis, (December, 1969), p. 398.

¹³ These criteria are detailed in Chapter V.

(Stock A), one a mineral resource stock (Stock B), and the third was a petroleum stock (Stock C).¹⁴

1.3.4 Data Analysis

The expectations data gathered in this study consisted of a respondent-supplied time horizon for the particular stock with which he was associated and, a distributional representation of his beliefs regarding possible price changes and changes in the stock's annual dividend by the time of his horizon. Each of these price and dividend distributions were annualized to yield an average rate of change expected in the price and annual dividend of the stock. Additionally the standard deviation and skewness of these distributions were computed. The internal rate of return implicit in a respondents' price and dividend distributions and an approximate variance of that return were also computed.

To investigate the indicated research questions these parameters of investors' price and dividend expectations were aggregated and compared on both an inter-stock and an intra-stock basis (as required by the research questions). Where applicable one- or two-tailed t- tests were employed to investigate the significance of inter- and intra-stock

¹⁴ A condition of obtaining corporate cooperation in this study was that the participating companies would not be identified by name in any publication of the study's findings.

differences in averages of expectation parameters.

1.4

SUMMARY OF CONCLUSIONS

This study was designed to provide insight into answers to the research questions posed in Section 1.2. Essentially the findings of this study support the following conclusions.

- (a) Investors do expect a higher return from higher risk stocks.
- (b) The risk-return characteristics of buyers', sellers', and owners' expectations do differ.
- (c) The expectations of investors who are associated with a particular stock are not consistent with the proposition that all publicly available information is fully reflected in the market price of that stock.

However, these conclusions are subject to substantial qualification regarding their applicability to different types of return (price, dividend, and total return), to different expectation time horizons, and to different parameters of return expectations. These qualifications are detailed in Chapter VII.

1.5

SUMMARY OF IMPLICATIONS

The results of this study have implications for financial theory and research, corporate financial practices, and the investment dealer industry.

In terms of its implication for financial theory, this study has supported theoretical representations of investor expectations employed in valuation theory. In terms of research methodology this study has indicated the feasibility of obtaining ex ante data inputs from a cross-section of individual investors to investigate ex ante phenomena such as investors' required rates of return and perceptions of risk.

The primary implication of this study for corporate financial practices stem from the quantification of investors' expectations in an objective and consistent manner. Specifically, this research indicates the feasibility of measuring a firm's cost of equity capital by direct measurement of the expectations of individuals who buy, sell, or otherwise follow the firm's stock. Such a determination of a firm's cost of equity capital is particularly relevant to regulated firms where considerable effort is expended to justify rate increases on the basis of a firm's cost of capital. The practical and academic support for the survey measurement of a firm's cost of equity capital is detailed in Chapter VII.

The implication of this study for the investment dealer industry is based on the finding that individual investors and security analysts did not have entirely consistent expectations for the same stocks. That is, there is evidence that supports the proposition that the market-

place for these stocks was not efficient at the time of the study, (prices did not fully reflect all publicly available information). No evidence was available to indicate whether differences in information or in the transformation of information (or both) was the cause of differences in expectations. The causes of the indicated inefficiency should therefore be investigated.

1.6 OUTLINE OF THE CONTENT OF THE STUDY

In Chapter II the construct of expectations is introduced and developed to provide a general context within which the specific notion of investor expectations will be discussed.

Chapter III draws on the ideas presented in Chapter II to develop the concept of investor expectations of financial return in the case of common stocks. In Chapter III the areas of capital markets theory encompassed in the research questions detailed in Section 1.2 are developed and empirical hypotheses presented to investigate these research questions.

Chapter IV addresses the issues involved in measuring investor expectations and the alternate ways of doing so. This Chapter is really a review of historic methodology and theory regarding the measurement of expectations in an objective and consistent manner.

Chapter V involves a resolution of the alternate methods of measuring expectations and details the methodology employed in this study to answer the stated research questions.

In Chapter VI the results of investigating the nature of investors' expectations are presented in terms of the empirical hypotheses specified in Chapter III.

Chapter VII involves a summary of this study's findings, the conclusions that were drawn from these findings, and the implications of these conclusions for researchers, corporate managers and the investment industry.

CHAPTER II

EXPECTATIONS PROPER

This chapter describes the content and nature of "expectations" in order to provide a framework of terms and ideas to be utilized in subsequent consideration of expectations in the context of the investment decision (Chapters III & IV). This review of the literature pertaining to expectations involves:

- (a) The recognition of expectations as a non-observable concept.
- (b) The identification and description of those elements involved in an expectation; namely, the individual, the evidence, and the set of perceived outcomes.
- (c) The characterization of expectations as continuous phenomena.
- (d) The characterization of expectations as being interdependent.

2.1

EXPECTATIONS DEFINED

A variety of definitions have been put forward in the literature to capture the essence of the construct generally referred to as "expectations", or "anticipations". Meredith has broadly defined expectations to be "propositions

with a future reference";¹ Katona considers expectations as those "attitudes that represent the extension of the time perspective"² Georgescu-Roegen states that, "Expectation is the state of mind of a given individual with respect to an assertion, a coming event, or any other matter on which absolute knowledge does not necessarily exist"³ Shackle, defines expectations as "conceptions of outcomes looked on as possible";⁴ Ozga defines expectations as "attitudes, dispositions, or states of mind which determine our behavior or at least accompany it";⁵ and Friend as "a qualitative or quantitative attitude held by an economic unit with respect to the future value of any economic variable".⁶

¹G.P. Meredith, "The Surprise Functions and the Epistemic Theory of Expectations", in Mary J. Bowman (ed.) Expectations, Uncertainty and Business Behavior, Social Science Research Council (New York, 1958), p. 74.

²G. Katona, Psychological Analysis of Economic Behavior (New York: McGraw-Hill, 1951), p. 60.

³N. Georgescu-Roegen, "The Nature of Expectations and Uncertainty", in M.J. Bowman (ed.), Expectations, p. 12.

⁴G.L. Shackle, Decision, Order and Time in Human Affairs (Cambridge University Press, 1961), p. 32.

⁵S.A. Ozga, Expectations in Economic Theory, (London: Weidenfeld and Nicolson, 1965), p. 23.

⁶I. Friend, "Critical Evaluation of Surveys of Expectations, Plans and Investment Behavior," in M.J. Bowman (ed.), Expectations, p. 189.

All of the foregoing definitions (and others found in the literature) identify at least two attributes of expectations; namely, that they are 'of the mind' (hence not directly observable) and pertain to the future. Being of the mind an expectation is an experience, that is, something that one may be able to identify by introspection as an expectation of rain, profits, etc. Thus, "expectations proper"⁷ are to be distinguished from other ex ante data such as budgets, contracts, forecasts, plans, etc., which, while pertaining to the future, are not 'of the mind'. Rather, these data are of a definite form that can be directly observed. Such data may be considered as formal representations of expectations only to the extent that they accurately reflect the forecaster's or planner's attitudes about future events and, even then, only in situations free of the intention to deceive or conflicting attitudes on the part of the forecaster or planner.

Of particular importance in the foregoing definitions is the conceptualization by some authors of expectations as 'attitudes' and by others as 'states of mind', 'conceptions', or 'hypotheses'. This distinction between these definitions is of fundamental importance in studying expectations per se versus expectations confounded with motivation.⁸

⁷Ozga, op. cit., p. 23.

⁸Georgescu-Roegen, op. cit., p. 25.

The study of expectations per se is the study of the cognitive dimension of 'attitudes held by' or 'states of mind of' individuals about a particular subject. In contrast, the combination of the affective and cognitive dimensions of attitudes is intrinsic to the study of choice among alternatives.

2.2

THE ELEMENTS OF AN EXPECTATION

An expectation is characterized as consisting of three elements: the individual - the one who expects; the evidence - what one knows; and the "prospect" - the individual's view of the future.⁹ The prospect of expectation is the result of the interaction of the individual and the evidence, and, is ultimately the subject of this study.

2.2.1

The Individual

Chambers has described 'the one who expects' as "a complex organism capable of perception, reflection, and action".¹⁰ The first two of these processes are of particular importance to an understanding of the formation of expectations since they encompass the essential elements of cognition. As described by Chambers

⁹ See: Georgescu-Roegen, *op.cit.*, and Ozga, *op. cit.*

¹⁰ R.J. Chambers, Accounting Finance and Management, (Sydney, 1969), p. 479.

Perception is the observing or sensing in any way of characteristics of the environment or of the organism itself. At any time the environment and the organism itself offer for perception an extensive array of things and events. As the sensory devices are limited, the span of attention is limited, so that at any time only some of the perceivable things are in fact perceived; only some become the focus of attention.¹¹

In the process of perceiving oneself and the environment Gestalt psychology proposes the hypothesis that the individual perceives his environment as a 'whole' which gives meaning to its various elements rather than as individual elements taken separately and combined into a 'whole'.¹² If for example one were to look at a line-drawing of a man, one would not perceive every line in the drawing but rather a picture of a man; the addition or deletion of a number of lines to or from the drawing would be unlikely to affect one's perception of the man in the picture.

Chambers conceptualizes the process of reflection as follows

Reflection includes all mental operations, such as relation, comparison, recollection and calculation. Relation is the apprehension of connexions between things perceived including causal connexions. Comparison is reflection on the similarities or differences between things. Recollection is bringing to immediate conscious attention things that have been perceived in the past. Calculation is the manipulation of qualities and quantities for the purpose of apprehending connexions, of making comparisons or contrasts. The operations of relation and comparison give rise to arrangement, classification and systematization. The capacity for recollection of specific things and events varies inversely with the number of specific unrelated things perceived, and directly with the extent of reflection on and systematization of things perceived."¹³

¹¹ Loc. cit.

¹² G. Katona, The Mass Consumption Society (New York, McGraw Hill, 1964)

Thus individuals are viewed as having "the power to sense their own condition and the impact of it on its environment, . . . the power to discriminate, to learn, and to reason, . . . But all of these powers are limited even in the case of persons who are unimpaired by unusual . . . psychological deficiencies."¹⁴ For example, one of the more important constraints on the affluent individual is time, which, when applied to investing, would tend to restrict the amount of reflection.

2.2.2 The Evidence

The evidence involved in the formation of an expectation has been defined as "all knowledge of the individual at the time",¹⁵ and more narrowly as "a set of statements which provide explicit answers to factual questions about conditions that give rise to the prospect".¹⁶ While Ozga intends the latter definition as an 'operational definition', the former is not capable of operationalization since it would appear to be impossible to ever obtain an unbiased list of all knowledge that an individual calls on in any particular situation.

The breadth of each of the two definitions, however, highlights the multivariate nature of knowledge where knowledge is defined to include:

¹⁵ Georgescu-Roegen, op. cit., p. 12.

¹⁶ Ozga, op. cit., p. 26.

"knowledge of the properties and laws of material objects and events, and the characteristics of human ingenuity".¹⁷

"knowledge of the consequences of past action, not simply of past experience, but on the extent to which past experience has been the subject of reflection for the purpose of discerning cause and effect relationships".¹⁸

"knowledge held by an individual about his own affairs - or of conditions about him".¹⁹

"opinions that are known or may eventually prove to be wrong".²⁰

Thus defined, knowledge includes both factual and relational 'information' (e.g. generalizations) about the environment (and events therein) and the individual. Since "knowledge" is viewed as the "prerequisite to intelligent anticipation"²¹ exclusion of one type of knowledge from consideration in an operational definition does not eliminate the influence of such information on the formation of expectations.

Relational information or generalizations are hypothesized relations or connections between possible events, at least one of which pertains to the future. The characteristic of this type of information that inhibits its formalization in the evidence is that generalizations or relations result from an inductive process and are therefore never known in an absolute sense. Thus they are necessarily the subject of reservations about the degree to which a

¹⁷ Meredith, op. cit., p. 80.

¹⁸ R.V. Chamber, Accounting Finance and Management, (Sydney, 1969), p. 487.

¹⁹ Ibid., p. 488.

²⁰ Georgescu-Roegen, op. cit., p. 12.

²¹ Meredith, op. cit., p. 80.

a generalization " is acceptable as a basis for prediction of instances of events to which it refers".²² In fact these reservations are a major source of 'uncertainty' about the future and, as will be indicated, are manifested in the nature of the events expected. The term 'uncertainty' as used in this study is defined as "a state of mind involving a feeling of incomplete knowledge or control of conditions relevant to decision making".^{23,24}

The above definitions and description of the evidence indicates the scope of information that may be brought to bear on the formation of any particular view of the future. In addition to the uncertainty generated by reservations held about generalizations, uncertainty also results from the recognition that even factual knowledge is never known in an absolute sense. That is, using Ozga's terms, "we do not know exactly what questions to ask . . . It is impossible to say once and for all, which questions are relevant".²⁵

²² Ozga, op. cit., p. 29.

²³ W.E. Henry, "Personality Factors in Managerial Reaction to Uncertainty". in M.J. Bowman, Expectations, p. 90.

²⁴ This subjective interpretation of uncertainty is to be distinguished from both "pure risk" and "pure uncertainty" as defined by Luce and Raiffa. Rather subjective uncertainty is some mixture of the two extreme types of situations and characterized by the influence of an individual's judgment being applied to the situation at hand. (Ozga, op. cit., p. 58.)

²⁵ Ozga, op. cit., p. 31.

2.2.3 The Prospect

Thus far a perceiving and reflecting individual has been postulated; the evidence has been characterized as being of virtually unlimited scope and subject to reservation. These two elements affecting an expectation are now hypothesized as interacting to produce an expectation. That is, an individual is viewed as transforming the evidence into a prospect by a process of inference whereby hypotheses are formed about the occurrence of future phenomena.^{26,27}

The prospect of an expectation regarding a particular subject (e.g. rain, profits, career, etc.) is conceived as consisting of more than one possible view of the future occurrence or state of the subject (hereafter referred to as "outcomes"). Since individuals are presumed to have less than perfect knowledge of the future, it is further hypothesized that outcomes in the prospect are "never without reservation . . . Thus to each outcome there is always attached a certain weight which qualifies it to a greater or smaller extent".²⁸ That is, an individual's feelings of uncertainty about the ultimate occurrence of any particular outcome are reflected in the weight he attaches to the outcome. Shackle has conceptualized the equivalent of the prospect as a "bundle" of "mutually

²⁶Ozga, op. cit., p. 27.

²⁷Angell, op. cit., p. 7.

²⁸Ozga, op. cit., p. 30.

exclusive hypotheses, only one of which, at most, can be true".²⁹

The nature and number of the outcomes in a prospect is determined by the nature of the subject and by the "creative effort"³⁰ or "imagination"³¹ of the individual. For example, an expectation about future profits from a venture might involve only three outcomes (i.e. some, none, or negative profits). Alternatively, the particular individual may conceive of various amounts of profit (e.g. +\$10, +\$8, +\$0, -\$5, -\$15) rather than categories. Imagination or creative effort is constrained however to "congruity with what seems in some degree possible"³² or to "confirmation" by the evidence.³³ Thus the process of inference whereby the individual transforms the evidence into the prospect is viewed as being constrained by his perceptions of what is 'reasonable' to expect in the light of the evidence.³⁴ Notwithstanding a set of outcomes being considered as reasonable, some are conceivably perceived by the individual as being more

²⁹ G.L. Shackle, Economics of Pleasure, 2nd ed., (Cambridge University Press, 1968), p. 121.

³⁰ Ozga, op.cit., p. 51

³¹ G.L. Shackle, Decision Order and Time. (Cambridge University Press, 1961), p. 9.

³² Ibid., p. 11

³³ Ozga, op. cit., p. 51

³⁴ See also Meredith's notion of the "pattern of evidence of rational likelihood". op. cit., p. 80.

congruous or confirmed by the evidence than others.³⁵

The influence of an individual's perceptual faculties on the range and degree of qualification of the outcomes indicated above is related to his perception and reflection on the less than absolute evidence that he brings to bear on the subject of the expectation. For example: of two individuals presented with the same set of data and opinion deemed relevant to the particular subject, one might perceive the 'whole' evidence as being more or less 'favorable' than the other to future instances of the subject. Thus, the range of reasonable instances imagined would likely be different. Even however, in the face of an identical range of reasonable outcomes being perceived, it is unlikely that the two individuals would perceive any one outcome as meriting more or less congruity or confirmation, given the evidence.

The foregoing example is reflective of the hypothesis that the outcomes, their qualifications, and the evidence (either factual or relational) are parts of the same whole that individuals perceive in the process of expecting. "To expect means to see that whole. And as

³⁵ Ellsberg suggests that in problems of choice, under uncertainty, the individual feels more or less "ambiguous" about the weights associated with his estimates of relative likelihoods of events because of the ambiguity of his information. This feeling of ambiguity is in the nature of "one's degree of 'confidence' in an estimate of relative likelihoods". Daniel Ellsberg, "Risk, Ambiguity, and the Savage Axioms," Quarterly Journal of Economics, V. 83 (1969), pp. 643-669.

different people may see the same elements as parts of different wholes, so they may also see the same elements in the evidence as parts of different wholes of expectations".³⁶

2.2.4 Summary

In summary the prospect is viewed as containing a set of less than certain outcomes. The relative uncertainty of each of the outcomes is reflected by the 'weight' that an individual associates with each outcome; the weight being assessed in accordance with one's perception of how "congruous" or "confirmed" the outcome is in view of the evidence brought to bear.

2.3 THE NATURE OF EXPECTATIONS

The previous section was concerned with the construct of "expectations proper" and the elements influencing their formation. This section will explore the implications of expectations being 'of the mind' and influenced by the individual's perception and reflection.

2.3.1 The Continuous Nature of Expectation

Meredith has hypothesized that contrary to the usual conception of expectation as a "state of mind which occurs only at certain times and in certain circumstances", expectation is in fact a "continuous and fundamental" state of mind. He suggests that the "organization of biological processes is . . . an extrapolating process . . . Watch a

³⁶ Ožga, op. cit., p. 80.

wheeling flight of birds and you can see this extrapolation at work".³⁷ Henry's conception of man as an "expectant being" is analogous to Meredith's idea.³⁸ While Meredith believes most of one's actions are regulated by "conscious", expectations he further proposes that "their continued existence is not conditional upon consciousness", rather "they exist . . . in some stored condition, available for evocation when relevant", such as when "we attend to them".³⁹ Instances requiring 'attending' to expectations include those involving changes therein.

Taking the "time of the expectation" as the point in time that an expectation is formed about the future situation or occurrence of a subject (e.g. weather) and the "time of the subject" as the time to which the expectation refers (e.g. tomorrow), expectations are viewed as undergoing more or less "adjustment" as the time of the expectation approaches the time of the subject.⁴⁰ Both the outcomes rationally imagined earlier and their associated qualifications may be altered as previously perceived evidence is augmented by new information and/or changing perceptions of the whole evidence. In an investing framework Angell notes this phenomenon of changing expectations as being akin to "the investor . . . (wearing) glasses whose colour often seems to alter, even in the absense of any substantial change in the

³⁷ Meredith, op. cit., p. 75.

³⁸ Henry, op. cit., p. 86.

³⁹ Meredith, op. cit., p. 77.

⁴⁰ Ozga, op. cit., p. 41

currently known 'objective facts'."⁴¹

Thus while expectations about a particular subject may not always be in the conscious mode, they are presumably brought to this state for alterations as the situation demands or the individual chooses to do so.

In part, the length of time that a particular expectation is held (i.e. possible outcomes and weights remain the same) is a function of the "mechanism" generating the processes, and conditions, by which future events result.⁴² For some types of future events the individual's behavior is part of the mechanism determining the occurrence of events (e.g. future income)⁴³ while for others (e.g. the weather) the individual's influence is non-existent⁴⁴ and the mechanism neither known nor meriting a stability assumption. Thus, the more unstable and resistant to individual influence, the shorter the time that expectations are likely to be held without alteration.

⁴¹ Angell, op. cit., p. 24.

⁴² Ozga, op. cit., p. 35.

⁴³ Expectations involving this type of mechanism are referred to as "internally oriented" expectations in that they involve the future course of action of the individual himself. See: F. Modiglianni and K. Cohen. "The Significance and Use of Ex Ante Data", and R. Mack, "Business Expectations and the Buying of Materials", in M.J. Bowman, Expectations, p. 151 and p. 106 respectively.

⁴⁴ Expectations involving this type of mechanism are referred to as "externally oriented" expectations in that they refer to the future course of action of subjects beyond the direct influence of the individual. See: Modiglianni and Cohen, op. cit., p. 153, and Mack, op. cit., p. 108.

Additionally, the length of time that an expectation, once formed, will be held is likely to be determined by the rather practical constraint on the time and effort that an individual will allocate to reassessing the evidence, the outcomes and their weights.⁴⁵

In short, expectations, once formed, may be altered as the result of changing perceptions and reflections of the same or different evidence, the existence of an uncontrollable or non-stable underlying mechanism, and the cost in terms of time and effort involved in adjusting expectations. Between alterations to expectations they may be stored in a state of mind other than consciousness.

2.3.2 Interdependence of Expectations

Thus far an individual has been characterized as holding only one expectation consisting of a set of outcomes and their attached weights. In reality, however, individuals hold expectations simultaneously about any number of subjects some of which may be influenced by expectations about others. For example, the outcomes in the prospect of an expectation about the profits one will receive from a venture will be influenced by expectations about the cost and revenues that will be incurred. Expectations about costs and revenues will, in turn, be influenced by expectations about the availability of labour, competitive

⁴⁵ R.G. Smith, "Uncertainty, Information, and Investment Decisions," The Journal of Finance, (March, 1971) p. 71.

actions, selling prices, etc.

The coexistence of 'intermediate' and 'terminal' expectations raises the issue of the consistency of expectations at any point in time and over time as well.⁴⁶

Consistency is an issue to the extent that individuals wish to behave consistently in the light of their expectations of future gains. Therefore, if an individual were to consider investing in a particular venture with the anticipation of gain, he would presumably strive to be consistent in his expectations; otherwise the gain might not be forthcoming.

For example, if he were to expect revenues from the venture to decrease and costs to increase then it would be logically inconsistent to expect profits to increase. Hence, the decision to participate in the venture in the expectation of gain would presumably be influenced by the consistency of an investor's expectations.

2.4 SUMMARY

In this chapter, "expectations proper", about a particular subject were described as being the result of an individual perceiving and reflecting upon evidence that bears on the future occurrence of instances of the subject. Expected outcomes are the result of a creative or

⁴⁶ See: Ozga, op. cit., p. 40, and G.L. Shackle, Decision, Order and Time in Human Affairs, Cambridge (University Press, 1961), Chapter XXIV.

imaginative effort constrained to some measure of reasonableness (e.g. congruity, confirmation). With every outcome is associated a qualification or weight reflecting the individual's subjective feelings of uncertainty about the ultimate occurrence of the particular outcome.

Furthermore, expectations were characterized as being of a continuous nature although subject to more or less frequent periodic changes. Different types of expectations were also proposed, one type being those terminal expectations that were in fact dependent on the so-called intermediate expectations.

CHAPTER III

INVESTOR EXPECTATIONS

The concept of investor expectations is central to the theory of equity valuation. As noted earlier, Keenan,¹ Robichek² and Friend³ have all indicated the need to obtain data inputs from investors in order to strongly specify investors' expectations in terms of the range of variables employed in the valuation process.

In this Chapter the role of expectations in the valuation of common stocks will be discussed. Empirical hypotheses are presented that will investigate the ability of the parametric representation of investors' expectations to distinguish among various stocks. That is, these hypotheses will delineate the scope of an investigation of the ability of the parametric specification of investors' expectations to distinguish stocks on the basis of their risk and return properties.

¹Keenan, op. cit.

²Robichek, op. cit.

³Friend, op. cit.

3.1

INVESTORS' GENERAL EXPECTATIONS

Individuals who invest in stocks are viewed as holding⁴ expectations on two related subjects.

(a) Investors expect to be better-off by making investments than by not making any investments.⁵ Smith has interpreted being "better-off" in the sense that investors "expect the future flow of satisfaction (or means of obtaining satisfaction) resulting from a decision to invest when appropriately discounted to the present, to exceed the satisfaction presently obtainable". Where money is the means of acquiring goods and services capable of yielding satisfaction the inducement to invest is, in general, the expectation of monetary gain.⁶

(b) Investors expect to invest in any particular security for a more or less specific period of time.⁷

⁴"Holding" in the sense of Meredith's continuous expectations. (op. cit., p. 81).

⁵R.J. Chambers, Accounting Finance and Management (Sydney, 1969), p. 600.

⁶R.G. Smith, "Uncertainty, Information, and Investment Decisions," The Journal of Finance, (March, 1971), p. 69.

⁷G.L. Shackle, Decision, Order and Time in Human Affairs, (Cambridge, 1961), p. 223. While the question of an individual's time horizon has not been addressed empirically, the time most commonly mentioned in the literature appears to be about 3 to 5 years. H.M. Markowitz, Portfolio Selection, (New York, 1959); B.G. Malkiel, "Equity Yields, Growth, and The Structure of Share Prices", American Economic Review, (Dec., 1963).

Shackle describes a forward time horizon as "the most distant future date with which in some particular manner, the decision maker concerns himself". By implication, the individual ignores all future possible developments beyond this more or less definite date. Shackle's rationale for such a horizon is that it is imposed upon the imaginative creation of the future, by uncertainty which becomes more and more unbounded by considerations of what is possible, the more remote the date concerned.⁸ Thus, there may appear to be nothing that does not appear to be possible at the time of the expectation if one looks far enough ahead.

The above concept of a time horizon does not preclude the possibility of an individual, at any particular time, expecting different possible outcomes for a subject of an expectation at more than one future date. Sauvain has proposed that there is actually "an element of both the short-term and the long-term in every estimate of the future The analyst who is considering Dow Chemical common as a purchase for long-term holding is not likely to ignore prospective developments over the next year or so that would affect market price".⁹

⁸ Shackle, Decision, op. cit., p. 223-224

⁹ H. Sauvain, Investment Management, 2nd ed. (Englewood Cliffs, 1959) in R.G. Smith, op. cit. p. 70.

3.2

INVESTOR EXPECTATIONS AND VALUATION

The notion of expecting to be better-off financially by a more or less specific period of time is a fundamental proposition of the theory of equity valuation.

Broadly stated, valuation theory attributes two generalized properties to a financial asset that determine its value; the asset's "lucrativity" (return) and its "risk".¹⁰

For a given asset, these properties are a function of "expectations about the underlying real or financial flows . . . associated with a particular instrument."¹¹

This conceptualization of value and its dependence on expectations directly incorporates the notion of being better-off in the monetary sense via the financial return of an asset. The time dimension of the expectation is similarly represented by both the return and risk properties of the assets in that risk and lucrativity are functions of the "flows" associated with the asset.

Since the practice of equity valuation is pursued by individuals, the risk and return properties of an asset are a function of the expectations of individuals for the particular asset. For example, an asset can properly be said to have a certain ex ante risk property at a point in time only on the basis of an individual's (or group's) expectations for the financial flows that

¹⁰ Marschak, op. cit., p. 311.

¹¹ Keenan, op. cit., p. 259.

they associate with the particular equity. That is, whatever the properties that are ascribed to a common stocks, these properties exist only in the minds of individuals.¹²

3.2.1 The Parametric Valuation Model¹³

Given this general valuation framework the risk and return properties of an asset that give rise to its value have been operationally defined via the behavioral assumption of expected utility maximization.¹⁴ For utility that is solely derived from wealth and monetary income a general utility function is defined for certain cash inflows received at time j ; $U(V_j)$. Although not expressed in an explicit form, this function is assumed to have characteristics such that a Taylor series expansion of it will give the approximate value of utility at a particular value of V_j . If $E(V_j)$ - the expected inflow - which is a possible value that the cash inflow can assume, is taken as the appropriate constant value of V_j in the Taylor series expansion then the approximate utility of this

¹² Researchers in the area of equity valuation have developed proxies for investors' return expectations. These surrogates are generally based on published financial data and implicitly assume that in the long-run investors receive what they expect. See for example: F.D. Ardetti, "Risk and the Required Return on Equity," Journal of Finance, (March 1967), p. 19.

¹³ The following development of the specification of the parametric valuation model draws heavily on: W.H. Jean, The Analytical Theory of Finance, (Holt Rinehart, and Winston, 1970), Chapter 4.

¹⁴ For an excellent presentation of the 'expected utility maximum' see: Markowitz, op. cit., Chapter 10.

inflow is given by Equation (1).

$$(1) \quad U(V_j) = U[E(V_j)] + U'[E(V_j)] [V_j - E(V_j)] \\ + \frac{U''[E(V_j)]}{2!} [V_j - E(V_j)]^2 + \frac{U'''[E(V_j)]}{3!} [V_j - E(V_j)]^3$$

+ terms with higher order $V_j - E(V_j)$ components

The expected value of the utility for an uncertain cash flow can be obtained by taking the expected value of both sides of Equation (1) to yield:

$$(2) \quad E U(V_j) = U[E(V_j)] + U'[E(V_j)] E[V_j - E(V_j)] \\ + \frac{U''[E(V_j)]}{2!} E[V_j - E(V_j)]^2 + \frac{U'''[E(V_j)]}{3!} E[V_j - E(V_j)]^3$$

+ terms with higher order $E(V_j - E V_j)$ components

Interpreting the right-hand side of Equation

(2) indicates that the expected utility of an uncertain cash flow is a function of the utility of the mean expected cash inflow $E(V_j)$, the second moment of the distribution of possible cash flows, $[V_j - E(V_j)]^2$, the third moment of the distribution of possible cash flows, $[V - E(V_j)]^3$, and higher order moments of the distribution.¹⁵ Since the moments of a distribution of possible cash flows are unique to a particular distribution, a distribution of possible cash flows can be summarized in terms of these moments. The central tendency of the distribution can be summarized by the mean,

¹⁵ The second term of Equation (2) has no effect on the utility of the expected cash inflow since $E[V_j - E(V_j)]$ equals zero. Also the derivative components of the terms in Equation (2) are constants.

$E(V_j)$; the variability of possible outcomes around the mean by the second moment (variance) of the distribution, $[V_j - E(V_j)]^2$; the asymmetry of possible outcomes (skewness/third moment) of the distribution, $[V_j - E(V_j)]^3$; and so forth.¹⁶

Given that investors attempt to maximize their expected utility by investing in securities, the specific form of their utility function determines the number of moments of the distribution of possible cash inflows that are relevant to operationally defining the return and risk properties of a particular asset. For example, if risk averse investors are assumed to be concerned with only the magnitude and variability of expected returns then a second-degree polynomial would completely specify their utility of wealth function; that is, $U'''(V_j)$ and higher derivatives would necessarily be zero. The same result is also obtained if it is assumed that expected cash inflows are normally distributed.¹⁷

A major objection to the specification of a risk averse investor as having a quadratic utility function is that at some level of wealth the slope of the utility function

¹⁶ For example, the fourth moment $[V_j - E(V_j)]^4$, is a measure of the "peakedness" of the distribution of possible returns and is alternately referred to as the kurtosis of the distribution.

¹⁷ E.F. Fama, and M.H. Miller, The Theory of Finance (Holt Rinehart and Winston, 1972), p. 217

becomes negative which violates the assumption that marginal utility must always be positive.¹⁸ Thus, a quadratic utility function is at best an approximation to the true utility function of a risk averter.

Accepting the assumption of a quadratic utility function for risk averse investors results in the expected utility of an investment being an increasing function of the magnitude of the expected return and a decreasing function of the variability of the return. The implication of this latter characteristic of expected utility is that for an asset to retain its appeal under conditions of increasing variability of return, the expected return term in Equation (2) would have to be greater by at least an off-setting amount. The increase in expected return necessary to retain the attractiveness is defined as the risk premium for the investment. For a single security, Ardetti¹⁹ has defined this risk premium (θ_j) as a function of the variance σ^2 of the expected return.

$$\theta_j = \frac{\sigma^2}{2} \frac{U''(W)}{U'''(W)}$$

¹⁸ Ibid., p. 256

¹⁹ Ardetti, op. cit., p. 20

This representation of risk as the variability, per se about the expected value of a distribution of possible returns is open to criticism. Van Horne states that "it is obvious that the risk to an investor is not dispersion per se but the possibility of downward deviation from the expected value of return".²⁰ Van Horne further notes that even the expected value is not necessarily the appropriate benchmark for all investors or even some investors. Rather, risk might be better described as the fractile of the probability distribution below, for example, the market price of the stock at the time of the purchase.²¹ Machol and Lerner have proposed that risk in a chance-constrained problem might be better defined as the cumulative probability of return falling below some level of "ruin".^{22,23}

²⁰ Van Horne, op. cit., p. 25. See also: F. Modigliani and G.A. Pague, "An Introduction to Risk and Return: Concepts and Evidence," Financial Analysts Journal (March - April, 1974) pp. 70-73.

²¹ Van Horne, loc. cit.

²² R.E. Machol, and E.M. Lerner, "Risk, Ruin and Investment Analysis," Journal of Financial and Quantitative Analysis, (December, 1969), pp. 473-92.

²³ For other possible measure of risk, see: Markowitz, op. cit., and Ozga, op. cit.

average return than sellers. Conversely, for the same expected magnitude of future return, buyers are defined as being more optimistic if they expect less risk than sellers.³⁰

The preceding intra-stock hypotheses can be extended to the question of the relative optimism of the expectations of owners of a particular stock by recognizing that for every stock there exists a population of market participants comprised of owners and non-owners. Within these two groups, the most optimistic individuals tend to become buyers of the stock while the least optimistic tend to become sellers (including short-sellers). In an efficient marketplace the set of expectations held by each of these two groups is based on the same information and hence, would be expected to involve the same range of expectations. If such is the case, the most optimistic expectations for both groups should be the same; similarly, the least optimistic expectations should be indistinguishable. Thus, aggregates of non-owner-buyers and owner-buyers would tend to have the same range of expectations just as aggregates of non-owner-non-buyers and owner non-buyers would be expected to have the

³⁰ As in the case of inter-stock comparisons of expectations, these intra-stock hypotheses focus on the element of the total risk premium that derives from the expected variability of return expectations.

FIGURE 3.1

THE RISK-RETURN, TRADE-OFF FUNCTION

on U_1 . Since risk-averse investors prefer less risk to more risk for a given level of return, the risk-return combination represented by C would be less desirable than that at A. Thus C would be on a lower-utility indifference curve than A. Similarly for a given level of risk, investors prefer more return rather than less and therefore the risk-return combination at D would be preferred to that at A. Combination D would therefore be in a higher-utility indifference curve than A.

The above representation of the risk-return trade-off made by investors in the market place implies that investors will buy those securities that offer the greatest return for a given level of risk or, alternatively, those securities that offer the lowest level of risk for a given return. Depending on the degree to which the investor is a risk averter, he will operate in a higher or lower risk-range of risk-return combinations available in the market place. Similarly, individuals will sell securities that are inconsistent with their preferences for risk and return.

3.2.3 Portfolio Considerations

In the foregoing discussion of the implications of the parametric valuation model the implicit assumption was made that individuals invest in a particular security on

the basis of the risk and return properties of the asset in isolation rather than as a contributing element to the risk and return of a portfolio of assets. It can be shown that depending on the covariation of returns in a portfolio of securities, the total risk (variability) of the portfolio of assets can be less than the sum of the variabilities of the constituent assets.²⁵ The total return and variability of a two-security portfolio of assets are given by

$$(3) \quad E(V_t) = \sum_{i=1}^2 W_i V_i$$

where V_t = total return

V_i = the return from the i^{th} security

W_i = the proportion of a portfolio's value that is invested in the i^{th} security.

$$(4) \quad \text{Var}(V_t) = \sum_{i=1}^2 W_i^2 \text{Var } V_i + 2 W_1 W_2 SD_1 SD_2 \text{Cor}_{1,2}$$

where

$\text{Var}(V_t)$ = variance of the total return

$\text{Var}(V_i)$ = variance of the return expected from the i^{th} security

SD = square root of $\text{Var}(V_i)$ = standard deviation

$\text{Cor}_{1,2}$ = correlation between the returns of securities 1, and 2.

²⁵ Markowitz, op. cit., p. 90.

The risk-return possibilities of portfolios of securities (including single-security portfolios) in the stock market are represented in Figure 3.2.

Here the solid line represents those portfolios that are efficient in the sense of providing the highest level of return for a given level of risk and the lowest level of risk for a given level of return. Portfolios to the right of the efficiency frontier are not possible because there is no set of w_i values that will yield a portfolio with a rate of return and risk to the right of the efficient set of portfolios. Portfolios to the left of the efficient set are infinite in number and can provide either a higher level of risk for a given level of return, or a lower level of return for a given level of risk.

The preference features implicit in the concepts of an efficient frontier of investments and indifference curves have been integrated to provide a normative model for investment behavior; Figure 3.3 depicts this integration.

In Figure 3.3 the maximum-utility indifference curves for a very risk-averse investor A, and a moderately risk-averse investor B, are shown at their point of tangency to the efficient frontier CD. The end-point limits of the efficient frontier represent the risk-return potential from

FIGURE 3.2

THE TWO-PARAMETER EFFICIENT FRONTIER

FIGURE 3.3

PORTFOLIO SELECTION MODEL

the least and most risky single-security portfolios available in the market place.

In interpreting the implications of the foregoing integration of investor preferences for risk and return and the interaction with portfolio theory it should be noted that the operative variables are expected risk and expected return rather than ex post variables. Thus, ex post, a definitive efficient frontier could be specified while ex ante any specification of an efficiency frontier is by definition subjective and therefore uniquely determined by the expector.

In the above context buying or selling a security is represented as making adjustments to an individual's portfolio of securities in accordance with the contribution of a security to the total return of the portfolio and its overall variability. Both buyers and sellers would be moving to a new, and presumably higher, level of utility to either improve the return of their portfolio for a given level of risk, or, reduce the risk of the portfolio for a given level of return. It is widely held belief that, given the risk-reducing properties of a 'well' constructed portfolio, the risk premium for an individual security does not depend solely on the relative variability of the expected return of the security; rather, the risk premium also depends on the covariability of a particular security's

return with an investor's overall portfolio. In this portfolio context the risk premium θ_j , for security j is defined by Van Horne as

$$\theta_j = \frac{R_p - i}{\sigma_p^2} (r_{jp} \sigma_j \sigma_p)$$

where R_p is the expected value of return for portfolio p , i is the risk free rate, σ_p^2 is the variance of the probability distribution of possible returns for the portfolio and the term $(r_{jp} \sigma_j \sigma_p)$ is the covariance of returns for security j with those of the portfolio.²⁶

Adler has noted that the effective or total risk premium for a single security can be determined uniquely only if there exists but one portfolio for all investors with known total returns and variance, to which it can belong.²⁷ Alternatively the effective risk premium associated with a particular security as perceived by a particular investor can only be determined if the returns and variances of other

²⁶ Van Horne, op. cit. p. 33

²⁷ Michael Adler, "On Risk-Adjusted Capitalization Rates and Valuation by Individuals," The Journal of Finance, (Sept., 1970)

securities in his portfolio are known. In the absence of this additional information regarding an individual's portfolio, the scope of this study focuses on the parametric representation of an investors' expectations as if investors were unaware of the implications of an individual security's covariability with his portfolio.

3.2.4 Summary

The foregoing development of the two-parameter model and its integration in normative decision theory provides a description of how investors should make decisions regarding securities. In essence, this model indicates that in an uncertain world investors attempt to maximize their expected utility of wealth by selecting from among the available investment alternatives those investments that are expected to provide the highest expected utility given the constraints imposed by the extent of their risk aversion and the availability of alternatives in the market place. The central proposal in this model is the recognition of the necessity to make risk-return trade-offs on the basis of the expected magnitude of the return and variability of that return.

3.3 EXPECTATIONS HYPOTHESES

As indicated earlier the objective of this research is to investigate the consistency of investor expectations with theoretical propositions regarding the content, form, and behavior of these expectations. In the preceeding sections the general nature and the parametric representation of investor expectations was shown to occupy a central position in the theory of asset valuation and choice. These theoretical precepts imply a series of propositions regarding the content, form, and behavior of investors' expectations for common stocks.

Empirical hypotheses to investigate these propositions are discussed in the following paragraphs.

3.3.1 Inter-Stock Hypotheses

The primary hypothesis to be tested in this study is stated below.

Hypothesis 1.1

The magnitude of stock market participants' financial return expectations for a more risky stock will be greater than those for a less risky stock.

This hypothesis is derived directly from the foregoing valuation model and could be described as "the risk premium hypothesis". That is, a risk premium in the form of expected return must be associated with stocks whose future return is expected to involve more variability than that from

alternate securities. This hypothesis focuses on the element of the total risk premium that derives from the expected variability of return expectations.

A stronger statement of the above hypothesis would require not only that the expected return be greater for higher risk but also that for a given risk-differential between stocks, the expected return-differential would be more than proportionately greater.

Hypothesis 1.2

The magnitude of stock market participants' financial return expectations for a more risky stock will be more than proportionately greater than those for a less risky stock.

The term "market participants" employed in the above hypotheses is defined to embrace the population of individuals that have, or may reasonably be expected to have, expectations for the financial return that a particular stock might provide in the future. As indicated in Chapter I, this study involves the expectations of four types of market participants associated with a particular stock during a given period of time; namely, buyers, sellers, owners, and security analysts.

The above two hypotheses can be tested by inter-stock comparisons of the financial return expectations of aggregates and disaggregates of market participants associated with a particular stock. That is, the return expectations of all market participants associated with stock X can be compared with the return expectations of all market participants associated with stock Y; the return expectations of just buyers of stock X can be compared with the return expectations of buyers of stock Y, and so on.

The return expectations compared involve in turn: price expectations, dividend expectations and combined price and dividend expectations. The specific nature of the relevant "financial return expectations." is discussed in Chapter IV. Similarly, the operationalization of the terms "magnitude" and "risk" is reserved for Chapter V.

3.3.2 Intra Stock Hypotheses

Empirical tests of the foregoing hypothesis based on the return expectations of a sample of market participants associated with a particular stock would yield valid risk-return rankings of the particular stocks only if there was

reason to believe: (1) that all market participants associated with a particular stock had identical return expectations for the stock; or, (2) that return expectations were randomly distributed among participants. In this latter case, the set of expectations represented by buyers would be indistinguishable from the set represented by sellers, owners, analysts or any other subsample of market participants.

Since expectations of financial return are the result of individuals perceiving and transforming evidence into a set of more or less possible future outcomes, it is unreasonable to anticipate all market participants as having identical expectations for the return from a stock (Chapter II). In the absence of market participants having identical expectations, some participants will, by definition, have more "optimistic" expectations than others. Williams has proposed that participants (in a single-security marketplace) having the most optimistic expectations of future return will tend to be purchasers of the stock while those having the least optimistic expectations will tend to be sellers of the stock.²⁸

²⁸ J.B. Williams, The Theory of Investment Values (New York, A.M. Kelly, 1965).

In a multiple-security marketplace Williams' proposition would be expected to hold if: (1) the market is efficient in the sense that all publically available information about a stock is reflected in the expectations of market participants, (2) the same set of investment alternatives is visible to all subsets of market participants,²⁹ and (3) all subsets of market participants associated with a particular stock are similar with respect to financial resources, needs, and analytical abilities.

The relative optimism of buyers, sellers, and owners' expectations can be empirically investigated by intra-stock comparisons of their financial return expectations. The primary intra-stock hypotheses are presented below.

²⁹The visibility assumption is necessary to distinguish between relative and absolute optimism in a multiple-security market. For example, an individual with one set of investment alternatives may view a particular stock, X, as providing a relatively high return vis à vis the other stocks in his set. However, a second individual if he has a different set of investment alternative returns that dominates the set of investment alternatives available to the first individual, might view Stock X as providing a relatively low return. Thus if different subsets of market participants had different investment alternatives such as those of the first and second individuals, sellers could be indicated as having larger absolute expectations for X than buyers.

Hypothesis 2.1

All other things being equal, the magnitude of buyers' expectations of future financial return from a particular stock will be greater than that of sellers.

Hypothesis 2.2

All other things being equal, the risk of the future financial return expected by buyers of a particular stock will be less than that of sellers.

The use of the qualifier "all other things being equal" refers specifically to the aforementioned market efficiency, stock visibility and investor-characteristic assumptions. Additionally, the qualifier also includes the other parameters of investors' expectations not explicitly involved in the particular hypothesis.

As in the case of the inter-stock hypotheses the return expectations compared involve, in turn: price expectations, dividend expectations, and combined price and dividend expectations. Additionally the specific nature of the relevant "financial return" expectations and the terms "magnitude" and "risk" are detailed in Chapters IV and V.

Given the earlier noted aversion to risk, a two-parameter representation of expectations, and the necessity of investors to make risk-return trade-offs, buyers are defined as being more optimistic than sellers if, for the same level of perceived risk, buyers expect greater

average return than sellers. Conversely, for the same expected magnitude of future return, buyers are defined as being more optimistic if they expect less risk than sellers.³⁰

The preceding intra-stock hypotheses can be extended to the question of the relative optimism of the expectations of owners of a particular stock by recognizing that for every stock there exists a population of market participants comprised of owners and non-owners. Within these two groups, the most optimistic individuals tend to become buyers of the stock while the least optimistic tend to become sellers (including short-sellers). In an efficient marketplace the set of expectations held by each of these two groups is based on the same information and hence, would be expected to involve the same range of expectations. If such is the case, the most optimistic expectations for both groups should be the same; similarly, the least optimistic expectations should be indistinguishable. Thus, aggregates of non-owner-buyers and owner-buyers would tend to have the same range of expectations just as aggregates of non-owner-non-buyers and owner non-buyers would be expected to have the

³⁰ As in the case of inter-stock comparisons of expectations, these intra-stock hypotheses focus on the element of the total risk premium that derives from the expected variability of return expectations.

same (and less optimistic) range of expectations. Hence, in the aggregate buyers' expectations are anticipated as being more optimistic than those of non-buyer, non-selling owners. However, the expectations of these non-transacting owners would be expected to be more optimistic than those of sellers; otherwise, these owners would become sellers of the stock. These propositions are presented graphically in Figure 3.4.

As the result of the foregoing propositions, two additional intra-stock hypotheses are proposed.

Hypothesis 2.3

All other things being equal, the magnitude of owners' expectations of future financial return will be greater than that of sellers but less than that of buyers.

Hypothesis 2.4

All other things being equal, the risk of the future financial return expected by owners will be less than that of sellers but greater than that of buyers.

3.3.3 Implications of Intra-Stock Hypotheses For Inter-Stock Hypotheses

The existence of conflicting expectations among market participants associated with any particular stock requires that this influence be controlled for in inter-stock comparisons.

GRAPHICAL REPRESENTATION OF DIFFERENCES IN THE MAGNITUDE OF
INTRA-STOCK RETURN EXPECTATIONS.

a) Range of Owners' Expectations (aggregates)

b) Range of Non-Owners' Expectations (aggregates)

c) Ranges of Buyers', Sellers', and Owners' Expectations

involving the expectations of aggregates of market participants associated with the particular stock. If this influence were not controlled for in empirical tests of the risk-return trade-offs associated with various stocks, then a preponderance of one type of market participant in the sample of market participants for a particular stock could influence the relative ranking of the stock. For example, if Stock X was in fact a riskier stock than Y yet the sample of market participants associated with X was comprised mainly of sellers of X while the sample of market participants associated with Y was comprised mainly of buyers of Y, the average expected return for stock X could be indicated as being less than that expected for B due solely to sampling factors.

To control for unbalanced representation of various types of market participants in the aggregate sample of market participants associated with a particular stock, Hypotheses 1.1 and 1.2 can be tested by type of market participant as well as for aggregates of market participants. These comparisons would then involve the expectations of, for example, buyers of A versus buyers of B, buyers of A versus buyers of C, and so on.

3.3.4

Implications of Time Horizons For Inter- and Intra-Stock Comparisons

In the preceeding section the need to control inter-stock comparisons of expectations for the type of market participant was noted in response to possible differences in expectations among the various classes of market participants. In this section the need to control both inter - and intra-stock comparisons for the time horizons of investors' expectations is noted.

Thus far the discussion of investor expectations has centered on the shape of the distributions of expected returns. Implicitly, it has been assumed that all market participants' expectations for any and all stocks involve the same future period. That is, returns could be compared as either absolute dollar returns in the case of identically priced stocks or as percentage changes in, for example, market prices, in the case of dissimilar priced stocks. However, the introduction of the time dimension into the expectation requires that expectations be "normalized" with respect to time.

The need to incorporate the time dimension of the expectation is evident from a consideration of the impact of time on the magnitude of an investors' expectation. If for example, an investor expected a \$40 stock to double in price,

over a period of 5 years while a second investor expected the same stock to double in price over a one-year period, non-normalized expectations would indicate that the two investors were equally optimistic for the return from the stock. This result would however be misleading since the investor with the shorter horizon is patently more optimistic than the individual with the longer time horizon. Annualizing the expected returns however would result in the shorter-term expectation being indicated as being more optimistic than the longer term expectation: 100% per annum versus approximately 15% per annum.

However, annualizing expectations can also obscure differences in expectations. For example, if an individual expected a \$40 stock to double in price in one year while a second individual expected the same stock to triple in price in two years, the shorter term expectation would be indicated as being more optimistic than the longer term expectation: 100% per annum versus approximately 75% per annum.

Results such as those indicated in the above examples stem from the reinvestment assumption implicit in comparisons of annualized rates of return over different time horizons; namely, that reinvestment occurs at the indicated internal rate of return. Thus, in the immediate example above, the short term investor is assumed to be

able to reinvest principle and return from year-one at the marginal rate of 100% per annum either in the stock in question or in some other investment vehicle. In effect, the reinvestment assumption broadens the scope of investigation to include not only the expected return from a particular stock in a given period of time but also the investor's future as well as present investment alternatives.

To abstract from these broader considerations, the reinvestment assumption can be controlled for by controlling comparisons of expectations on the basis of their time horizons. Thus both inter- and intra-stock comparisons of expectations enumerated earlier will be made on market participants whose expectations involve approximately the same future time period.

3.3.5

Investigation of the Market Efficiency Assumption

The foregoing presentation of the relative optimism of buyers', owners' and sellers' expectations assumed that differences in expectations result from different interpretations of the same information rather than monopolistic access to specific information. Either or both of these conditions could result in more and less optimistic expectations for a particular stock.

The strong form of the efficient market hypothesis³¹ is concerned with whether all available information is fully reflected in the price of a stock in the sense that no individual has a higher expected return than others because he has monopolistic access to some information. The semi-strong-form efficiency of the marketplace for a particular stock can be investigated for aggregates of individuals by establishing a control group of market participants whose expectations for a stock could reasonably be expected to embrace all publically available information pertaining to a stock as well as a "considered" interpretation of this information. A group of security analysts who "follow" a particular stock can be construed as having these characteristics. Comparing the expectations of market participants associated with a particular stock with the expectations of security analysts for the same stock would indicate the extent to which individuals have different powers of interpretation and/or information. Knowledge of expectations alone cannot identify the specific

³¹ The theory of efficient markets is concerned with whether or not stock prices fully reflect available information about a stock at any point in time. The strong form of the efficient market model defines "available information" as all available information, the semi-strong model as all publically available information, and the weak-form model as simply the set of historical price sequences. See; E.F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance (May 1970), pp. 383-423.

cause of differences in expectations; however, the proposed comparisons would indicate the extent to which inconsistencies in the marketplace for a particular stock do exist. In a strong-form efficient market inconsistencies of the above nature would not be expected to exist.

Fama³² has concluded that "corporate insiders and specialists are the only two groups whose monopolistic access to information has been documented. There is no evidence that deviations from the strong form of the efficient markets model permeate down any further through the investment community". In view of this conclusion the null hypothesis is adopted in testing for inconsistencies between analysts' and individual investors' expectations for a particular stock.

Hypothesis 3

Market participants' expectations of financial return expectations for a particular stock are consistent with those of security analysts for the same stock.

The above hypothesis is a further intra-stock comparison of expectations and similarly involves both the risk and return properties of expectations.

The rejection of the null hypothesis for analysts' and participants' expectations raises the issue of the specification of the risk-return trade-offs between various

³² Ibid.

stocks via security analysts' expectations. Inter-stock Hypotheses 1.1 and 1.2 test for trade-offs on the basis of market participants' expectations (excluding security analysts). However, inefficiency in the market place indicated by rejection of Hypothesis 3 could lead to trade-offs being indicated by analysts that are different from those indicated by market participants. Whether or not differences in market participants' and analysts' expectations are substantial enough to result in a different ranking of stocks can be investigated by inter-stock comparisons of analysts' expectations in addition to those indicated for Hypotheses 1.1 and 1.2

3.3.6 The Third Moment of Investor Expectations

In the foregoing development of inter- and intra-stock hypotheses regarding the nature of investor expectations, only the first two moments of investors' expectations were involved in these hypotheses. In effect, it has been assumed thus far that return expectations were normally distributed or that investors had quadratic utility functions.

This assumption has been questioned by several authors and empirically investigated by Ardetti.³³ Ardetti has argued that the risk premium demanded by an investor for

³³ Ardetti, op. cit., p. 19. Ardetti has argued that a wealthy man would demand a higher price for a lottery ticket offering the chance of a \$20,000 gain or a \$10,000 loss than would a poor man.

accepting increased risk is not independent of his wealth; rather, the risk premium is proposed as decreasing as wealth increases. Ardeti has postulated that the coefficient of the third moment term in Equation (2) must be positive rather than zero as implied by a quadratic utility function.

The resultant implication of this argument is that the utility of an investment is increased by the presence of positive symmetry (right skewness) in the distribution of possible pay-offs and decreased by the presence of negative symmetry (left skewness). Positive symmetry or right skewness can be interpreted as indicating the presence of a relatively large positive gain (in relation to the mean of the expectation) and limited negative gain (in relation to the mean) in the distribution of possible gains, hence, the more positive the skewness the more optimistic the expectations.

The incorporation of the third moment of the distribution of possible pay-offs in the expected utility of an investment requires that the earlier noted implication of a quadratic utility function be restated. Given risk aversion and a decreasing risk premium in relation to wealth, the expected return of an asset under conditions of increasing risk would have to increase by an offsetting amount

only if no change in the skewness of the expectation of possible pay-offs accompanied the increase in risk. If an increase in the variability of the expected pay-offs is accompanied by changes in the symmetry of the distribution then the behavior of the mean of the expected pay-offs need not be restricted to an offsetting increase. For example, an increase in the positive skewness of the distribution could be of sufficient magnitude to offset all or part of the loss in utility brought about by the increased variability of the mean pay-off.

The relevance of the third moment of the expectation of possible pay-offs in the determination of value is attested to by empirical investigations and investment industry practices.

Alderfer and Bierman³⁴ in an experimental situation presented graduate students, and middle- and top-level management with three alternate investment opportunities that differed with respect to the skewness of the possible returns (three possible outcomes were stated for

³⁴ C.P. Alderfer, and H. Bierman, Jr., "Choices with Risk: Beyond the Mean and Variance," Journal of Business, (May, 1970), p. 341.

each alternative). For a given mean and variance, preference was evidenced for the positively skewed alternative over a negatively skewed and a symmetric distribution of possible returns. However, both the negatively skewed and symmetric distributions included the possibility of a loss while the positively skewed alternative did not. Recognizing this situation, Alderfer and Bierman developed two new, no-loss alternatives having virtually the same mean (\$1.0 and \$0.995), slightly different variances (\$0.5 and \$0.524 respectively), but having very different skewness (0.00 and 79.04 respectively). Again subjects strongly preferred the high skewness alternative even in the face of slightly increased risk.³⁵ Thus, the third moment of the distribution of pay-offs is indicated as possibly being a relevant characteristic of the distribution.

The relevance of the third moment of expectations in the valuation model is also attested to by the widely employed practice of adding "sweetners" (e.g. warrants)

³⁵ Coombs and Pruitt used two-outcome alternatives that resulted in the same finding of skewness preference when mean and variance were held constant. See: C.H. Coombs and D.G. Pruitt, "Components of Risk in Decision Making: Probability and Variance Preferences," Journal of Experimental Psychology, (1960), p. 265.

to new issues of securities or, providing for a conversion feature on debt issues. In effect, such provisions tend to increase the positive skewness of the distribution of possible return as well as the mean and variance of the distribution.³⁶

In recognition of the rationale and empirical evidence supporting the relevance of the third moment of the distribution of expected returns the preceding intra- and inter-stock hypotheses can be extended to include the skewness of investors' expectations. That is, the term "positive skewness" can be inserted in place of "magnitude" in the set of inter- and intra-stock hypotheses presented earlier, for price and dividend expectations taken separately. Data necessary to approximate the skewness of investors combined price and dividend expectations³⁷ was not collected in this study and therefore inter- and intra-stock comparisons of this aspect of return expectations were not possible.

³⁶Jean op..cit., p. 179.

³⁷Ibid., pp. 185-187.

3.4

SUMMARY

In the present chapter the central rôle of expectations in the theory of value and choice has been outlined along with the rationale for the parametric representation of expectations.

The discussion centered initially on the general expectations of investors who were presented as expecting to be "better-off at some future time as the result of foregoing present consumption. This notion of being "better-off" was then developed in the context of the classical properties of capital assets; namely, their "lucrativity" and "risk". Combining these concepts with the behavioral assumptions of diminishing marginal utility for wealth and expected utility maximization lead to the expression of investor utility as an increasing function of the expected magnitude of the cash flows from an investment and a decreasing function of the expected variability of the expected flows.

The interaction of investor preferences for risk and return with the set of efficient investment alternatives available in the market place was outlined in relating the parametric valuation model to the normative theory of choice in an uncertain environment.

Having established the perspective in which to view expectations, a series of hypotheses was detailed to investigate the consistency of empirically measured expectations with their theoretical counterparts.

These hypotheses addressed the question of inter- and intra-stock risk premiums as reflected in the magnitude and the positive skewness of investors' expectations of financial return. As indicated it was found necessary to control inter-stock comparisons for the type of investor associated with a particular stock and control both inter- and intra-stock comparisons of expectations for the time horizon of the expectations. Additionally, a test of the semi-strong-form market efficiency assumption implicit in the inter- and intra-stock hypotheses was proposed.

In the next Chapter, the question of the operational definition of investor expectations will be addressed to fully specify the empirical hypotheses developed in this Chapter. Basically this operationalization will involve identification of the elements and relative nature of the financial return that investors expect from common stocks.

CHAPTER IV

THE MEASUREMENT OF FINANCIAL RETURN EXPECTATIONS

In the preceding Chapter empirical hypotheses were proposed to investigate the nature of investors' financial return expectations. These hypotheses were not fully operationalized in that the term "financial return expectations" was not defined in measureable terms.

In the present Chapter the measurement of investor expectations is considered in the context of previously employed or suggested approaches to quantifying expectations. Essentially, this discussion will consider and select from alternate operational definitions for the subjects, outcomes, and weights of investors' expectations of financial return.

4.1 THE METHODOLOGY OF OPERATIONALLY DEFINING INVESTOR EXPECTATIONS

To operationally define the subject of an expectation and the elements in the related prospect requires that they be described in terms of the operation by which they are to be ascertained. In general, two types of operations could be employed; namely, introspection, or, observation of behavior. In the absence of the opportunity to observe behavior, it is necessary to formalize the above constructs in terms of the operation of introspection.

Introspection as a scientific operation has been criticized on the grounds that the "results of it cannot be either confirmed or refuted by anyone except the person who is the subject of it".¹ While such a criticism is valid, the ultimate test of any operational definition is the extent to which the behavior of the construct (as defined) is consistent with the appropriate theory.

To operationally define investors' financial return expectations so that they may be ascertained by introspection involves defining the outcomes of the subject and the associated weights in terms appropriate to this operation. Such definitions are provided in the following sections.

4.2 THE SUBJECT(S) OF INVESTORS' EXPECTATIONS

The concept of being "better-off" in the future as the result of deferring present consumption is most likely a multi-dimensional concept. That is, in addition to being better-off in the sense of one's monetary position, other non-monetary considerations may be relevant, e.g. those arising from a 'controlling interest' in a stock or psychological factors such as status, excitement, or even being

¹Ozga, op. cit., p. 16. Ozga has summarized the criticisms of the operation of observation usually employed in the context of a 'gambling situation'. The major criticism of interest to this study is the inability of observation to distinguish between an individual's affective feelings for the outcomes and the associated weights. (Ibid., pp. 87-94).

able to attend annual meetings and exercising one's voting rights. In this study only the monetary dimension of being better-off, the financial return, will be investigated. In the case of common stocks, Van Horne has modeled an investors' financial return expectations as being multi-outcome expectations about the future cash flows that may accrue to him in the form of capital appreciation and dividend income.² Thus the subjects of investors' expectations of financial return may involve two cashflow elements.

It should be noted, however, that different investors may be more interested in one element of return than another as well as the timing of the return. As Smith has noted

Some investors are compelled by their circumstances to place chief emphasis on the regularity of future income. Others may seek primarily to preserve the principal of their accounts. And still others can afford to seek a large if fluctuating income, even though at greater risk to the safety of their principal. Moreover, some investors are prepared to invest for long periods, and the necessity of realizing their investments in the short run is minimized; whereas others wish only to invest for short periods, so that the expected freedom to liquidate their investments promptly and without loss is important to them.

While the relative emphasis or concern that investors place on capital appreciation and dividend income will vary with the circumstances of the individual and hence, influence his aversion to risk; in the ensuing discussion it is assumed that investors associated with a particular

²van Horne, op. cit., p. 20.

stock are not oblivious to the two elements of return if both elements are potentially involved in the return. That is, a stock's market participants hold expectations for both elements of cashflow.

4.3 THE "OUTCOMES" OF INVESTORS' EXPECTATIONS

As indicated above, various types of investors are viewed as holding expectations about the future return available from a particular stock. For example, an investor might hold an expectation about the market price of a \$20 stock, one year hence. The prospect of such an expectation might contain many or a few, more or less precise outcomes. That is, one investor may hold a prospect containing such possible outcomes as: "probably increase; might stay the same; might decrease". Alternately, another investor might hold a prospect containing such possible outcomes as: not much chance of increasing beyond \$35; slight possibility of increasing to \$30-\$35; fairly good possibility of increasing to \$25-\$28; very probably will increase to \$24; almost sure to increase to \$22; slight chance of dropping to \$18; not much chance of dropping below \$16.

In the first instance both the weights and the subject of the outcomes are less "precise" than in the second. Even when the outcomes are specified in dollar terms there may be gaps in the range of dollar values concerned as well as differences in the perceptions of outcomes

with near outcomes being thought of as discrete values and more distant outcomes as ranges of values.

Neither of these two sets of outcomes is intended to define how any particular investor may perceive the future price of a stock. Rather they are put forward to suggest the direction in which extremes may occur. Assuming a market place wherein investors perceive and reflect upon information that bears on the potential return from a stock, the more 'knowledgeable' and 'concerned' investors may have expectations approximating the more precise prospect indicated above. Carter goes further and proposes that "in order to make choices between different ways of employing funds, an investor will have to 'put a figure' to ideas like 'will go up' and 'will go up a lot'."⁴

In theory at least, the possible outcomes that a stock's price might take on are all positive numbers increasing from zero to an infinitely large number. Carter's position and that of others is, however, that:

The human mind does not, I think carry very easily a picture of a continuous variable. Attention will at once be concentrated on typical outcomes in imagined future situations . . . The number of typical outcomes depends in part on the liveliness of the imagination in conjuring up alternative future situations, and in part on the image-date (i.e. on the time available for disturbing elements to enter in).⁵

⁴ C.F. Carter, "A Revised Theory of Expectations", The Economic Journal, (Dec. 1953), p. 811

⁵ Ibid., p. 814.

The effect of the "image date" on the range of typical outcomes imagined is illustrated by Carter's example:

Suppose I buy 100 shares of Standard Motors at 6s6d. The outcome, in terms of capital value at any given date in the future can be looked at as one of a range of 'conceivable values' at that date. Looking at an hour hence, the range will be narrower - perhaps 6s. to 7s. - For six months it will be wider - 4s. to 12s. Looking ahead five years it might be nil to 20s.⁶

Simplification of the possible outcomes to one or more typical values is a widely held proposition in the literature although the number of outcomes that result from simplification is the subject of substantial disagreement. For example, suggested simplifications include simplification to one or a range of outcomes such as the mean, most likely, highest possible, range, most likely gain (loss) outcome or range of outcomes, focus gain (loss).⁷

In the preceding examples of outcomes in a prospect of price expectations, the outcomes were described in terms of the market price of the stock at some future date. It should however be noted that investors might generate outcomes that would be better described in other terms such as: the percentage changes per year; the absolute percentage change over the entire period of investment horizon; the amount of price appreciation (before or after tax) to be received per year or over the investment horizon, from one or all owned shares of the stock; or other such descrip-

⁶Carter, loc. cit.

⁷See: Angell, op. cit. pp. 5-6; and Ozga, op. cit.,

tions.

Analogous descriptions of outcomes in expectations about future dividend receipts could also be developed representing different degrees of precision. Again, a diverse range of alternate descriptions of the outcomes is possible and similar to that for price-outcomes. For example, dividend expectations may be in terms of the income (before or after tax) to be received per year or over the investment horizon, for one or all owned shares of the stock, the percentage change per year in the annual (or quarterly) dividend, the dividend yield, or other such descriptions.

While the foregoing indicates two separate elements of return expectations, (i.e. price and dividend expectations) this formulation should not be interpreted as implying that all investors have separate price and dividend expectations; some may, and some may not. However, given the distinctly different nature of the dividend and price return provided by stocks it is necessary to recognize these differences in measuring financial return expectations.⁸ In the case of investors having return expectations with outcomes representing combinations of price and dividend return, outcomes may be described as possible percentage returns per year for one or more years,

⁸ The rationale for proposing that the price and dividend elements of total return are fundamentally different in character is expanded upon in Section 5.

with each outcome composed of $x\%$ of capital gains and $y\%$ of dividend yield per year. As indicated earlier such joint outcomes are presumably based on some combination of price and dividend expectations.

As will be detailed subsequently, there is very little indication in the literature as to the actual way in which investors perceive outcomes.

Thus far, various types of investors has been characterized as holding more or less precise price and dividend expectations in which the outcomes could be described in a variety of ways. All other things being equal, those investors who perceive their state of being better-off as being best achieved by capital gains (dividends) might have more specific price (dividend) expectations than dividend (price) expectations. For example, those investors who are particularly interested in the regularity of future income from a stock might reflect on the nature of past dividend payments 'more' than on past price changes, and in so doing arrive at an expectation that dividend payments might be increased by some more or less specific amount in the near future. In contrast, their reflections on the future price of the stock may be less conclusive to them in terms of specific price movements in the future possibly because of less understanding of factors affecting the future price of the stock, or because of a general notion of the long-run price of the stock not decreasing. As was indicated earlier, investors may hold expectations on the

same subject but for a different and earlier time in the future than that of the investment horizon. The outcomes in such shorter term expectations may also be described in any one of many possible ways.

4.3.1 The Outcomes Defined

The above variety of ways in which outcomes can be described has unfortunately not been empirically investigated to determine which one way might be 'most appropriate' for describing the outcomes in price and dividend expectations. Nor by implication is there a consensus among researchers in terms of the descriptions that they have used. In the following paragraphs the descriptions of outcomes used or suggested in the literature are reviewed with a view to assessing their applicability for this study.

Markowitz and Angell combine the price appreciation and income elements of return into one expectation in which outcomes are expressed as a percentage return per unit of time.^{9,10} Additionally, both prefix such outcomes by a qualifier such as "at least" or "or less". For example, Angell describes dividend outcomes such as "at least 6 percent a year for 10 years" and price outcomes as "at least

⁹ Markowitz, *op. cit.*

¹⁰ Angell, *op. cit.*, p. 11.

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25% by the end of ten years". Schlaifer, although not addressing investor expectations, similarly suggests a prefix to outcomes in describing ex ante notions about the future.¹¹

Winkler has suggested that outcomes in an expectation of the future price of a stock might be best described as intervals of possible values. "For a stock selling in the \$5 - \$20 range, intervals of width of \$1 might be chosen . . . in the \$50 - \$100 range, intervals of width of \$4 might be used".¹²

In contrast with the above descriptions of outcomes - usually discussed in terms of analysts' expectations - empirical researchers have tended to ignore the use of prefixes on outcomes as well as the measurement of the dividend portion of financial return. Rather, they have measured the expected price at a particular time in the future.

Pankoff and Virgil had 27 security analysts make both a single future price estimate for a number of stocks and a six-interval probability distribution for the percentage change in a stock's price during a one-year period. "The six mutually exclusive and exhaustive inter-

¹¹ R. Schlaifer, Analysis of Decisions under Uncertainty, Preliminary Edition, Vol. 1. (McGraw Hill, 1967).

¹² R.L. Winkler, "The Quantification of Judgement: Some Methodological Suggestions". Journal of the American Statistical Association, (Dec. 1967), p. 1105.

vals were $(-\infty; -20\%)$, $(-20\%; -10\%)$, $(-10\%; 0\%)$, $(0\%; 10\%)$, $(10\%; 20\%)$, and $(20\% + \infty)$ ". In effect, a qualifier is implicitly attached to each bound; for the upper bound "less than or equal to" and for the lower bound "greater than".¹³

Westerfield had over one hundred college students forecast the 'most likely' price, the 'most likely' price holding the DJIA constant, and an upper and lower limit on the price of a number of securities for several one-year time periods.¹⁴

Turnovsky employed two sets of short-term expectations (covering different periods of time) of "informed business economists" on the Consumer Price Index in the United States.¹⁵ While it is not clear how the possible outcomes were described, they do not appear to have been prefixed as noted above. Instead, they seem to have been single value estimates of the Index.

In addition to these studies that have dealt with 'price' expectations a number of other researchers have attempted to measure expectations on related subjects.

¹³ L.D. Pankoff, and R.L. Virgil, "Some Preliminary Findings from a Laboratory Experiment on the Usefulness of Financial Accounting Information to Security Analysts". Empirical Research in Accounting (1970) p. 13.

¹⁴ R. Westerfield, "A Behavioral Approach to the Investment Management Decision and to the Securities Markets". PhD Dissertation, The University of California, Los Angeles, (1968).

¹⁵ S.J. Turnovsky, "Empirical Expectations on the Formation of Price Expectations," Journal of the American Statistical Association, (Dec. 1970) Applications Section p. 1441.

Cragg and Malkiel obtained single-value estimates from security analysts of five investment firms of "an average annual rate of growth expected to occur in the next five years" in the earnings per share for 185 companies.¹⁶ Similarly, Elton and Gruber collected analysts' forecasts of future earnings per share for two and three-year periods for 180 corporations.¹⁷ These forecasts were apparently single-value estimates of the magnitude of earnings per share at the indicated time horizons.

There is little consistency evidenced among the above examples of research and suggestions for dealing with expected price or other future outcomes. Basically, differences in definitions of outcomes have to do with:

- (a) the number of outcomes considered in the prospect; and,
- (b) the words used to describe the outcomes.

These differences, the general tendency to ignore dividend expectations, and the fact that the descriptions of expectations were generally made with analysts in mind do not provide any clear direction as to the description of outcomes that might be most appropriate for measuring investors' expectations via a mail questionnaire. However,

¹⁶ J.G. Cragg and E.G. Malkiel, "The Consensus and Accuracy of Some Predictions of the Growth of Corporate Earnings," Journal of Finance (March, 1968), p. 68.

¹⁷ E.J. Elton, and M.J. Gruber, "Earnings Estimates and the Accuracy of Expectational Data," Management Science (April, 1972), p. B-409.

in view of the considerations of the subjects of investor expectations discussed earlier in this chapter and the nature of expectations in general discussed in Chapter 2, the various measures and suggestions indicated above are amenable to adaptation for this study. That is, recognizing the possible diversity of the way in which investors may perceive of the return from owning a stock and the hypothesized nature of expectations proper, any description of outcomes for the purpose of study must attempt to be flexible to accommodate differences among individuals. Thus, the prospect of an expectation about the capital return portion of an investor's return is formalized as consisting of a number of more or less possible outcomes which are tentatively defined as mutually exclusive intervals of the possible market prices per share that a stock may have by the time of any particular investment horizon.

This definition explicitly incorporates the notion suggested by Winkler and used by Pankoff and Virgil that outcomes be considered as ranges of possible values.^{18,19} It also specifies outcomes as absolute values in the interest of simplicity rather than percentage changes

¹⁸ R.L. Winkler, "The Quantification of Judgment: Some Methodological Suggestions," Journal of the American Statistical Association (Dec., 1967), p. 1105

¹⁹ Pankoff and Virgil, op. cit.

and provides for a multi-outcome prospect. Furthermore, this definition specifies expectations as being "by" a time in the future rather than "at" a time in the future to better reflect the contingent nature of an investor's investment horizon for a particular stock.

The prospect of an expectation about the dividend portion of an investor's return is similarly formalized as consisting of a number of more or less possible outcomes which are tentatively defined as mutually exclusive intervals of possible cash dividends per share per year that may be paid by the time of any particular investment horizon. As in the case of the price expectation, the number and size of the intervals would be determined in relation to the existing level of the cash dividend per share per period.

Although not indicated in the foregoing, these definitions of outcomes in a price or dividend expectation were developed in conjunction with the definition of the weights associated with these outcomes. The interrelated nature of the definitions of the outcomes and weights will be discussed in the next section.

4.4

THE NATURE OF THE WEIGHTS

The preceding section has been concerned with the description of the outcomes in words that are relevant to investors' perceptions of outcomes. As in the case of

definitions of the outcomes, the definition and elicitation of the weights associated with the outcomes by the operation of introspection involves choosing the words by which the weights are to be described and elicited. Different writers have suggested different sets of words depending on their particular conception of the nature of the weights.

Two different types of descriptions have been proposed. One type describes the weights as the degree of (positive) belief in the occurrence of the particular outcome (e.g. Savage,²⁰ Angell,²¹ and, Schlaifer²²) and will be referred to as the "probabilistic school". The second type describe the weights as the degree of disbelief in the occurrence of the particular outcome (i.e. Shackle²³).

The essence of the Probabilistic Approach is summed up by Angell as the reconciliation of uncertainty into risk:

²⁰ L.J. Savage, The Foundation of Statistics (Wiley, 1954).

²¹ Angell, op. cit.

²² Schlaifer, op. cit.

²³ G.L.S. Shackle, Decision, Order and Time (Cambridge, 1961), Chapter 10.

... the investor tries to deal with the problems of uncertainty as if they could be handled by use of the technique of mathematical expectation or by some modification thereof: that is, as if true uncertainty could somehow be transmuted, and could be replaced by a statement presenting a distribution of possible outcomes with a coefficient of probability attached to each outcome, and itself having prediction value.²⁴

Thus weights are interpreted as probability weights. In contrast the non-probabilistic approach restricts the scope of introspection to experiences and sensations and, in so doing, excludes positive belief from being a legitimate subject of introspection. The experience that Shackle employs to describe the state of mind embodying the degree of confirmation is that of "surprise". Shackle's opinion is that at the time of the subject, the sensation that one experiences at the occurrence (non-occurrence) of some event previously judged to be impossible (perfectly possible) is surprise. Surprise is experienced because one previously disbelieved in the occurrence of the event as the result of the recognition of some disabling circumstance. At the time of the expectation, however, one can only imagine the surprise that one would experience at the time of the subject if a particular outcome did not come off; therefore, Shackle proposes the "degree of potential surprise" as the appropriate weight for an outcome.

²⁴ Angell, op. cit., p. 3.

The degree of potential surprise is characterized as a continuous psychic variable, allowing many, or perhaps all conceivable, degrees of possibility to be distinguished, named, and ordered, and even perhaps located against a fixed background scale or grid of accepted fixed levels so as to be treated as measurable.

As indicated earlier, consistency is required among terminal and intermediate expectations. Also, the weights must be consistent within any set of outcomes of either type of expectation. Thus by defining weights as probabilities, elicited weights must adhere to the rules of probability calculus; specifically, the Rules of Addition and Multiplication of Probabilities. Herein resides a major criticism of the probabilistic approach which stems from the observed non-additivity of subjective probabilities. While Shackle has developed criteria for consistency of potential surprise, there is no such additivity requirement.²⁵

The significance of the additivity requirement in the controversy over the 'right' way to describe individuals' feelings of uncertainty is reflected in an assessment of the validity of the criticisms levelled against the probabilistic approach. All of the criticisms originate in the condition of additivity that if violated leads to logical inconsistencies in the assigned weights. That is, probabi-

²⁵ For a critique of Shackle's consistency rules, see Ozga, op. cit., pp. 96-106.

lity is limited in total amount so that generally speaking the greater the number of outcomes the smaller the share. For example, whenever an outcome is considered to be "perfectly plausible", credible, or possible, the weight should be at its maximum, i.e. unity. However, if more than one outcome is perfectly plausible (i.e. profit of \$10 and of \$11) then assigning unity to both would violate the rule of addition. The counter to this argument however is that the absolute levels of probability are irrelevant for decision purposes. If one desired that all probabilities should sum to unity then one need only multiply all absolute probabilities by an appropriate factor. Winkler has proposed such a "normalizing" remedy.²⁶ In defense of the use of subjective probabilities, it should also be noted that a major restriction on the applicability of potential surprise concept results from its non-additive nature. For example, decision theory requires an additivity requirement; otherwise, an individual would be indifferent to the number of cards in a deck if he were trying to draw, say, the queen of hearts. Arrow has evidenced a similar objection to Shackle's theory when he expressed the view that "the elimination of all probability elements

²⁶Winkler, op. cit.

from Shackle's theory cannot be regarded as satisfactory".²⁷

Angell has added a further criticism to that portion of Shackle's theory which postulates that an investor may simultaneously attach zero degrees of potential surprise to both a particular gain outcome (or range of gain outcomes) and a particular loss outcome (or range of loss outcomes).

Angell notes that "the investor is presumably neither irrational nor philosophically indifferent to worldly matters: he is unlikely to regard both a particular gain and a particular loss as outcomes of zero surprisingness".²⁸

In summary, Shackle's concept of the weights associated with outcomes does not appear to be superior to the probabilistic approach and in some aspects it appears inferior. His reflections on the ability of introspection as a vehicle for eliciting cognitions or positive beliefs is interesting and warrants further study which unfortunately is beyond the scope of this research.

4.4.1 Eliciting the Weights

The precision with which probability weights can be ranked by introspection has been questioned on the grounds

²⁷ Arrow, op. cit., p. 405.

²⁸ Angell, op. cit., p. 5.

that "we do not feel or see any numbers when we think of outcomes . . . as qualified". However, one may be able to arrive at numerical values for these weights if the "proper questions" are asked.²⁹ The proper questions are those that pertain to differences in the weights assigned. Several different sets of questions have been employed or suggested in the literature.

(a) Consumer survey research has simply asked the subjects to indicate how certain or uncertain they are that they will undertake a particular action. In some instances individuals were provided with a scale of probabilities and corresponding words or phrases, e.g., Hughes and Naert³⁰ and the U.S. Bureau of the Census.³¹

²⁹ Ozga, op. cit., p. 84.

³⁰ G.D. Hughes, and P.A. Naert, "A Computer-Controlled Experiment in Consumer Behavior". The Journal of Business.

³¹ U.S. Bureau of the Census, Consumer Buying Indicators: Recent Purchase of Coro and other Durables and Expectations to Buy during the Months Ahead, Survey Data through 1969, Current Population Reports, series p. 65, no. 25, March 11, 1969 (Washington, D.C.: Government Printing Office, 1969), p. 6.

The scale used by Hughes and Naert is provided below:

Probability Scale

Certain that the specific event will occur.	91 - 100
Almost sure	81 - 90
Very probable	71 - 80
Probable	61 - 70
Good possibility	51 - 60
Fairly good possibility	41 - 50
Fair possibility	31 - 40
Some possibility	21 - 30
Slight possibility	11 - 20
Very slight possibility	1 - 10
No chance that the event will occur	0

(b) Motivational research has provided experimental subjects with probability scales and asked them to indicate, for example, their subjective probabilities of success at a particular task. Feather employed a 5-inch scale numbered from 0 - 100 in equal steps of twenty with the statement "no chance at all" at one extreme of the scale; the statement, "an even chance" at the middle of the scale; and the statement, "completely certain" at the other extreme of the scale".³²

³² N.T. Feather, "The Relationship of Expectations of Success to Achievement and Test Anxiety," Journal of Personality and Social Psychology (1965), p. 121.

(c) Winkler has suggested that probabilistic weights for multi-outcome price expectations could be assessed as a discrete or continuous distribution of outcomes using outcomes defined as intervals of possible prices or discrete possible prices respectively.³³

Pankoff and Virgil employed the former methodology for assessing probability weights but instead of using intervals of prices they used intervals of percentage change in price.³⁴

(d) Similar to the suggestion by Winkler, Schlaifer has proposed a method for the "direct judgmental assessment of probability distributions"³⁵ based on an assessment of cumulative rather than discrete probabilities. Schlaifer suggests that this method of assessing cumulative probabilities is not only less time consuming, particularly in the case of a large number of outcomes, but also, the issue of non-additivity may be avoided. Angell, while not as elaborate as Schlaifer, has suggested the same general procedure for the assessment of investor's expectations.³⁶

Of the foregoing examples of methods of eliciting probabilistic weights associated with outcomes, that used

³³Winkler, op. cit.

³⁴Pankoff and Virgil; op. cit.

³⁵Schlaifer, op. cit., Chapter 8.

³⁶Angell, op. cit.

by Hughes and Naert and suggested by Winkler appears to be the most suitable for eliciting weights from randomly selected individuals. That is, a discrete probabilistic scale does not require the presumption of statistical sophistication of respondents.

4.5 THE TIME HORIZON OF EXPECTATIONS

In the preceding discussions of the subjects of investors' expectations and the operational definitions of the outcomes and weights in the prospects of these subjects, the time horizon of expectations was assumed to be given. However, as indicated in Chapter III, the time horizon applied to an expectation has a substantial impact on the magnitude and uncertainty of the expectation. Hence, the time horizon of the expectation must be incorporated into the operationalization of the construct of expectations to provide a frame of reference.

In operationally defining the time horizon of an expectation the distinction must be made between the period of time that an owner of a stock might expect to continue to own the stock and the most distant point in time for which an owner may have an expectation about the price and/or dividend of a stock. The period of time from the present to the most distant point in time for which an owner might have an expectation is not necessarily the same as the period of time that he might expect to continue to

hold the stock. For example, an investor might invest temporarily excess funds in a particular stock with the expectations that he might liquidate his investment in order to purchase a new car in one year. However, this ^{eg} same investor might hold an expectation for the same stock at a more or less precise point in time beyond one year.

If the scope of this study were restricted to the expectations of only buyers or owners of particular stocks, either the holding period or the time to the most distant time of an expectation could be used to anchor expectations. However, the inclusion of security analysts' and sellers' expectations in the study precludes the use of a time horizon associated with stock ownership; such a reference point would simply be irrelevant to analysts and sellers who did not have an ownership interest in the stock. Thus, for the purpose of this study the time horizon of an expectation is defined as the most remote point in time in the future for which an individual holds a return expectation. The relevance of this reference point for return expectations is independent of the ownership-interest of the expecting individual.

Adoption of this definition of the time horizon of expectations for completing the operational definition of expectations does not provide for individuals having different time horizons for the different elements of financial return. That is, it is assumed that an individual's most remote price expectation and his most remote

dividend expectation are roughly coincident in time. To the extent that price and dividend expectations are causally related, this assumption is considered to be reasonable.

4.6 RESOLUTION OF ALTERNATIVE DEFINITIONS

As indicated earlier, the description of the outcomes, the means of eliciting the weights, and the reference of expectations to a more or less specific time in the future are interrelated considerations. That is, if one were to elicit probabilistic weights by means of a cumulative or discrete description of outcomes, it would be necessary to describe outcomes in appropriate terms, e.g., "equal to or less than", "between" various values. In view of the alternate specification of outcomes indicated earlier and the related interpretation of indicated possibilities, investigations were undertaken to select that means of eliciting expectations from individual investors that provided a reasonable representation of investors' expectations. To make this judgement regarding alternate descriptions, empirical criteria were developed and tested by interviewing investors and conducting a mail survey of recent purchasers of a listed common stock.

4.6.1 Empirical Criteria

To assess the extent to which the measured expectations reflected investors' expectations two objective

criteria were employed. These criteria pertained to the relative shape and magnitude of the measured price and dividend expectations. The rationale for these criteria is based on the fundamentally different nature of the behavior of cash dividends and the market price of common stocks referred to earlier in this chapter. This rationale is developed below.

In a world of uncertainty, the variability of a common stock's dividend return can reasonably be expected to be less than that of the capital return. This fundamental difference is attributed to the managed nature of a company's annual dividend.

The dividend paid by a company is a managed variable under the direction of the firm's board of directors and is therefore, not directly under the influence of stock market participants. In contrast, the price of a stock is not a variable under the direction of the firm's board but rather fluctuates in response to a variety of influences. Recognizing the managed return of dividends, K.V. Smith has proposed and developed empirical evidence supporting the "increasing stream hypothesis of corporate dividend policy" which states that-

The board of directors deliberately avoids dividend cuts if at all possible and attempts to construct over time an increasing, or at least a non-decreasing, record of cash dividend payments.³⁷

³⁷ K.V. Smith, "Increasing Stream Hypothesis of Corporate Dividend Policy," California Management Review (Fall, 1971), p. 57.

Smith's support for this hypothesis was based on an investigation of the dividend change history of approximately 900 companies during the period 1949 - 1966.

The implications of Smith's pragmatic hypothesis for investor expectations of future dividend cash flows are significant. If investors are or become aware of the past behavior of the dividend cash flow from a stock which has had a non-decreasing dividend, then their expectations of future dividend changes could reasonably be expected to have a lower bound approximately coincident with the existing dollar-dividend (ignoring stock splits).

In contrast, investor recognition of the unmanaged nature of a stock's price behavior would not bound their expectations for future price change at the current price of the stock. Thus, while investor expectations of the future price behavior of a stock that was associated with a non-decreasing dividend could reasonably be expected to involve variability below the present price of the stock, expectations for the stock's dividend could be anticipated as involving at least less variability below the present dividend value.

The above discussion regarding the variability of price and dividend expectations below the present price and dividend rates does not resolve the issue of the similarity of the variability and other momental characteristics of price and dividend expectations of a common stock. To

address the larger question of differences in that variability between price and dividend expectations it is necessary to propose that the managed nature of dividends also precludes unlimited upside dividend potential where no such constraint is theoretically imposed on the upside behavior of stock prices. If investors recognize this proposition, then it could also be anticipated that expected variability above the present dividend level reflected in investors' expectations would also be less than that reflected in investors' price expectations. Thus, total variability reflected in price expectations would be expected to be greater than that reflected in dividend expectations.

Two empirical hypotheses result from the foregoing considerations and are premised on the presumption of a stock for which Smith's hypothesis is appropriate, and, investor awareness of the managed nature of a stock's dividend vis à vis its market price.

Hypothesis 4.1

An investor's price expectations for a particular stock should reflect greater uncertainty (variability) than his dividend expectation.

Hypothesis 4.2

An investor's dividend expectation should reflect less downward variation from the current dividend rate than his price expectation in relation to the current market price.

It should be noted that the above two hypotheses are directed specifically at expectations for stocks whose annual dividends are consistent with the increasing stream hypothesis. No a priori relationships between price and dividend expectations for stocks paying a fluctuating dollar dividend is implied by the increasing stream hypothesis.

4.6.2 Empirical Testing of Validation Criteria

In essence, the investigation of alternate ways of describing outcomes and weights consisted of interviewing individual investors and subsequently mailing questionnaires to 204 recent purchasers of a publicly traded stock. The data provided by these investigations was analysed in accordance with the foregoing hypotheses.

This preliminary study involved investigating three descriptions of weights and outcomes for price and dividend expectations for an investor-supplied time horizon. One description asked for was in terms of a three point summary of expectations involving an investor-supplied upper limit, lower limit, and most likely value of a return element (Beta description). The second asked for a multi-outcome description in the form of a cumulative probability distribution (cumulative description). The third asked for a multi-outcome description in the form of a discrete probability distribution (Discrete description). Investors who were asked to provide a cumulative or discrete description of their price and dividend expectations were provided with

a probability scale (similar to that employed by Hughes and Naert) and 23 mutually exclusive interval outcomes for each return element. The type of description asked of a particular investor was randomly determined.

As a result of this investigation, the discrete description of investor expectations was found to be superior in terms of conformance with the foregoing two hypotheses. This judgement was based on the observed evidence of beta descriptions resulting in dividend expectations having greater variability than the corresponding price expectations. Additionally, investors frequently failed to distinguish between the upper limit and the most likely value for a price or dividend description. Furthermore, investors' beta descriptions appeared to be truncated in relation to both the cumulative and discrete descriptions.

The discrete description was judged as being superior to the cumulative description on the basis of the incidence of cumulative descriptions resulting in dividend distributions having greater variability than the corresponding price distribution. Furthermore, a number of investors who were asked for a cumulative description of their expectations completed the questionnaire as if a discrete distribution had been asked for. This difficulty with understanding cumulative probability concepts was evidenced by one respondent who wrote: "Your wording of this question is confusing - 'less than \$150' could mean

anything from \$150 to \$1.00. If you had said between \$120 and \$150 for questions, I could have answered it".

4.7

SUMMARY

The objective of this chapter was to operationally define the remaining undefined term employed in the hypotheses specified in Chapter III; namely "financial return expectations". Essentially this objective involved applying the concepts developed in Chapter II pertaining to expectations in general to the special case of investor expectations.

Initially, consideration was given to specifying the subject(s) of investors' expectations as being dividend income and capital changes. It was then noted that future expected outcomes of these subjects could be defined in several different ways. Furthermore, it was noted that the definition of outcomes and the definition of the weights associated with the outcomes were interdependent. As a result of arguments for-and-against different definitions of outcomes and weights, investors' price and dividend expectations were formalized as consisting of a number of more or less possible (probabilistic) outcomes which were tentatively defined as mutually exclusive intervals of possible prices (dividends) that a stock might have by a more or less precise time in the future.

This tentative operational definition of investors' expectations was investigated in relation to

cumulative and beta descriptions of expectations in accordance with two hypotheses regarding the relative shape of price and dividend expectations. The results of this investigation indicated that of the three methods, that involving a discrete description of expectations was most consistent with the hypothesized shape criteria.

In the next Chapter the methodology of obtaining the expectations of market participants for a selected group of stocks is presented along with the method of analyzing these expectations for inter-and intra-stock differences.

CHAPTER IV

METHODOLOGY

In Chapter IV the operational definition of the hypotheses developed in Chapter III was completed with the specification of the method for measuring investors' expectations of financial return. The methodology of measuring and analyzing investor expectations for several stocks is detailed in the present Chapter. Essentially, methodological considerations pertain to the standardization of the measuring devices for a selection of stocks, the selection of stocks for study, the data collection procedures, the method of summarizing measured expectations, and the statistical analysis of inter- and intra-stock differences in expectations.

5.1 OPERATIONAL CONSTRAINTS ON THE ELICITATION OF INVESTOR EXPECTATIONS

As indicated in Chapter IV empirical evidence supports the employment of a discrete distribution to describe investors' expectations. In adopting this method of eliciting expectations for testing the hypotheses developed in Chapter III, several practical considerations must be taken into consideration when developing questionnaires for several stocks. For each stock involved in a study of this nature, the number and relative range of outcomes provided for both price and dividend expectations must be approximately identical. This consideration is

necessary to avoid biased responses resulting from asking "different" questions either across stocks, or, for price and dividend expectations for any particular stock.

Furthermore, the number and range of outcomes to be provided in a set of expectation questions in essence determine the sensitivity of the measuring instrument. Here, sensitivity is reflected in the ability of the measures to distinguish different perceptions of risk and return. The more outcomes commented on by respondents and the smaller the interval involved in the outcome, the more sensitive the measuring instrument will be to small differences in expectations of risk and return. Offsetting the desirability of a highly sensitive measuring device is the unfavorable effect that a very detailed set of questions is expected to have on the response rate to expectation questions.

The resolution of this conflict in priorities in the case of investor expectations is ultimately a matter of judgement and experience. Preliminary investigations indicated that response rates of approximately 25% could be obtained with approximately 20 interval outcomes.

As a result of these considerations, the following guidelines were adopted in constructing questionnaires designed to elicit investors' expectations of future price and dividend behavior. The results of these guidelines are presented in Appendix I.

- (a) To elicit an investors' time horizon in a manner independent of the ownership status.

of the individual, an indirect procedure was adopted. (Questions 3a, 3b, and 3c Appendix I).

(b) Nineteen mutually-exclusive intervals would be used for distributions. Intervals would encompass a range providing for roughly a 400% increase, and a 100% decrease from the current value of the return element (price or dividend).

(c) Interval sizes would vary; intervals nearest the current value of the return element being smaller than those more distant from the current value. This procedure was necessary to minimize the number of possible outcomes that the respondent was required to assess.

<u>Range</u>	<u>Approximate Interval Size</u>
Current price + and - (50%) (dividend)	10% of current value
+ and - (51-100%)	20% of current value
+ (101% - 200%)	50% of current value
+ (201% - 400%)	100% of current value

(d) The probability scale to be employed is a modification of the Hughes and Nahert scale and Feather's scale.

As indicated in Appendix I, a respondent first completed the time horizon questions and then the immediately following questions asked him for his price and

dividend expectations in relation to that time horizon.

5.2 STOCK SELECTION

The number and nature of stocks selected for this investigation of investors' expectations of financial return was constrained by several operational and theoretical considerations.

In effect, budgetary limitations dictated that no more than three stocks could be involved in the study. Furthermore, the co-operation of the investment community necessary for this study was considered to be more readily available if the administrative demands inherent in the study were minimized.

Given these budgetary and administrative limitations the actual selection of stocks to be investigated was contingent upon obtaining the co-operation of the senior management of three companies whose stock could be expected to satisfy four basic conditions.

- (a) The common stock of the several companies had to represent different risk categories with respect to the nature of the financial return expected from these stocks. Given that the research questions of this study attempted to distinguish stocks on the basis of their risk characteristics, selection of stocks representing different risk situations was a necessary condition to begin

to address the major research questions.

(b) The selected common stocks had to involve annual dividends that were paid in cash to ensure that dividend questions would be consistent across stocks and with price expectations.

(c) The common stocks of the several companies had to be actively traded in the market place to ensure that an adequate number of transactions could be expected during a relatively short period of time.

(d) The common stocks of the companies had to be widely held to provide for the opportunity of obtaining a representative cross-section of expectations for a particular stock.

The actual selection of stocks took place during a two-month period beginning in January 1973 and involved an examination of the daily number of trades made in all stocks listed on the Toronto Stock Exchange. This investigation led to a limited list of stocks which satisfied the condition of being sufficiently actively traded to merit initial consideration for selection. Three stocks were ultimately selected in consultation with co-operating investment dealers and inspection of beta coefficients¹.

¹ Although beta coefficients reflect the systematic volatility of a stock's price in relation to the market index and not the total risk (systematic and non-systematic components), this data was taken into the stock selection process as a proxy for the relative total risk of the three stocks.

Market behavior statistics for these stocks are presented in Table 5.1. All three of the indicated stocks were among the top twenty stocks in Canada in terms of dollar volume of trading in 1972. Stock A was a major utility, Stock B a metals resource company, and Stock C a petroleum resource company. Based on the beta coefficients Stock A was indicated as being the least risky; Stock B the most risky; and Stock C as being of intermediate risk in relation to A and B.

As indicated in Chapter III the research hypotheses deal with relative ex ante riskiness as measured by the variance of expectations rather than relative ex post riskiness such as that provide by beta coefficients. Thus it was necessary to assess the relative riskiness of future returns from the selected stocks. For the three stocks, Stock A was judged (in consultation with the co-operating investment dealers) as offering the least risky future return. No conclusive judgement was made regarding the future relative riskiness of the return from Stocks B and C. Both were assessed as being more risky than Stock A but in view of the then existing uncertainty in the resource industries, neither stock would be specified as being more risky than the other.

These judgements have substantial implications for the statistical testing of the inter-stock hypotheses presented in Chapter III. Essentially, these judgements

Table 5.1

STOCK BEHAVIOR STATISTICS (a) (b)

<u>Company</u>	<u>Alpha</u>	<u>Beta</u>	<u>R²</u>
A	-.347	.412	28.8
C	.010	.821	24.4
B	-.003	1.054	40.2

(a) Computed from the Financial Research Institute monthly price file for 99 Canadian Stocks for the period January 1963 to January 1973.

$$P_t^s / P_{t-1}^s = \text{alpha} + \text{beta} (P_t^m / P_{t-1}^m) + e$$

where P_t^s = monthly closing stock price

P_t^m = monthly closing level of the Toronto Stock Exchange Industrial Index.

(b) A stock's beta coefficient is determined by plotting changes in the stock's price against changes in a market index; the slope of the resulting line is the stock's beta factor. When risk is defined as volatility per se in relation to the market index the beta coefficient is an objective proxy for the relative risk of a security. The alpha or intercept of the stock's characteristic line indicates the percentage change in the stock's price that is due to factors other than the market itself. See Modigliani and Pogue op. cit.

allow directional significance tests of the applicable hypotheses for Stock A/Stock B and Stock A/Stock C inter-stock comparisons of expectations. In contrast only non-directional statistical tests could be applied in the case of Stock B/Stock C inter-stock comparisons.

5.3 INVESTOR SAMPLING

As indicated in Chapter III this study's research hypotheses pertained to the expectations of buyers, sellers, owners, and security analysts associated with the selected stocks. Investment dealers co-operated in the study by transmitting questionnaires to buyers, sellers and analysts. The selected companies co-operated by transmitting questionnaires to owners of their stock.

Sixteen investment dealers participated in the study by mailing questionnaires to individual clients who transacted in (bought or sold) any one of the three stocks during the period March 19, 1973 to April 13, 1973.² The sixteen investment houses involved in this study represented both large and small retail and institutional firms. While procedures varied among dealers for identifying individual transactors, questionnaires were generally

²As originally proposed, the study was expected to require only ten trading days, however, reduced transactions in the three selected stocks just prior to and during the study resulted in the study involving 20 trading days. Only twelve of the sixteen firms participated for the full 20 days.

mailed by dealers to their clients from one to three days after the day of the transaction.³ Security analysts employed by these firms completed similar questionnaires during the time of the study.

Each of the three selected companies forwarded questionnaires to a sample of individual investors randomly drawn from their shareholder lists.⁴

5.4 SUMMARIZING AN INVESTOR'S EXPECTATIONS

The summary statistics of an investor's expectation that were of interest in this study were the mean, the standard deviation, and the skewness of each investor's price and dividend expectation and the mean and standard deviation of the combined return. The computation of these statistics is outlined in the following subsections.

5.4.1 The Mean

The expected value of a distribution was computed by:

- (a) annualizing the mid-points of each of the 19 interval-outcomes to reflect the investor-provided time horizon; i.e. determining

³The sixteen investment dealers were not randomly selected from all possible investment dealers because of budgetary and administrative considerations.

⁴An attempt to screen out child recipients of the questionnaires on the basis of size of shareholdings eliminated mailings to shareholders owning less than ten shares.

the compound rate of change from the base value of a price or dividend to the value of each interval mid-point.

(b) normalizing the probabilities assigned to each of these interval-outcomes by the investor so that the normalized probabilities summed to unity.

(c) computing the arithmetic and geometric means of the particular distribution as indicated below.

$$\bar{x} = \sum_{i=1}^K p_i x_i$$

$$\text{and } G = \prod_{i=1}^K x_i^{p_i}$$

where K = the number of non-zero normalized probabilities,
 < 19 ,

x_i = annualized interval mid-points for the i^{th} interval,

p_i = normalized investor-assigned probability for the i^{th} interval

$$\sum_{i=1}^K p_i = 1$$

$\bar{x}$ = the arithmetic mean expected rate of change,

and, G = geometric mean expected rate of change.

A simplified example involving a three point distribution will illustrate the calculations involved in computing the mean value of a hypothetical price expectation. A base price of \$25.00 and a time horizon of 1 year are assumed. The base price actually employed in the study

was the closing price of the stock on the day preceeding the date in which the investor completed the questionnaire. Price intervals and assigned probabilities are presented in Table 5.2, columns (1) and (2) respectively.

Interval mid-points shown in column (3) of Table 5.2 were computed by averaging the extreme values defining the interval range. These mid-points were annualized by computing the compound rate of return implied by the base price, the interval mid-point, and the indicated time horizon. The annualized interval mid-points are indicated in column (4) of Table 5.2 and are in the units of compound annual rates of change in the price of the stock. It is these rates of change (x_i 's), weighted by the corresponding normalized probabilities (p_i 's), that were used to compute the moments of the price distribution.

Normalized probabilities are shown in column (5) of Table 5.2 and are computed by dividing assigned probabilities by their sum. The above computational procedures employed to arrive at a mean price or dividend expectation result in an investor's price or dividend expectation having the units of 'annual compound rate of change' expected. Alternatively, these same results - at least in the case of the arithmetic mean - could have been obtained by computing the mean of the interval mid-points and then determining the compound annual rate of growth in the base price (dividend) necessary to arrive at the

mean price or dividend by the horizon of the investors' expectation. However, had this procedure been employed the mean of the distribution would have been in one type of units (rate of change) and the corresponding standard deviation in a second type of units (dollars).

At this point it should be noted that the reason for computing both the arithmetic and geometric mean of price and dividend distributions is also related to the annualization of the interval outcomes. Essentially, when working with distributions involving rates of change, a spurious correlation may result between the mean and variance of the distribution if the distribution is skewed. Ardetti has reported that "... Professor Merton Miller has pointed out that a natural positive correlation exists between the arithmetic mean and the variance when the distribution (of annual rates of return) is skewed. In fact, the covariance between the first and second moments is directly proportional to the third moment - $COV(u_1 u_2) = \frac{1}{n} u_3$. This spurious correlation result is less likely when the geometric mean is used".⁵

The implication for this study of the foregoing observation pertains to the measure of central tendency that should be used in comparing the expected magnitude (rate of change) of price or dividend expectations. If

⁵ Ardetti, op. cit., p. 24.

Table 5.2

AN EXAMPLE OF SUMMARIZING
A MEASURED PRICE EXPECTATION

(1)	(2)	(3)	(4)	(5)
Price Interval (\$)	Assigned Probability	Interval Mid-Point (\$)	Annualized Mid-Points (Rate of change)	Normalized Probability
41-50	40	45.5	.82	.333
31-40	60	35.5	.42	.500
15-30	<u>20</u>	22.5	-.10	<u>.167</u>
	120			1.000

Arithmetic Mean Expected Price ($\bar{P}$)

$$\bar{P} = \frac{.333 \times 45.5}{15.1515} + \frac{.500 \times 35.5}{17.75} + \frac{.167 \times 22.5}{3.7575} = \underline{\$36.66}$$

Arithmetic Mean Expected Rate of Change*

$$= (.333 \times 1.82 + .500 \times 1.42 + .167 \times .90) - 1 = .466$$

Note: $\$25.00 \times 1.466 = \underline{36.66}$

Geometric Mean Expected Rate of Price Change*

$$G = \frac{(1.82^{1/3} \times 1.42^{1/2} \times .90^{1/6})}{1.221 \times 1.1917 \times 0.9826} - 1.0 = .429$$

Note: $\$25.00 \times 1.429 = \underline{\$35.72}$

*Annualized mid-points are converted to Holding Period Returns to avoid computational difficulties encountered when negative rates of return are involved.

there was no need for concern about a spurious correlation between the magnitude and the variance of a distribution of annualized rates of return then the arithmetic mean of investors' expectations could be compared in inter- or intra-stock hypothesis tests. This mean rate when applied to a base price or dividend would result in the same mean price or dividend that would have resulted had the interval mid-points not been annualized but simply averaged. However, concern for a spurious correlation between the mean and variance requires that inter- and intra-stock comparisons of these characteristics of price or dividend expectation involve the geometric mean of distributions. It should be noted however that the geometric mean tends to understate the rate of change that is indicated by the arithmetic mean. In the example presented in Table 5.2 the geometric mean was in fact smaller than the arithmetic mean. Latané and Tuttle have noted that, "For any distribution, the geometric mean will be less than the arithmetic mean except when all values of the distribution are equal . . . the greater the dispersion, the greater the spread between the two means".⁶

The dilemma posed by the possible correlation between the arithmetic mean and variance of an expectational

⁶ H.A. Latané and D.L. Tuttle, Security Analysis and Portfolio Management (Ronald Press, New York, 1970) p. 212

distribution and the understatement of the true expectation by the geometric mean was resolved by employing the geometric mean in hypotheses tests involving the mean of price and dividend expectations. Hypotheses tests involving the internal rate of return implied by the price and dividend expectations employed the arithmetic mean of these distributions.

5.4.2 The Standard Deviation

As a measure of dispersion (risk) of an individual's price or dividend distribution the standard deviation (S) was computed as follows:

$$S = \sqrt{\sum_{i=1}^k p_i (x_i - \bar{x})^2}$$

The standard deviation is in the same units as those of the mean of the distribution; namely, 'compound annual rate of change'.⁷

5.4.3 Skewness

The skewness (SK) of an individual's price or dividend expectations was computed in terms of the semi-variance of the distribution:⁸

⁷ The standard deviation for the example given in Table 5.2 is 0.310; had the geometric mean been used the standard deviation would have been 0.313.

⁸ Markowitz, op. cit. p. 191

$$SK = \frac{S^2}{2 \times S_L}$$

where S^2 = the total weighted sum of the squared deviations.

where S_L = the weighted sum of the squared deviations below the mean

A skewness of 1.0 indicates that the sum of the squared deviations below the mean is equal to the sum of the squared deviations above the mean; that is, the distribution is perfectly symmetrical. A skewness greater than 1.0 indicates that the distribution is skewed to the right (high-end) while a skewness less than 1.0 indicates that the distribution is skewed to the left (low-end).⁹

The measure of asymmetry was used in preference to the third moment of a distribution because of the added information provided. For example, a skewness of 1.20 as measured in the above form indicates not only that the distribution is skewed to the right but additionally that 41.67% ($1/(2 \times 1.20)$) of the sum of the squared deviations are below the mean of the distribution. In contrast a third

⁹The example presented in Table 5.2 indicates a phenomena that may occur when the geometric mean is used to compute the variance of a distribution. Since $G \neq \bar{x}$, squared deviations about G may be greater than those about $\bar{x}$, and therefore the skewness computed on the basis of G will be larger than if computed on the basis of $\bar{x}$. In this example the skewness computed on the basis of deviations about G was 1.04, indicating a distribution skewed to the right; when computed on the basis of deviations about the arithmetic mean, the skewness was 0.88 indicating a distribution that was skewed to the left. These conflicting results were resolved by reference to the original interval mid-point data which had a skewness of 0.88. That is, use of the geometric mean in computing variances and semi variances could result in substantially biased results.

moment of .20 while indicating a positively skewed distribution, does not provide the above additional information.

5.4.4 Total Expected Return

The total return expected by an investor, before taxes and commissions and assuming annual receipt and reinvestment of dividend income was computed as the internal rate of return (r) implied by an individual's price and dividend distributions.

$$P_0 = \frac{E_A(D_1)}{(1+r)^1} + \frac{E_A(D_2)}{(1+r)^2} + \dots + \frac{E_A(D_t)}{(1+r)^t} + \frac{E_A(P_t)}{(1+r)^t}$$

where P_0 = base price of the stock

t = the number of annual periods involved in the individual's expectation time-horizon.

$E_A(D_t)$ = the dividend expected to be received at the end of the t^{th} period based on the arithmetic mean annual rate of change expected in the dividend.

$E_A(P_t)$ = the price expected to be realizeable at the end of the t^{th} period based on the arithmetic mean annual rate of change expected in the price.

If fractional time horizons were indicated the individual was assumed to receive the appropriate fraction of the expected annual dividend.¹⁰

¹⁰ If an investor provided only a price distribution it was assumed that he did not expect the stock's annual dividend to change and therefore the current dividend was used for all D_t 's. By implication this assumed the dividend distribution would have a zero variance. Alternately if only a dividend expectation was provided and individual was assumed to have a single point price distribution with zero variance.

5.4.5 The Standard Deviation of the Total Expected Return

The standard deviation of an investor's combined return (S_c) was approximated by

$$S_c = \sqrt{S_p^2 X_p^2 + S_D^2 X_D^2 + 2X_p X_D \text{COV}_{PD}}$$

where S_p = the standard deviation of an investor's price distribution (section 5.4.2)

S_D = the standard deviation of an investor's dividend distribution (section 5.4.2)

X_p = the fraction of the total return provided by capital appreciation,¹¹

X_D = the fraction of the total return provided by dividend income,¹¹

and COV_{PD} = the covariance of the price and dividend elements of the total return

= $r_{DP} \times S_D \times S_p$ where r_{DP} is the correlation between the price and dividend elements of total return.

The formulation of the standard deviation of the total return is an adaptation of the standard mathematical model used to compute the standard deviation of a two-security portfolio.¹² Adaptation of this model to the situation

¹¹ If an individual had a price expectation greater than zero the dividend portion of the total return was computed as $x_D = r - x_p$ where x_p is the mean expected rate of price change. If the individual had a negative price expectation the dividend portion of the total return was computed as:

$x_D = |r| + |x_p|$. Depending on the type of price expectation that an individual had his gross return (T_{DP}) was then computed as $T_{DP} = x_D + |x_p|$. Thus $x_D = x_D / T_{DP}$ and $x_p = x_p / T_{DP}$.

¹² Markowitz, op. cit., p. 89.

of two elements of return from a single security represents a substantial deviation from the two-security portfolio analogy. The interpretation of the weighting terms X_P and X_D changes from the fraction of the total portfolio value invested in each of two securities to the fractions of the total return that derive from the capital change and dividend elements of the total return. Furthermore the estimation of the covariance between the price and dividend elements of return is subject to the constraint that investors were not asked to provide data regarding the expected correlation between the price and dividend elements of expected return. Thus the standard deviation of total expected return as computed above can only be interpreted as an approximation to the variability of total return that an investor might have expected.¹³ Two estimates of the correlation between price and dividend behavior were made, one based on the historical correlation between annual price and dividend changes and the second based on the observed correlation between expected annual price and dividend changes.

The historical correlation between price and dividend changes during the period 1952-1972 were as follows: Stock A, 0.164; Stock B, 0.530; and Stock C, 0.168. These correlations were significant at the .10 level only in the case of Stock B. The correlations between the measured price and dividend expectations were as follows:

¹³ Jean has shown that the skewness of a two security-portfolio of dependent returns can be computed if the curvilinear association of the two returns is known. In the absence of data necessary to approximate this association, a skewness computation was not undertaken. Jean, op. cit., pp. 185-187.

Stock A, 0.532; Stock B, 0.196; and Stock C, 0.514.

All three correlation coefficients were significant at the 0.041 level or better. Thus investor perceptions of the association between future price and dividend changes was indicated as being weakest for Stock B and much stronger for Stocks A and C.

The contrast in results between forward-looking and historical data indicates that investors' perceptions of the association between price and dividend changes are not consistent with the past record of performance for at least two of the three stocks (A and C), and in fact, the relative strength of the correlation based on expectations data is opposite to those based on historical data with the price-dividend association being strongest for Stock B.

This inconsistency of correlation coefficients is open to a number of rationalizations. For example, investors may not be aware of the historical association between price changes and dividend change or, if they are aware, they may be expecting a significant change. Alternatively, a twenty-year relationship in the past may not be the retrospective time horizon of individual investors. That is, individual investors may be looking back over a very short period of time and at the limit, totally ignoring the previous relationship between the stock's annual price change and annual dividend change.

5.5

SUMMARIZING THE PARAMETERS OF INVESTORS' EXPECTATIONS

To test the inter- and intra-stock hypotheses specified in Chapter III regarding the mean, variance, and skewness of expectations for the selected stocks, it was necessary to aggregate the above parameters of expectations of investors associated with the selected stocks.

For example, to compare the standard deviation of price expectations of investors associated with Stock A with the standard deviation of price expectations of investors associated with Stock B, an average standard deviation ($\bar{S}$) was computed for Stock A ($\bar{S}_A$) and Stock B ($\bar{S}_B$).

$$\bar{S}_A = \frac{\sum_{i=1}^{N_A} S_{Ai}}{N_A}$$

where N_A = the number of investors associated with stock A.

S_{Ai} = the standard deviation of the i^{th} investor associated with Stock A.

Additionally the standard deviation (SD) of this distribution of standard deviations was computed.

$$SD = \frac{\sum_{i=1}^{N_A} (S_{Ai} - \bar{S}_A)^2}{N_A - 1}$$

Analagous formulations were constructed for computing the average and the standard deviation of the mean and skewness parameters of investors' expectations.

5.6

STATISTICAL HYPOTHESES TESTS

Statistical comparisons of averages of expectations' characteristics were accomplished by one- or two-tailed 't' tests where appropriate. Given populations of unequal variances (assumed) a 't' statistic cannot be computed for differences in sample means. Instead, an approximation to t may be computed (t').¹⁴

$$t' = \frac{(M_1 - M_2) - (u_1 - u_2)}{(SD_1^2/N_1) + (SD_2^2/N_2)}$$

where: u = population mean

M = sample mean

This statistic (t') is not distributed as Student's t; however, the probability for t' can be approximated by treating it as t, but with degrees of freedom (df) given by

$$df = \frac{[(SD_1^2/N_1) + (SD_2^2/N_2)]^2}{\frac{(SD_1^2/N_1)^2}{N_1} + \frac{(SD_2^2/N_2)^2}{N_2}}$$

Throughout the analysis of inter- and intra-stock differences in expectations, differences were considered to be 'significant' if the probability of obtaining a t' statistic was equal to, or less than 10% for both one- and two-tail tests.

¹⁴W.J. Dixon and F.J. Massey Jr., Introduction to Statistical Analysis 3rd Ed. (McGraw Hill, 1969), p. 119.

5.7

SUMMARY

The methodology of this study was presented in this Chapter. Essentially, methodological considerations involved developing an consistent expectations - measuring device that would be applicable across all three stocks involved in this study. These stocks were selected on the basis of several criteria and in consultation with the investment dealers cooperating in this study.

This Chapter further dealt with the details of the computations involved in summarizing the central tendency, variability and asymmetry of investor price, dividend, and total return expectations. Finally the nature of the statistical tests of significance employed in the study was presented along with the decision to accept as significant, difference in expectations that were indicated as having only a 10% or less chance of occurring.

CHAPTER VI

RESULTS

The results of testing the empirical hypothesis proposed in Chapter III are reported in the following sections. Essentially these tests involved inter- and intra-stock comparisons of expectations of samples of market participants associated with three different stocks. Stock A is a major utility; Stock B, a mineral resource company; and Stock C a petroleum resource company.

6.1

OVERVIEW OF MEASURED EXPECTATIONS

Approximately 2700 questionnaires were mailed to investors during the period March 19 - April 13, 1973. Four hundred questionnaires were sent to owners of each of the three stocks involved in the study and approximately 1500 were sent to buyers and sellers. In total 828 were returned resulting in a gross response rate of approximately 31%. Of these returns, 24 questionnaires were completely unanswered for a variety of reasons (death, total reliance on professional advice, lack of interest, etc.). From the remaining 804 questionnaires, 723 (90%) price expectations and 684 (85%) dividend expectations were judged to be usable. Of these usable expectations 683 respondents provided

both a usable price and dividend expectation; that is 40 individuals who provided usable price expectations did not provide a usable dividend expectation. Thus the minimum usable response rate to the mailing was approximately 25%.

6.1.1 . Response Types

Among the 804 usable returned questionnaires several distinct types of responses to the expectation items were noted. Examples of these variations are provided in Figure 6.1 and the frequency of occurrence summarized in Table 6.1.

As indicated in the accompanying Table and Figure, approximately 68% of investors responded to the price expectations questions in the manner that had been anticipated. That is, the perceived possibility of both positive and negative deviations from the present price decreased to zero as the magnitude of the deviation increased. A further 24% of respondents provided some variation of this type of response with the single most significant variation (12%) being distributions that were truncated at the high end (but not at the low end) of the scale of future values. This finding indicated that the range of values provided in the questionnaire for upward price changes was either inadequate or that investors' upward expectations for possible future changes in price were unbounded. The summary statistics computed for this type

FIGURE 6.1

TYPES OF EXPECTATION RESPONSES.

Table 6.1

TYPES OF RESPONSES TO EXPECTATION QUESTIONS*

	<u>Price</u> <u>Expectations</u>				<u>Dividend</u> <u>Expectations</u>			
	<u>Co. A</u> <u>(%)</u>	<u>Co. B</u> <u>(%)</u>	<u>Co. C</u> <u>(%)</u>	<u>Total</u> <u>(%)</u>	<u>Co. A</u> <u>(%)</u>	<u>Co. B</u> <u>(%)</u>	<u>Co. C</u> <u>(%)</u>	<u>Total</u> <u>(%)</u>
1. Closed at both ends	74	68	56	68	70	60	50	62
2. Open at high end	6	14	20	12	6	12	16	11
3. Open at low end	3	3	3	3	3	5	4	4
4. Open at both ends	0	3	4	2	2	5	6	4
5. Incomplete	4	4	2	4	4	3	1	3
6. Other (unuseable)	3	3	3	3	2	2	3	3
7. No Response	9	6	13	9	12	12	20	13
Totals	331	300	173	804	331	300	173	804

*Some Columns do not add to 100% because of rounding.

of expectation would therefore result in a smaller mean, standard deviation, and skewness for these distributions. Comparison of the response types across the three stocks indicate that the frequency of 'open at high end' responses was least for Stock A, intermediate for Stock B and greatest for Stock C. Hence, understatement of distribution statistics would tend to be greatest for Stock C and least for Stock A.

Non-response to the price expectations questions was found in approximately 9% of the returned questionnaires indicating that respondents either did not comprehend the meaning of the questions, were unwilling to give the questionnaire the required time, or did not have any particular expectation of price change.

The above pattern of results was also found for dividend expectations. However, the incidence of dividend expectations that were closed at both ends was lower in the aggregated and consistently less across all three stocks than in the case of price expectations. Similarly the incidence of non-response was uniformly greater in the case of dividend expectations than price expectations.

It is interesting to note that the six-interval price change distributions obtained from security analysts by Pankoff and Virgil¹ exhibited similar variations

¹Pankoff and Virgil, op. cit. pp. 41-43.

in the form of respondents expectations. These distributions are presented in Appendix II.

6.1.2 Relative Shape of Price and Dividend Expectations

To further the general description of measured price and dividend distributions, the relative shapes of the distributions were compared in accordance with the hypotheses presented in Chapter IV.

Hypothesis 4.1 (restated)

An investors' price expectations for a particular stock should reflect greater uncertainty (variability) than his dividend expectations.

The results of testing this hypothesis are presented in Table 6.3. A binomial test² ($p = .5$) on the total of respondents having a greater standard deviation of their price expectations than their dividend expectation supports the validation hypothesis beyond the .0000 level.

Hypothesis 4.2 (restated)

An investors' dividend expectation should reflect less downward variation from the current dividend rate than

² S. Siegel, Nonparametric Statistics, (McGraw-Hill New York, 1956) p. 40

Table 6.3

RELATIVE UNCERTAINTY OF
PRICE AND DIVIDEND EXPECTATIONS

<u>Relative</u> <u>Uncertainty</u>	<u>A</u>	<u>Company</u> <u>B</u>	<u>C</u>	<u>TOTALS</u>
1. Price Standard Deviation Greater than Dividend Standard Deviation	169	142	75	386
2. Dividend Standard Deviation Greater than Price Standard Deviation	103	110	56	269
3. Price and Dividend Standard Deviation Equal	<u>13</u>	<u>9</u>	<u>6</u>	<u>28</u>
Totals	285	261	137	683

than his price expectation in relation to the current market price.

The results of testing this hypothesis are presented in Table 6.4. In interpreting the results of this test it should be noted that Stock B's dividend did not fit the increasing stream hypothesis; that is, during the past several years the dollar-dividend had decreased. A binomial test ($p = .5$) on the total of respondents having price expectations with greater probability of downward deviations than corresponding dividend expectations supports the validation hypothesis beyond the .003 level. This result was found when the expectations for Stock B were included and excluded from the binomial tests. Thus, on the basis of the criteria outlined in the above hypotheses the expectations that were measured were consistent with theoretical propositions regarding their shape.

6.1.3 Types of Investors Associated with the Three Stocks

While the primary concern of this study was with investors' expectations of financial return, selected non-expectational data were also collected in the questionnaires. Inter-stock comparisons of this data are presented

Table 6.4.

RELATIVE DOWNWARD DEVIATIONS (CUMULATION PROBABILITY) FROM
THE CURRENT PRICE AND DIVIDEND LEVELS

	<u>Company</u>			<u>Total</u> ^a	<u>Total</u> ^b
	<u>A</u>	<u>B</u>	<u>C</u>		
1. Probability of Downward Deviations of Price Equal to or greater than that for dividends	160	140	88	248	388
2. Probability of Downward Deviations of Dividends greater than that of price deviations	<u>125</u>	<u>121</u>	<u>49</u>	<u>174</u>	<u>295</u>
Totals	285	261	137	422	683

(a) Excluding Company B

(b) Including Company B

in Tables 6.5 through 6.10 to provide perspective with which to view the expectational results. Chi-square tests³ of the data in these tables indicated that significant differences across stocks were found at the .10 level or better for several socio-economic investor characteristics. Chi-square tests indicated that:

- (a) The age of market participants is not independent of the stock with which they are associated (.02 level). Inspection of the data indicates that investors associated with Stock B are generally younger than those associated with either Stock A or C (Table 6.5).
- (b) The annual income of market participants is not independent of the particular stock with which they are associated (.001 level). Investors associated with Stock B tended to have larger annual incomes than investors associated with either Stock A or C (Table 6.6). Of the latter two stocks, investors associated with Stock C tended to have larger incomes than investors associated with Stock A (Table 6.6).

³ Ibid., p. 174.

Table 6.5

AGE OF RESPONDENTS

	<u>Company A</u> (%)	<u>Company B</u> (%)	<u>Company C</u> (%)
34 years and under	17.5	17.5	7.6
35-44	17.4	20.6	20.5
45-54	16.2	22.6	25.7
55-64	25.5	20.9	21.1
65 and over	23.4	18.3	25.2
Number	321	296	171

Table 6.6

ANNUAL GROSS INCOME OF RESPONDENTS

	<u>Company A</u> (%)	<u>Company B</u> (%)	<u>Company C</u> (%)
Under \$5,000	19.8	10.3	20.1
5,001-10,000	16.4	14.0	14.0
10,001-15,000	26.0	21.6	18.3
15,001-25,000	25.4	29.1	17.0
25,001-50,000	10.5	18.5	21.3
over \$50,000	1.9	6.5	9.1
Number	323	292	164

Table 6.7

SIZE OF COMMON STOCK PORTFOLIO

	<u>Company A</u> (%)	<u>Company B</u> (%)	<u>Company C</u> (%)
Under \$5,000	30.7	11.3	16.2
5,001-15,000	23.2	23.5	21.0
15,001-25,000	13.1	12.3	16.8
25,001-50,000	10.6	16.7	13.2
50,001-75,000	7.2	10.2	6.0
75,001-100,000	5.9	6.8	6.6
over 100,000	9.4	20.4	19.1
Number	320	293	167

Table 6.8

REASONS FOR PURCHASE OR OWNERSHIP

	<u>Company A</u> (%)	<u>Company B</u> (%)	<u>Company C</u> (%)
Income	29.6	2.3	7.1
Capital Appreciation	6.0	56.7	42.1
Both	64.4	41.0	50.8
Number	216	261	126

Table 6.9

REASONS FOR SELLING

	<u>Company A</u> (%)	<u>Company B</u> (%)	<u>Company C</u> (%)
Consumption	41.7	14.3	15.6
Investing	38.9	57.1	55.6
Other	19.4	28.6	28.9
Number	108	45	35

Table 6.10

SEX OF RESPONDENTS

	<u>Company A</u> (%)	<u>Company B</u> (%)	<u>Company C</u> (%)
Male	71.8	78.2	71.0
Female	28.2	21.8	29.0
Number	323	294	169

- (c) The size of market participants' common stock portfolio is not independent of the particular stock with which they are associated (.001 level). Inspection of the data in Table 6.7 reveals that those investors associated with Stock B tended to have larger (dollar value) common stock portfolios than investors associated with either Stock A or C.
- (d) Market participants' reasons for owning or buying a particular stock are not independent of the stock with which they are associated (.001 level). Investors associated with Stock A tended to be more dividend-income oriented than investors associated with either Stock B or Stock C. Investors associated with Stock B tend to be more capital-appreciation orientated than investors associated with Stock C (Table 6.8).
- (e) Market participants' reasons for selling a particular stock are not independent of the stock with which they are associated (.01 level). Investors selling Stock A are doing so primarily for consumption purposes while those

selling Stock B or C are doing so primarily for reinvestment (Table 6.9).

- (f) The sex of market participants is not independent of the stock with which they are associated (.05 level). More males are associated with Stock B than with either Stock A or Stock C (Table 6.10).

In summary the above findings support the proposition that different types of investors are associated with the various stocks involved in this study. In essence this non-expectational data indicates that investors associated with Stock B are: generally younger, have larger annual incomes and common stock portfolios, and are more capital gains oriented than investors associated with either Stock A or C. Furthermore, investors selling Stock A are doing so primarily for consumption purposes while those selling stock B or C are doing so mainly for reinvestment purposes.

The above profile of investors associated with Stock B intuitively seems to fit the description of individuals who would be better suited for investing in riskier securities than individuals associated with Stocks A or C.

6.1.4 Comparative Yields on Other Investments

The returns available on a variety of savings/investment instruments available in Canada during the time of the study are provided in Table 6.11. These returns are presented to provide additional perspective in which to view the measured magnitude of price, dividend, and total return expectations of the three stocks involved in this study.

6.2 RESPONDENTS' TIME HORIZONS

As indicated in Chapters III and IV, a respondent-supplied time horizon is an integral characteristic of a respondent's expectations. Initial data analysis indicated that the time horizon could have a very substantial impact on the magnitude and uncertainty of an investor's summarized expectations. For example, one purchaser of Stock C, who had a time horizon for that stock of one month, expected a mean annual rate of capital appreciation of 737% with a standard deviation of 1564%. Computational results such as this were found only in cases of individuals having very optimistic and very short-term expectations, and were due to the reinvestment assumption implicit in the compounding model. Since such results would distort an average of mean annual rates of change, investors' expectations involving a time horizon of less than one year were excluded from the subsequent analysis. The result

Table 6.11

SUMMARY OF YIELDS ON VARIOUS INVESTMENTS
DURING THE TIME OF THIS STUDY

What Money Earns Now**

SHORT-TERM MONEY MARKET SECURITIES	Recent yield %	Month ago yield %
Canada treasury bills (90 days)	4.48	4.10
Do. (180 days)	4.81	4.42
Bank certificates of deposit (90 days) ...	5 3/8	5 1/8
Do. (180 days)	5 3/4	5 1/4
Do. (364 days)	6	5 1/2
Trust company deposit receipts (90 days) ..	5 3/8	5 1/8
Finance company paper (90 days)	5 1/2	5
Do. (180 days)	5 3/4	5 1/2
Do. (364 days)	6	5 1/2
Commercial paper (90 days)	5 1/2	5
Bankers' acceptances (90 days)	5.40	4.85
Day loans	4.45	4
Prime rate	6 1/2	6
FEDERAL GOVERNMENT BONDS:		
Canada 5% due 1973	5.10	5.00
Do. 4 1/2% due 1983	7.03	6.98
Do. 5 1/4% due 1990	7.44	7.31
LONG-TERM PROVINCIAL BONDS:		
Alta. Municipal Financing Corp.	7.80	7.75
Manitoba Hydroelectric	7.94	7.95
Ontario	7.86	7.85
Quebec	8.00	8.00
LONG-TERM MUNICIPAL BONDS:		
Toronto	7.95	7.93
Montreal	8.12	8.12
LONG-TERM CORPORATE BONDS:		
Bell Canada	7.97	7.86
Domtar Ltd.	7.94	7.94
Union Gas Co. of Canada	8.17	8.12

Table 6.11 (cont'd)

	Recent yield %	Month ago yield %
STOCKS:		
Av. yield 64 common industrials*.....	3.45	3.48
Do. 18 preferred and A shares*.....	6.13	6.34
Real estate mortgages:		
N.H.A. single family..	9	9
N.H.A. rental projects	9-9 1/2	9-9 1/2
Conventional	9-9 1/4	9-9 1/4
N.H.A. net investment yield	8.875	8.875
SAVINGS, DEPOSITS:		
Chartered bank (chequable)	3	2 3/4-5
Do. (nonchequable)....	4 1/2	4
Trust companies (chequable)	0-4	0-4
Do. (nonchequable)....	4 1/2-5 1/2	4 1/2-5
TERM MONEY:		
Trust & Loan co. GIC/ debentures (1-2 years)	6 1/2-6 3/4	6-6 3/4
Do. (3-5 years)	7-7 3/4	7-7 1/2

*Moss, Lawson & Co. averages.

N.H.A. mortgage investments available from Gairdner & Co.

*Source The Financial Post, April 14, 1973.

of this exclusion are presented in Table 6.12. Also included in Table 6.12 are the results of grouping expectations by two time horizons: one-and two-year horizons, and three or more year horizons. Such a grouping was indicated in Chapter III as being necessary in order to control inter- and intra-stock comparisons of expectations for differences in time horizons. Other possible groupings were considered but rejected since simultaneous control for time horizons and the type of investor in hypotheses tests would have resulted in some comparisons involving fewer than ten respondents.

6.2.1 Time Horizon Comparisons

The data in Table 6.13 indicates the result of comparing investor time horizons by stock and by type of market participant after exclusion of less-than-one-year horizons.

In the aggregate (buyers, sellers, and owners) investors associated with Stock A or Stock C had an average time horizons of 4.4 years and 4.3 years respectively. Investors associated with Stock B had significantly (0.05 level) shorter time horizons: 3.5 years on average. In contrast, analysts' time horizons were relatively short for both Stocks B and C and longest for Stock A. In general

Table 6.12

RESPONDENTS' TIME HORIZONS FORUSABLE EXPECTATIONS

	<u>Company A</u>		<u>Company B</u>		<u>Company C</u>	
	<u>Price</u>	<u>Divid*</u>	<u>Price</u>	<u>Divid*</u>	<u>Price</u>	<u>Divid*</u>
<u>Buyers' Horizons</u>						
One & Two-Year	28	24	69	64	12	11
Three Year +	77	76	32	32	14	14
Less than 1 year	<u>10</u>	<u>9</u>	<u>28</u>	<u>27</u>	<u>2</u>	<u>2</u>
Total	115	109	129	123	28	27
<u>Sellers' Horizons</u>						
One & Two-Year	54	54	17	14	23	23
Three Year +	38	35	10	8	11	10
Less than 1 year	<u>10</u>	<u>10</u>	<u>5</u>	<u>5</u>	<u>8</u>	<u>4</u>
Total	102	99	32	27	42	37
<u>Owners' Horizons</u>						
One & Two-Year	32	33	61	54	20	17
Three Year +	47	46	45	43	54	53
Less than 1 year	<u>1</u>	<u>1</u>	<u>13</u>	<u>13</u>	<u>2</u>	<u>2</u>
Total	80	80	119	110	76	72
Total Individual Investors	297	288	280	260	146	136
Exclusions						
-Number	21	20	46	45	12	8
-% of total	7%	7%	16%	17%	8%	6%
<u>Net Individual Investors</u>	276	268	234	215	134	128
<u>Analysts: All Horizons</u>	16	16	15	15	15	15
<u>Net Analysts</u>	15	15	13	13	13	13

Table 6.13

COMPARISONS OF MARKET PARTICIPANTS' TIME HORIZONS (a)

	<u>Company</u>			<u>Inter-Stock Comparisons: Significance Level</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B^c</u>	<u>A/C^c</u>	<u>B/C^d</u>
	<u>(Years)</u>	<u>(Years)</u>	<u>(Years)</u>			
Aggregate ^(b)	4.41 (4.66)	3.50 (4.23)	4.32 (3.60)	.009	.410	.041
Number	290	244	143			
<u>Buyers</u>	5.87 (6.35)	3.04 (3.63)	4.55 (4.75)	.000	.118	.135
Number	111	104	26			
<u>Sellers</u>	3.12 (2.81)	2.48 (1.83)	2.97 (2.64)	.078	.386	.610
Number	95	28	36			
<u>Owners</u>	3.92 (2.91)	4.19 (5.03)	4.84 (3.47)	.324	.032	.289
Number	84	112	81			
<u>Security Analysts</u>	3.93 (2.25)	2.38 (1.04)	2.23 (1.42)	.012	.010	.753
Number	15	13	13			
	<u>Intra Stock Comparisons: Significance Level</u>					
Buyers/Sellers ^c	.000	.129	.064			
Buyers/Owners ^c	.005	.051	.774			
Sellers/Owners ^c	.029	.002	.001			
Analysts/ Aggregate ^d	.529	.006	.000			

(a) Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in average time horizons occurring by chance.

(b) All investors excluding those with time horizons of less than one year; i.e., includes investors who provided a time horizon but no price or dividend distribution.

(c) One-tail t test

(d) Two-tail t test

security analysts' time horizons were shorter than individual investors'.⁴

An additional finding indicated in Table 6.15 is that sellers have consistently shorter time horizons than either buyers or owners. Sellers of Stock B had the shortest horizons averaging 2.5 years; sellers of Stock A, the longest horizons averaging 3.1 years; and sellers of stock C had about the same time horizon as those for Stock A - 3.0 years. No clear pattern emerged in comparisons of buyers' and owners' time horizons.⁵

6.3. PRESENTATION OF MAJOR FINDINGS

In Chapter III two sets of empirical hypotheses were proposed; those pertaining to inter-stock and intra-stock differences in expectation statistics. As was noted, inter-stock comparisons required controls for both the type of investor associated with a particular stock and

⁴ If an expector's time horizon is postulated as being inversely related to his perception of the riskiness of a stock's future return then the ordering of aggregates of individuals' time horizons would indicate that Stock B was relatively more risky than both Stock A and Stock C. Ranking security analysts' time horizons however would indicate only that Stock A was less risky than Stock B and Stock C.

⁵ If an expector's time horizon is interpreted as being inversely related to his perception of the riskiness of a stock's future return then this finding would suggest that sellers view their respective stocks as being more risky than either buyers or owners. Additionally one could speculate that potential sellers of a stock could be identified from among the shareholder population by changes in owners' time horizons for that stock.

the time horizon of the expectation.⁶

The results of hypotheses tests pertaining to price expectations are presented in Sections 6.4 those pertaining to dividend expectations in Section 6.5; and those involving expectations of total return in Sections 6.6. The sequence of hypotheses tests applied to price expectations is outlined below for illustrative purposes.

a) Inter-Stock Hypotheses

For each stock the mean price expectations of all investors associated with that stock were averaged. This average was then compared to the corresponding average for each of the other two stocks. A directional t' test was used in the case of Stock A/Stock B and Stock A/Stock C comparisons and a non-directional test for Stock B/Stock C comparisons. Thus the average mean price expectation of all investors (buyers, sellers, and owners) associated with Stock A was compared with the average mean price expectation of all investors associated with Stock B and so on.

⁶ Control for the type of investor was necessary for inter-stock comparisons because of the possible disproportionate representation of buyers, sellers, or owners in the aggregate sample of market participants associated with a particular stock. Control for the time horizon of expectations was necessary because of the substantial impact that the time horizon of an expectation has on the computed summary statistics of an investor's expectation. The just noted differences in time horizons among the different types of investors and across stocks reinforces the decision to control for time horizons in inter- and intra-stock comparisons.

The above procedure was then applied to the standard deviation and the skewness of investors' price expectations.

b) Intra-stock Hypotheses

(i) for each stock the mean price expectations of all buyers were averaged and compared sequentially with the corresponding average for each of the other two types of investors - sellers and owners. A directional t test was employed for Buyer/Seller, Buyer/Owner, and Seller/Owner comparisons.

(ii) The above comparisons of price expectations were then repeated with buyers, sellers, and owners classified according to whether or not they had short-term (one-and two-year) or long-term (more than two-years) time horizons.

Thus the average mean price expectation of short-term buyers of Stock A was compared sequentially with the average mean price expectation of short-term sellers of Stock A and short-term owners of Stock A. These comparisons were then repeated for Stock B and Stock C.

All of the foregoing intra-stock comparisons were then applied to the standard deviation and the skewness of investors' price expectations.

c) Controlled Inter-stock Hypotheses

The inter-stock comparisons indicated in (a) above were repeated with control exerted for the type of investor and then for both the type of investor and the

time horizon of the expectation.

(i) Control for the Type of Investor

For each stock the mean price expectations of buyers of the stock were averaged and compared to the corresponding average for each of the other two stocks. This procedure was then repeated for sellers' and owners' price expectations.

Additionally the above procedures were then applied to the standard deviation and skewness of investors' price expectations.

(ii) Control for the Type of Investor and the Time Horizon of the Expectation

The above comparisons of type-of-investor-controlled inter-stock comparison were then repeated with buyers, sellers and owners classified according to whether or not they had short-term or long-term time horizons.

Thus for each stock the mean price expectation of short-term buyers were averaged and compared with the corresponding average for each of the other two stocks. This procedure was then repeated for long-term buyers.

After comparing buyers' expectations in this manner, identical comparisons were made of sellers' and owners' price expectations.

In addition, the above procedures were applied to the standard deviation and skewness of investors price expectations.

d) Inter-Stock Hypotheses and Analysts' Expectations

The inter-stock comparisons in (a) above were replicated using security analysts' expectations instead of individual investors' expectations.

e) Intra-Stock Hypotheses and Analysts' Expectations

For each stock the mean price expectations of all individual investors associated with that stock were averaged and compared to the corresponding average of security analysts' price expectations. A non-directional t test was employed in these comparisons.

This procedure was then applied to the standard deviation and skewness of investors' and analysts' price expectations.

Upon completion of the foregoing five sets of comparisons for price expectations, these comparisons were repeated for dividend expectations and expectations of total return.

6.4 PRICE EXPECTATIONS

Investors' price expectations were analyzed for inter-and intra-stock differences in the sequence outlined in Section 6.3.

6.4.1 Inter-Stock Comparisons of Price Expectations

The results of inter-stock pair-wise comparisons of the mean, standard deviation, and skewness of

investors' expectations are presented in Table 6.14 and discussed in the following paragraphs.

a) Stocks A and B

The rate of growth expected in the market price of Stock B was significantly (.000 level) more optimistic (12.8% per annum) and more uncertain (15.0%) than the price expectations for Stock A (4.5% per annum and 7.7% respectively).

In addition to the greater magnitude of the expected return, the price expectations for Stock B reflected greater right skewness (1.128) than those for Stock A (1.083).

b) Stocks A and C

The rate of growth expected in the market price of Stock C is significantly (.000 level) more optimistic (6.8% per annum) and uncertain (11.8%) than the price expectations for Stock A (4.5% per annum and 7.7% respectively). Additionally the price expectations for Stock C were significantly (.070 level) more right-skewed than those for Stock A.

c) Stocks B and C

The rate of growth expected in the market price of Stock B was significantly (.001 level) more optimistic (12.8% per annum) and more uncertain (15%) than in the case of Stock C (6.8% per annum and 12% respectively).

Table 6.14

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR PRICE EXPECTATIONS (a)

<u>Expectation</u> <u>Parameters</u>	<u>Company</u>			<u>Significance Level</u> <u>of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
Average Mean (b)	.045 (.063)	.128 (.121)	.068 (.071)	.000	.000	.001
Average Std. Deviation	.077 (.074)	.150 (.111)	.118 (.092)	.000	.000	.003
Average Skewness (c)	1.083 (.476)	1.128 (.339)	1.137 (.269)	.106	.070	.776
Number -	276	234	134			

(a) The "Average Mean" and "Average Std. Dev." are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

(b) On a historical basis the average annual rates of price change for the period 1952-1972 are: Stock A (.011), Stock B (.082), and Stock C (.095). These rates of change are not directly comparable with the figures presented in this table since the historic data does not incorporate the mix of time horizons inherent in the expectational data.

(c) The skewness coefficients indicated that the percentages of the total squared deviations to the left of the arithmetic mean of the price distributions are: 46.2% for Stocks A, 44.3% for Stock B, and 43.9% for Stock C.

In contrast with earlier results the asymmetry factor was not significantly different between Stocks B and A although the right-skewness for Stock C was slightly greater than that for Stock B.

d) Discussion

The above findings for each of the three stocks are summarized in Figure 6.2 which plots the expected return and risk of each of the three stocks in risk-return space.

Based on the differences in the risk-return characteristics of aggregates of investors associated with each of these three stocks, Stock B is indicated as being the most risky of the three stocks in terms of expected future price appreciation, Stock A the least risky, and Stock C intermediate to Stocks A and B.⁷ This finding is consistent with the relative riskiness of the three stocks as indicated by the beta coefficients presented in Chapter V. In fact, the data indicates that as the risk increases, the optimism increases more than proportionately. Specifically, the "sensitivity"⁸ of the average mean to changes in the average standard deviation is less (.960) between Stocks A

⁷ The earlier observed fact that proportionally more price expectations for Stock C were open at the high-end than for Stocks B and A would tend to understate the differences between Stocks A and C and Stocks A and B.

⁸ "Sensitivity" is defined here as the ratio of the percentage change in the average mean expectation between two stocks to the percentage change in the average standard deviation between the two stocks.

FIGURE 6.2

AVERAGE RISK AND RETURN OF
PRICE EXPECTATIONS

(Reference: Table 6.14)

and C than that between Stocks C and B (3.254).

Thus the above findings support the hypothesis (1.1) that the magnitude of stock market participants' price expectations for a more risky stock is greater than that for a less risky stock where risk and expected price return are defined according to the two-parameter valuation concept. The data also supports the stronger form of the above hypothesis (1.2); namely, that the risk premium is more than proportionately greater than the risk-differential. Furthermore, there is evidence to support the hypothesis that the skewness of price expectations also enters into the risk premium associated with higher risk stocks.

6.4.2

Intra-Stock Comparisons of Investors' Price Expectations

The results of intra-stock comparisons of the average mean, standard deviation, and skewness of investors' price expectations are presented in Tables 6.15, 6.16, 6.17 and discussed below as pair-wise comparisons of buyers/owners, sellers/owners, and buyers/sellers expectations for each of the three stocks.

a) Buyers and Owners

The evidence presented in the referenced Tables supports the hypothesis that the average magnitude and uncertainty of buyers' and owners' price expectations are not significantly different. That is, for each stock,

Table 6.15

INTRA-STOCK COMPARISONS OF SUMMARIZED
INVESTOR PRICE EXPECTATIONS*

				<u>Significance</u> <u>Level of</u> <u>Comparisons</u>		
	<u>Buyers (B)</u>	<u>Sellers (S)</u>	<u>Owners (O)</u>	<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
<u>Company A</u>						
Average Mean	.051 (.061)	.029 (.050)	.057 (.076)	.003	.595	.003
Average Std. Deviation	.064 (.060)	.080 (.080)	.090 (.083)	.064	.017	.303
Average Skewness	1.042 (.261)	1.119 (.731)	1.096 (.289)	.329	.189	.388
Number	105	92	79			
<u>Company B</u>						
Average Mean	.131 (.099)	.113 (.140)	.130 (.135)	.277	.944	.297
Average Std. Deviation	.160 (.117)	.141 (.143)	.143 (.097)	.266	.240	.477
Average Skewness	1.109 (.372)	1.204 (.330)	1.127 (.309)	.100	.708	.139
Number	101	27	106			
<u>Company C</u>						
Average Mean	.083 (.072)	.050 (.088)	.071 (.061)	.056	.556	.110
Average Std. Deviation	.138 (.125)	.135 (.095)	.103 (.075)	.463	.188	.042
Average Skewness	1.144 (.384)	1.189 (.234)	1.110 (.237)	.303	.677	.052
Number	26	34	74			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tailed t' tests.

Table 6.16

INTRA-STOCK COMPARISONS OF SUMMARIZED
INVESTOR PRICE EXPECTATIONS: ONE-AND TWO-YEARS HORIZONS*

				<u>Significance</u> <u>Level of</u> <u>Comparisons</u>		
	<u>Buyers(B)</u>	<u>Sellers(S)</u>	<u>Owners(O)</u>	<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
<u>Company A</u>						
Average Mean	.091 (.095)	.029 (.060)	.086 (.105)	.001	.086	.003
Average Std. Deviation	.122 (.081)	.105 (.095)	.151 (.048)	.300	.209	.016
Average Skewness	1.124 (.270)	1.178 (.923)	1.103 (.269)	.346	.766	.292
Number	28	54	32			
<u>Company B</u>						
Average Mean	.156 (.107)	.103 (.141)	.171 (.153)	.011	.516	.006
Average Std. Deviation	.198 (.122)	.174 (.172)	.194 (.092)	.305	.848	.328
Average Skewness	1.101 (.429)	1.199 (.349)	1.153 (.320)	.334	.569	.319
Number	69	17	61			
<u>Company C</u>						
Average Mean	.125 (.084)	.041 (.100)	.116 (.081)	.006	.747	.004
Average Std. Deviation	.229 (.129)	.164 (.101)	.194 (.083)	.073	.571	.145
Average Skewness	1.286 (.499)	1.215 (.238)	1.171 (.235)	.325	.532	.272
Number	12	23	20			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tailed t' tests.

Table 6:17

INTRA-STOCK COMPARISONS OF SUMMARIZED
INVESTOR PRICE EXPECTATIONS:
LONGER THAN TWO-YEAR HORIZONS*

	<u>Buyers (B)</u>	<u>Sellers (S)</u>	<u>Owners (O)</u>	<u>Significance Level of Comparisons</u>		
<u>Company A</u>				<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
Average Mean	.036 (.034)	.029 (.031)	.036 (.033)	.119	.990	.159
Average Std. Deviation	.043 (.029)	.044 (.025)	.049 (.030)	.460	.297	.309
Average Skewness	1.012 (.253)	1.034 (.284)	1.090 (.304)	.341	.136	.306
Number	77	38	47			
<u>Company B</u>						
Average Mean	.078 (.047)	.131 (.218)	.074 (.074)	.265	.770	.281
Average Std. Deviation	.079 (.039)	.084 (.030)	.073 (.047)	.341	.517	.327
Average Skewness	1.126 (.204)	1.212 (.312)	1.091 (.293)	.282	.537	.139
Number	32	10	45			
<u>Company C</u>						
Average Mean	.047 (.031)	.070 (.052)	.054 (.041)	.104	.523	.319
Average Std. Deviation	.060 (.043)	.075 (.039)	.070 (.031)	.304	.534	.341
Average Skewness	1.032 (.194)	1.135 (.225)	1.088 (.236)	.099	.292	.273
Number	14	11	54			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tailed t' tests.

buyers' and owners' expectations were of approximately the same magnitude, uncertainty and asymmetry in the aggregate and over all time horizons.

b) Sellers and Owners

The evidence in Table 6.16 supports the hypothesis - over all three stocks - that sellers with a time perspective of one or two years are significantly more pessimistic than owners for the future rate of price appreciation of their stock. There is no consistent evidence across all three stocks that sellers' and owners' price expectations differed significantly with respect to their perceptions of risk and skewness.

Hence, sellers' and owners' price expectations are, in general, distinguishable only in terms of the magnitude of the expectation and then only in the shorter-term.

c) Buyers and Sellers

The evidence in Table 6.16 supports the hypothesis for all three stocks that sellers, with time perspectives of up to two years, are significantly more pessimistic than buyers for the future rate of price appreciation of their stock. There is no consistent evidence upon which this hypothesis can be extended to the risk and skewness of buyers' and sellers' expectations.

Thus, buyers' and sellers' price expectations are in general, distinguishable only in terms of the magnitude of the expectation and then only in the shorter term.

d) Discussion

The foregoing comparisons of buyers', sellers' and owners' price expectations provide evidence supporting the hypothesis that for time perspectives of one- or two-years, sellers of each of the three stocks are significantly more pessimistic for the magnitude of the growth in the stock's price, than both buyers and owners of the respective stock.

This conclusion can be put into perspective by noting the earlier finding that Stock B was a significantly higher risk-return situation than Stock C, which in turn was a significantly higher risk-return situation than Stock A. That is, the price determining conflict of opinion regarding the magnitude of the price expectations for each stock was occurring at different risk-return levels for each of the three stocks. Essentially, buyers, sellers, and owners for a particular stock are operating on basically the same level of uncertainty/ risk and are differentiated according to the magnitudes of their expectations; with buyers and owners having similar magnitudes that are significantly greater than those of sellers. This finding is illustrated in Figure 6.3.

FIGURE 6.3

AVERAGE RISK AND RETURN OF
PRICE EXPECTATIONS BY TYPE OF
INVESTOR.

(Reference: Table 6.18)

6.4.3Inter-Stock Comparisons of Price Expectations
With Control For the Type of Investor and the
Time Horizon

Recognizing the indicated differences in the magnitude of buyers', sellers' and owners' expectations, the earlier inter-stock comparisons of aggregates of investors' expectations were further analyzed with control for the type of investors and the time horizon of the expectation.

The results of the analysis are presented in Tables 6.18, 6.19 and 6.20 and discussed in the following paragraphs.

a) Stocks A and B

The data in the referenced Tables indicates that in the aggregate and over both the short and longer-terms, all three types of investors associated with Stock B are significantly more optimistic and uncertain in their price expectations than their counterparts associated with Stock A. Differences in the skewness of price expectations were significant (.10 level) only for buyer and seller comparisons of investors with longer-term horizons.

b) Stocks A and C

The evidence in Table 6.18 indicates that all three types of investors associated with Stock C are more

Table 6.18

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR PRICE EXPECTATIONS
BY TYPE OF INVESTOR*

	<u>Company</u>			<u>Significance</u> <u>Level of</u> <u>Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.051 (.061)	.131 (.099)	.083 (.073)	.008	.020	.007
Average Std. Deviation	.064 (.060)	.160 (.117)	.138 (.125)	.008	.003	.574
Average Skewness	1.042 (.261)	1.109 (.372)	1.144 (.384)	.066	.102	.678
Number	105	101	26			
<u>Sellers</u>						
Average Mean	.029 (.050)	.113 (.141)	.050 (.088)	.082	.094	.045
Average Std. Deviation	.080 (.080)	.141 (.143)	.135 (.095)	.019	.001	.856
Average Skewness	1.119 (.731)	1.204 (.330)	1.189 (.234)	.299	.289	.843
Number	92	27	34			
<u>Owners</u>						
Average Mean	.057 (.076)	.130 (.135)	.071 (.061)	.000	.102	.000
Average Std. Deviation	.090 (.083)	.143 (.097)	.103 (.075)	.000	.157	.002
Average Skewness	1.096 (.289)	1.127 (.309)	1.110 (.237)	.253	.367	.698
Number	79	106	74			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t test.

Table 6.19

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR PRICE EXPECTATIONS BY TYPE OF INVESTOR:
ONE-AND TWO-YEAR HORIZONS*

	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.091 (.095)	.156 (.107)	.125 (.084)	.002	.126	.285
Average Std. Deviation	.122 (.081)	.198 (.122)	.229 (.129)	.000	.008	.542
Average Skewness	1.124 (.270)	1.101 (.429)	1.286 (.499)	.373	.153	.242
Number	28	69	12			
<u>Sellers</u>						
Average Mean	.029 (.060)	.103 (.141)	.041 (.100)	.000	.094	.027
Average Std. Deviation	.105 (.095)	.174 (.172)	.164 (.101)	.061	.009	.825
Average Skewness	1.178 (.923)	1.199 (.349)	1.215 (.238)	.444	.391	.534
Number	54	17	23			
<u>Owners</u>						
Average Mean	.086 (.105)	.171 (.153)	.116 (.081)	.001	.129	.039
Average Std. Deviation	.151 (.098)	.194 (.092)	.194 (.083)	.021	.045	.987
Average Skewness	1.103 (.269)	1.153 (.320)	1.171 (.235)	.282	.324	.793
Number	32	61	20			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

Table 6.20

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR PRICE EXPECTATIONS BY TYPE OF INVESTOR:
LONGER THAN TWO-YEAR HORIZONS*

	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.036 (.034)	.078 (.047)	.042 (.031)	.000	.142	.010
Average Std. Deviation	.043 (.029)	.079 (.039)	.060 (.043)	.000	.082	.169
Average Skewness	1.012 (.253)	1.126 (.204)	1.022 (.194)	.007	.427	.107
Number	77	32	14			
<u>Sellers</u>						
Average Mean	.029 (.031)	.131 (.218)	.070 (.052)	.083	.003	.590
Average Std. Deviation	.044 (.025)	.084 (.030)	.075 (.039)	.001	.012	.549
Average Skewness	1.034 (.284)	1.212 (.312)	1.135 (.225)	.060	.116	.534
Number	38	10	11			
<u>Owners</u>						
Average Mean	.036 (.038)	.074 (.074)	.054 (.041)	.001	.012	.106
Average Std. Deviation	.049 (.030)	.073 (.047)	.070 (.031)	.002	.000	.709
Average Skewness	1.090 (.304)	1.091 (.293)	1.088 (.236)	.497	.480	.959
Number	47	45	54			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail 't' tests; Stock B/Stock C tests involve a non-directional 't' test.

optimistic and uncertain in their expectations than the corresponding types of investors associated with Stock A. Differences in the perception of risk and return were significant at the .01 level for buyer and seller comparisons. Similar results were found over both the short-and longer-term horizons although the significance deteriorated to the .142 level in the case of the expected rate of price appreciation. Significant differences in the skewness of price expectations were not found.

c) Stocks B and C

The data in Table 6.18 indicates that all three types of investors associated with Stock B are significantly more optimistic in their price expectations than their counterparts associated with Stock C. Only the expectations of owners of Stock B were significantly more risky than the expectations of owners of Stock C. Similar results were found in the short-and long-term regarding the direction of the risk-return trade-off between Stocks B and C but these findings were not consistently significant at the .10 level or better. Significant differences in the skewness of price expectations were not found in the aggregate or over the short-or longer-terms.

d) Discussion

The above findings add further support to the proposition that, of the three stocks, Stock B is viewed as being potentially the most profitable and the most risky; Stock A is potentially the least profitable and least risky; and Stock C is intermediate to Stocks A and B in terms of expected price appreciation. That is, the foregoing inter-stock comparisons of price expectations indicated that the highly significant risk-return tradeoffs noted in comparisons of aggregates of price expectations (Table 6.14) are not the result of any one type of investors or any particular expectation time horizon. As could be expected, the level of significance of differences in averages of expectation characteristics deteriorated as sample size decreased; however, the direction of the risk-return tradeoffs was consistent throughout the control comparisons.

6.4.4 Inter-and Intra-Stock Comparisons Involving Security Analysts' Price Expectations

Inter-stock comparisons of security analysts' price expectations were made to investigate the extent to which the risk-return trade-offs perceived by individual investors were consistent with those perceived by analysts. The results of comparing analysts' expectations are presented in

Table 6.21. Comparisons of analysts' price expectations with those of aggregates of individual investors are presented in Table 6.22.

a) Stocks A and B

As in the case of individual investors, the price expectations of security analysts for Stock B are significantly more optimistic and uncertain than those for Stock A. In fact the risk-return trade-off inherent in analysts' expectations are essentially identical to that of individual investors. In contrast to the above consistency of findings, analysts' price expectations for Stock A were significantly more skewed to the right than those for Stock B.

b) Stocks A and C

The data in Table 6.21 indicate that analysts' expectations for Stock C are more optimistic and uncertain than those for Stock A. Although only significantly different with respect to the uncertainty of the expectations, the return differential between Stocks A and C as perceived by analysts was essentially the same as that perceived by investors. In contrast to investors' expectations, the risk differential perceived by analysts was roughly four times that observed by individuals. Analysts' price expectations were skewed in the expected direction but not significantly skewed at the .10 level or better.

Table 6.21

INTER-STOCK COMPARISONS OF
SUMMARIZED SECURITY ANALYSTS' PRICE EXPECTATIONS*

	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
Average Mean	.043 (.050)	.114 (.071)	.066 (.078)	.003	.350	.108
Average Std. Deviation	.064 (.047)	.124 (.055)	.202 (.140)	.001	.001	.074
Average Skewness	1.093 (.192)	1.018 (.097)	1.186 (.295)	.095	.327	.065
Number	15	13	13			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

Table 6.22

COMPARISONS OF ANALYSTS' AND
INVESTORS' SUMMARIZED PRICE EXPECTATIONS*

	<u>Stock A</u> <u>Individual/</u> <u>Analysts</u>	<u>Stock B</u> <u>Individual/</u> <u>Analysts</u>	<u>Stock C</u> <u>Individual/</u> <u>Analysts</u>
Average Mean	.045/.043 (.063) (.049)	.128/.114 (.121) (.070)	.068/.066 (.071) (.078)
Significance	.875	.510	.890
Average Std. Deviation	.077/.064 (.074) (.045)	.150/.124 (.111) (.054)	.118/.202 (.092) (.140)
Significance	.273	.130	.048
Average Skewness	1.083/1.093 (.476) (.192)	1.128/1.018 (.339) (.097)	1.137/1.186 (.269) (.295)
Significance	.857	.006	.587
Number	.276/15	234/13	134/13

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of return. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve a non-directional t' test.

c) Stocks B and C

The evidence in Table 6.21 is not consistent with that found in comparisons of aggregates of individual investors for Stocks B and C. Rather analysts for Stock C are significantly more uncertain than those for Stock B and less optimistic (at the .11 level) than analysts for Stock B. That is, the indicated risk-return trade-off consists of an unfavorable 60% risk differential for Stock C and a 40% return disadvantage in relation to Stock B. Furthermore, the price expectations for Stock C are significantly more skewed to the right than those for Stock B indicating that the perceived potential for an extreme upside price movement for Stock C was greater than that for Stock B.

d) Discussion

The foregoing data indicate that analysts' price expectations for the three stocks are generally consistent with those of individual investors with one notable exception. Analysts view the price return from Stock C as being significantly more uncertain than individuals (Table 6.22). Consequently Stock C is indicated as being significantly more risky than Stock B; thus the ranking of the three stock based on analysts' expectations is somewhat different than the ranking resulting from individual investors' expectations, this difference being the result of different perceptions of the riskiness of Stock

C. It is interesting to note that the risk ranking generated by analysts' expectations is inconsistent with that provided by beta coefficients.

6.4.5. Summary of Inter- and Intra-Stock Comparisons Price Expectations

A) Inter-Stock Comparisons of Price Expectations

The risk-return characteristics of the three stocks as reflected in individual investors' price expectations indicated significant differences in the risk-return trade-offs associated with the stocks. In relation to Stock A which had the lowest level of risk associated with its expected price appreciation, Stock C represented a 50% increase in risk and Stock B, a 100% increase in risk. Correspondingly, Stock A was expected to provide the smallest annual rate of price appreciation, 5%; Stock C an intermediate rate of 7%; and Stock B the greatest rate of price appreciation, 13%. Thus for a 50% increase in risk between Stocks A and C, the price-return differential was greater by roughly 50% while for a 100% increase in risk between Stocks A and B, the price-return differential was greater by roughly 150%. Essentially these findings support Hypotheses 1.1 and 1.2; namely that investors expect a higher price return from more risky stocks and that as risk increased, a more than proportionate increase in return is expected.

Investigations of the symmetry of price expectations indicated that the price expectations for

for Stocks B and C were more skewed to the right than those for Stock A. That is, the price expectations for Stocks B and C incorporated a "long-shot" possibility for an extremely large appreciation in price, more so than the price expectations for Stock A. Thus, the higher price appreciation risk perceived for Stocks B and C was associated not only with a larger price expectation but also with a small chance of a very large price appreciation. Of the two higher risk stocks, price expectations for Stock C were slightly more right-skewed than those for Stock B; when disaggregated, skewness was not a significant factor.

The above findings were derived from inter-stock comparisons of individual investors' price expectations, with all buyers, sellers, and owners of Stock A being compared in the aggregate, with corresponding aggregates for Stock B and Stock C. Comparisons of analysts' expectations yielded somewhat different results.

As in the case of individual investors, analysts' expectations indicated that Stock A was expected to provide the lowest annual rate of price appreciation, 4%; Stock C an intermediate rate of 7%; and Stock B the highest rate of 12%. Similarly, analysts' expectations indicated Stock A to have the least risky price return and that Stock B was roughly 100% more risky than Stock A. However, where the price expectations of aggregates of individual investors indicated that Stock C was 50% more

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risky than Stock A, the price expectations of analysts indicated that Stock C was more risky than Stock A by roughly 200% and more risky than Stock B by roughly 100%. Thus in terms of analysts' expectations of the average rate of price appreciation and risk, Stock C was an inferior investment to Stock B. It should also be noted however, that analysts' price expectations for Stock C were significantly more right-skewed than analysts' price expectations for Stock B indicating that although Stock B was a higher risk (variability) situation than Stock C, the potential for a "long-shot" extreme increase in price was greater for Stock C than Stock B.

The foregoing difference in analysts' and individual investor's expectations for Stock C is centered on the assessment of the risk of the future expected rate of price appreciation in the stock's price. Further analysis indicated that individuals and analysts were in agreement regarding the magnitude and skewness of expected price appreciation for Stock C. Furthermore, individuals and analysts were in agreement regarding the magnitude and risk of expected price appreciation for both Stocks A and B; however, in the case of Stock B, individuals anticipated a greater chance for an extreme upside increase in price than did analysts. These findings therefore support Hypotheses 3 regarding the consistency of individual investors' and security analysts' price expectations for Stocks A.

Exceptions to this Hypothesis were evident for both Stocks B and C.

B) Intra-Stock Comparisons of Price Expectations

No evidence was found of significant differences in price expectations in comparisons of buyers' and owners' expectations for each of the three stocks. That is, buyers' and owners' price expectations were statistically indistinguishable in terms of the magnitude, risk, and skewness of expectations in both the aggregate and when disaggregated by time horizon.

Comparison of sellers' and owners' expectations and sellers' and buyers' price expectations did indicate significant differences in price expectations but only for those investors with relatively short time horizons (one- or two-years). For all three stocks sellers with one- or two-year horizons expected a lower average rate of price appreciation than both buyers and owners with similar time horizons. Statistically significant risk or skewness differentials were generally not evident among buyers, sellers and owners.

Thus the above findings support only two of the four intra-stock hypotheses presented in Chapter III (Hypotheses 2.1 and 2.3). That is, differences in opinion about the future price appreciation of these stocks did exist between buyers and owners, and sellers at the time of the study. However, this price-determining conflict of

opinion was limited to differences regarding the rate of growth expected in the market price and was generally independent of investors' perceptions of risk and skewness.

6.5 DIVIDEND EXPECTATIONS

Investors' dividend expectations were analyzed for inter- and intra-stock differences in the sequence outlined in Section 6.3.

6.5.1 Inter-Stock Comparisons of Dividend Expectations

The results of inter-stock pair-wise comparisons of the average mean, standard deviation, and skewness of investors' dividend expectations are presented in Table 6.23 and discussed in the following paragraphs.

a) Stocks A and B

The evidence in Table 6.23 supports the hypothesis that the dividend expectations for Stock B are significantly more optimistic and uncertain than those for Stock A. No significant differences in skewness of dividend expectations is evident although those for Stock A are more skewed than those for Stock B.

b) Stocks A and C

The data in Table 6.23 supports the hypothesis that the dividend expectations for Stock C are significantly more optimistic and uncertain than those for Stock A. The skewness of Stock A and C dividend expectations are not significantly different although those for Stock C are

Table 6.23

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR DIVIDEND EXPECTATIONS (a)

<u>Expectation Parameters</u>	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
Average Mean (b)	.029 (.055)	.107 (.118)	.071 (.095)	.000	.000	.003
Average Std. Deviation	.069 (.067)	.138 (.098)	.119 (.134)	.000	.000	.160
Average Skewness (c)	1.144 (.543)	1.128 (.304)	1.155 (.365)	.342	.403	.520
Number	268	215	128			

(a) The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

(b) On a historical basis the average annual rate of dividend change for the period 1952-1972 are: Stock A (.015), Stock B (.045), and Stock C (.059). These rates of change are not directly comparable with the figures presented in this table since the historic data does not incorporate the mix of time horizons inherent in the expectational data.

(c) The skewness coefficients indicate that the percentages of the total squared deviations to the left of the arithmetic mean of the dividend distributions are: 43.7% for Stock A, 44.3% for Stock B, and 43.3% for Stock C.

more skewed than those for Stock A.

c) Stocks B and C

The evidence in Table 6.23 supports the hypothesis that the dividend expectations for Stock B are significantly more optimistic than those for Stock C. The expectations for Stock B are also more uncertain than those for Stock C but significantly so at only the .16 level. The skewness of expectations for Stock C is greater than that for Stock B but only significantly different at the .51 level.

d) Discussion

The above findings indicate that of the three stocks, the expectations of dividend growth for Stock B are the most optimistic and most uncertain; those for Stock A, the least optimistic and most certain, and those for Stock C intermediate with respect to Stocks A and B. Thus, dividend expectations reflect essentially the same risk-return rankings as provided by price expectation although the differentiation among stocks is less pronounced with dividend expectations. As in the case of price expectations the "sensitivity" of the average mean dividend expectation to changes in the average standard deviation is less (2.0) between Stocks A and C than that between Stocks C and B (3.18).

No significant differences in the skewness of dividend expectations were evident.

6.5.2 Intra-Stock Comparisons of Investors' Dividend Expectations

The results of intra-stock comparisons of the average mean, standard deviation, and skewness of investors' dividend expectations are presented below as pair-wise comparisons of buyers/owners, sellers/owners, and buyers/sellers expectations for each of the three stocks. Summary data are presented in Table 6.24, 6.25 and 6.26.

a) Buyers and Owners

As in the case of intra-stock comparisons of price expectations buyers' and owners' dividend expectations were generally indistinguishable in terms of the magnitude, uncertainty, and skewness of their dividend expectations over both the short-and longer-term.

b) Sellers and Owners

The data in the above Tables supports the hypothesis that sellers' dividend expectations are significantly less optimistic in terms of future dividend growth than those of owners', but only in the case of Stocks A and C and only for time horizons of one and two years. There was no consistent evidence across all three stocks that sellers and owners dividend expectations differed significantly with respect to risk and skewness.

c) Buyers and Sellers

The data presented in the referenced Tables are inconclusive with respect to the hypothesis that the

Table 6.24

INTRA-STOCK COMPARISONS OF SUMMARIZED INVESTOR
DIVIDEND EXPECTATIONS*

	<u>Buyers (B)</u>	<u>Sellers (S)</u>	<u>Owners (O)</u>	<u>Significance Level of Comparisons</u>		
				<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
<u>Company A</u>						
Average Mean	.029 (.042)	.022 (.064)	.038 (.059)	.288	.249	.049
Average Std. Deviation	.057 (.051)	.076 (.070)	.076 (.078)	.013	.069	.486
Average Skewness	1.071 (.295)	1.153 (.603)	1.227 (.692)	.122	.060	.264
Number	100	89	79			
<u>Company B</u>						
Average Mean	.117 (.127)	.112 (.132)	.095 (.105)	.433	.195	.295
Average Std. Deviation	.142 (.086)	.133 (.136)	.136 (.101)	.388	.667	.464
Average Skewness	1.119 (.231)	1.147 (.448)	1.133 (.332)	.988	.741	.442
Number	96	22	97			
<u>Company C</u>						
Average Mean	.102 (.120)	.057 (.061)	.066 (.099)	.048	.185	.301
Average Std. Deviation	.142 (.122)	.119 (.105)	.111 (.150)	.259	.676	.374
Average Skewness	1.134 (.321)	1.148 (.317)	1.166 (.405)	.429	.695	.404
Number	25	33	70			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tail t' tests.

Table 6.25

INTRA-STOCK COMPARISONS OF SUMMARIZED
INVESTOR DIVIDEND EXPECTATIONS:
ONE AND TWO YEARS HORIZONS*

				<u>Significance Level of Comparisons</u>		
	<u>Buyers (B)</u>	<u>Sellers (S)</u>	<u>Owners (O)</u>	<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
<u>Company A</u>						
Average Mean	.033 (.060)	.022 (.079)	.051 (.078)	.265	.317	.047
Average Std. Deviation	.101 (.073)	.094 (.083)	.120 (.102)	.350	.570	.109
Average Skewness	1.087 (.328)	1.219 (.734)	1.273 (.725)	.135	.195	.369
Number	24	54	33			
<u>Company B</u>						
Average Mean	.133 (.148)	.151 (.149)	.122 (.123)	.349	.656	.261
Average Std. Deviation	.169 (.087)	.157 (.166)	.186 (.103)	.394	.633	.278
Average Skewness	1.117 (.243)	1.194 (.501)	1.152 (.346)	.294	.539	.383
Number	64	14	54			
<u>Company C</u>						
Average Mean	.171 (.151)	.063 (.066)	.142 (.174)	.019	.653	.042
Average Std. Deviation	.248 (.111)	.144 (.114)	.258 (.253)	.008	.881	.046
Average Skewness	1.284 (.403)	1.140 (.292)	1.268 (.487)	.152	.919	.325
Number	11	23	17			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tailed t' tests.

Table 6.26

INTRA-STOCK COMPARISONS OF SUMMARIZED
INVESTOR DIVIDEND EXPECTATIONS:
LONGER THAN TWO-YEAR HORIZONS*

	<u>Buyers (B)</u>	<u>Sellers (S)</u>	<u>Owners (O)</u>	<u>Significance Level of Comparisons</u>		
				<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
<u>Company A</u>						
Average Mean	.027 (.035)	.022 (.031)	.028 (.040)	.288	.912	.277
Average Std. Deviation	.043 (.032)	.049 (.028)	.044 (.030)	.310	.903	.260
Average Skewness	1.066 (.287)	1.049 (.292)	1.194 (.674)	.391	.224	.098
Number	76	35	36			
<u>Company B</u>						
Average Mean	.084 (.061)	.044 (.054)	.062 (.064)	.042	.119	.282
Average Std. Deviation	.087 (.048)	.091 (.035)	.073 (.051)	.378	.254	.121
Average Skewness	1.125 (.209)	1.066 (.354)	1.109 (.317)	.331	.794	.374
Number	32	8	43			
<u>Company C</u>						
Average Mean	.047 (.041)	.045 (.048)	.041 (.032)	.442	.634	.417
Average Std. Deviation	.058 (.030)	.063 (.048)	.064 (.030)	.377	.517	.473
Average Skewness	1.015 (.176)	1.166 (.386)	1.133 (.374)	.135	.095	.399
Number	14	10	53			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tailed t' tests.

magnitude of sellers' dividend expectations is significantly less optimistic than that for buyers' of the respective stocks. This hypothesis is supported only for Stock A for time horizons of more than one year; for Stock B for time horizons of three and more years, and for Stock C for time horizons of one and two years. Hence, if the magnitude of dividend expectations do distinguish buyers and sellers, the occasions of this effect are unique for the particular stock.

Comparisons of the uncertainty of buyers and sellers' dividend expectations indicate a similar pattern of significant differences. Where significant differences in the magnitude of expectations were noted, significant differences in uncertainty were also noted with sellers being more certain than buyers, but only for Stocks A and C.

No significant differences in the skewness of buyers and sellers dividend expectations were evident.

The above findings indicate that buyers and sellers' dividend expectations are occasionally distinguishable in terms of the magnitude and uncertainty of the expectation. However, instances of these differences appear to be uniquely determined by the particular stock.

d) Discussion

Unlike the earlier comparisons of buyers, sellers and owners' price expectations, the above analysis of dividend expectations does not generally support the

the hypothesis that sellers' dividend expectations are significantly more conservative, uncertain, or skewed than those of either buyers or owners. Instances of significant differences appear to be unique to the particular stock. Buyers' and owners' dividend expectations were indistinguishable as in the case of price expectations.

Thus the above findings regarding sellers' versus buyers' or owners' dividend expectations are inconclusive. That is, there is evidence of differences in the hypothesized direction but these differences are not consistent across all three stocks.

6.5.3 Inter-Stock Comparisons of Dividend Expectations With Control for the Type of Investor and Time Horizon

The results of extending the analysis to inter-stock comparisons of dividend expectations with controls imposed on the type of investors and their time horizons is presented in Table 6.27, 6.28 and 6.29.

a) Stocks A and B

The data in the referenced Tables indicate that all three types of investors associated with Stock B - across all time horizons - are significantly more optimistic and more uncertain than their counterparts associated with

Table 6.27

INTER-STOCK COMPARISONS OF SUMMARIZED INVESTOR
DIVIDEND EXPECTATIONS BY TYPE OF INVESTOR*

	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.029 (.042)	.117 (.127)	.102 (.120)	.000	.002	.580
Average Std. Deviation	.057 (.051)	.142 (.086)	.142 (.122)	.000	.001	.987
Average Skewness	1.071 (.295)	1.119 (.231)	1.134 (.321)	.097	.309	.830
Number	100	96	25			
<u>Sellers</u>						
Average Mean	.022 (.064)	.112 (.132)	.057 (.061)	.002	.003	.076
Average Std. Deviation	.076 (.070)	.133 (.136)	.119 (.105)	.036	.015	.691
Average Skewness	1.153 (.603)	1.147 (.448)	1.148 (.317)	.480	.478	.289
Number	89	22	33			
<u>Owners</u>						
Average Mean	.038 (.059)	.095 (.105)	.066 (.099)	.000	.018	.061
Average Std. Deviation	.076 (.078)	.136 (.101)	.111 (.150)	.000	.037	.232
Average Skewness	1.227 (.692)	1.133 (.332)	1.166 (.405)	.135	.256	.588
Number	79	97	70			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

Table 6.28

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR DIVIDEND EXPECTATIONS BY
TYPE OF INVESTOR - ONE AND TWO YEARS HORIZONS*

	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.033 (.060)	.133 (.148)	.171 (.151)	.000	.005	.537
Average Std. Deviation	.101 (.073)	.169 (.087)	.248 (.111)	.000	.000	.041
Average Skewness	1.087 (.328)	1.117 (.243)	1.284 (.403)	.343	.084	.203
Number	24	64	11			
<u>Sellers</u>						
Average Mean	.022 (.079)	.151 (.149)	.063 (.066)	.003	.010	.050
Average Std. Deviation	.094 (.083)	.157 (.166)	.144 (.114)	.091	.031	.790
Average Skewness	1.219 (.734)	1.194 (.501)	1.140 (.292)	.436	.253	.720
Number	54	14	23			
<u>Owners</u>						
Average Mean	.051 (.078)	.122 (.123)	.142 (.174)	.000	.024	.663
Average Std. Deviation	.120 (.102)	.186 (.103)	.258 (.253)	.002	.020	.261
Average Skewness	1.273 (.725)	1.152 (.346)	1.268 (.487)	.311	.486	.624
Number	33	54	17			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail 't' tests; Stock B/Stock C tests involve a non-directional 't' test.

Table 6.29

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR DIVIDEND EXPECTATIONS BY
TYPE OF INVESTOR: LONGER THAN TWO-YEAR HORIZONS*

	<u>Company</u>			<u>Significance</u> <u>Level of</u> <u>Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.027 (.035)	.084 (.061)	.047 (.041)	.000	.052	.019
Average Std. Deviation	.043 (.032)	.087 (.048)	.058 (.030)	.000	.059	.015
Average Skewness	1.066 (.287)	1.125 (.209)	1.015 (.176)	.116	.302	.074
Number	76	32	14			
<u>Sellers</u>						
Average Mean	.022 (.031)	.044 (.054)	.045 (.048)	.140	.090	.991
Average Std. Deviation	.049 (.028)	.091 (.035)	.063 (.048)	.004	.303	.166
Average Skewness	1.049 (.292)	1.066 (.354)	1.156 (.386)	.451	.302	.578
Number	35	8	10			
<u>Owners</u>						
Average Mean	.028 (.040)	.062 (.064)	.041 (.032)	.002	.036	.056
Average Std. Deviation	.044 (.030)	.073 (.051)	.064 (.030)	.000	.000	.286
Average Skewness	1.194 (.674)	1.109 (.317)	1.133 (.374)	.222	.297	.738
Number	46	43	43			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

Stock A for the expected annual growth in dividends. No consistent evidence of differences in the skewness of expectations was found.

b) Stocks A and C

The data indicate that the expectations of all three types of market participants associated with Stock C were significantly more optimistic and more uncertain than those of their counterparts associated with Stock A in both the short and longer term. No consistent significant differences in the skewness of the expectations were evident.

c) Stocks B and C

The data in the referenced Tables indicate that the earlier noted more optimistic dividend expectations (Table 6.23) for Stock B in relation to Stock C is due to a unique mix of investor types and time horizons. That is, disaggregates of expectations show that only sellers of Stock B with short-term horizons and buyers and owners with long-term horizons have significantly more optimistic dividend expectations than their counterparts associated with Stock C (although not significantly less optimistic). Instances of significant differences in risk were inconsistent with those indicated in Table 6.23. Similarly no consistent differences in skewness were

evident.

d) Discussion

The foregoing findings indicated that the earlier noted (Table 6.23) magnitude and uncertainty trade-offs between Stocks A and B, and A and C are consistently found in comparisons involving different types of market participants and time horizons. In contrast the earlier noted direction and significance of differences in the dividend expectations for Stocks B and C was found to be the result of an apparently unique combination of investor types and time horizons.

6.5.4 Inter- and Intra-Stock Comparisons Involving Security Analysts' Dividend Expectations

The results of inter-stock comparisons of analysts' dividend expectations are presented in Table 6.30. Comparisons between analysts' and individual investors' expectations are presented in Table 6.31.

a) Stocks A and B

As in the case of individual investors, the dividend expectations of security analysts for Stock B are significantly more optimistic and uncertain than those of analysts for Stock A. Similar to individuals' dividend expectations, analysts' dividend expectations for Stock A

Table 6.30

INTER-STOCK COMPARISONS OF SUMMARIZED
SECURITY ANALYSTS' DIVIDEND EXPECTATIONS*

	<u>Company</u>			<u>Significance</u> <u>Level of</u> <u>Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
Average Mean	.029 (.016)	.093 (.072)	.095 (.077)	.003	.004	.941
Average Std. Deviation	.038 (.036)	.107 (.039)	.087 (.064)	.000	.011	.640
Average Skewness	1.223 (.323)	1.019 (.147)	.924 (.434)	.018	.025	.526
Number	15	13	13			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve a one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

Table 6.31

COMPARISONS OF ANALYSTS' AND INVESTORS
SUMMARIZED DIVIDEND EXPECTATIONS*

	<u>Company A</u> <u>Individual/</u> <u>Analysts</u>	<u>Company B</u> <u>Individual/</u> <u>Analysts</u>	<u>Company C</u> <u>Individual/</u> <u>Analysts</u>
Average Mean	.029/.029 (.055)(.016)	.107/.093 (.113)(.072)	.071/.095 (.095)(.077)
Significance	.840	.504	.331
Average Std. Deviation	.069/.038 (.067)(.036)	.138/.107 (.098)(.039)	.119/.087 (.134)(.064)
Significance	.006	.021	.141
Average Skewness	1.144/1.223 (.543)(.322)	1.128/1.019 (.304)(.147)	1.155/.924 (.365)(.434)
Significance	.608	.025	.080
Number	268/15	215/13	128/13

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of return. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve a non-directional 't' test.

were more skewed to the right than those for Stock B, and although individuals' skewness was not significantly different, analysts' skewness was.

b) Stocks A and C

Dividend expectations for Stock C were significantly more optimistic and more uncertain than those for Stock A which is identical to the finding for individuals. However, while individuals did not differentiate between these two stocks on the basis of the skewness of the expectation, analysts did. Here Stock A is significantly more skewed to the right than Stock C, and on average, expectation for Stock C are skewed to the left.

c) Stocks B and C

Whereas individuals' dividend expectations were more optimistic and more uncertain for Stock B than Stock C, analysts expectations were not distinguishable between the two stocks.

d) Discussion

The dividend expectations of individual investors and security analysts were generally consistent except in the case of comparisons of Stock B and Stock C. Differences in analysts' and individuals' dividend expectations centered on the uncertainty and skewness of expectations and not on

the magnitude of the expectations. A similar finding was noted in the case of price expectations.

6.5.5 Summary of Inter- and Intra-Stock Comparisons of Dividend Expectations

A) Inter-Stock Comparison of Dividend Expectations

Analysis of individual investor's dividend expectations yielded results similar to those found for price expectations. Expectations for growth in the annual dividend were lowest for Stock A, 3%; intermediate for Stock C, 7%; and most optimistic for Stock B, 11%. Correspondingly, the risk associated with these rates of change in the annual dividend was lowest for Stock A, 70% greater for Stock C, and 100% greater for Stock B. Differences in the rate and risk of dividend growth were highly significant (.003 level in better) across stocks except in the case of the risk differential for stocks B and C. Unlike the findings for price expectations significant differences in the skewness of dividend expectation were not evident.

These findings support the hypothesis that greater dividend growth is expected in the presence of greater dividend risk (Hypothesis 1.1). However, the similar risk perceived for dividend growth in the cases of Stock B and C does not support the hypothesis that rate of growth differen-

tials increase more than proportionally with increasing risk.

Analysts' dividend expectations for the three stocks were again somewhat different from those of individual investors with no significant differences being indicated between the dividend expectations for Stocks B and C. As in the case of individual investors, analysts' expectations indicated that of the three stocks, Stock A's annual dividend was expected to grow at the lowest annual rate, 3%, versus 9-10% for Stocks B and C. Similarly, the risk associated with the average annual dividend growth for Stocks B and C was roughly twice that expected for Stock A. However, unlike individuals' expectations, analysts' expectations for Stock A reflected significantly more right-skewness than in the case of Stock B and Stock C.

In relation to the consistency of analysts and individuals' price expectations, analysts and individuals' dividend expectations were more frequently inconsistent. These inconsistencies dealt with the risk and/or skewness of dividend expectations but not with the magnitude of the expected growth in the dividend. Thus these findings provide only limited support for the efficient market hypothesis in so far as dividend expectations are concerned (Hypothesis 3).

B) Intra-Stock Comparisons of Dividend Expectations

Differences in dividend expectations among buyers, sellers, and owners, for each of the three stocks were generally not as statistically distinct as those found for price expectations. As in the case of price expectations, buyers' and owners' dividend expectations were generally indistinguishable in terms of magnitude, risk, and skewness for all three stocks in both the short- and longer-terms and in the aggregate. In contrast, differences in sellers' and owners', and sellers' and buyers' expectations were not consistently found for each of the three stocks in the aggregate or when disaggregated by time horizon. That is, differences in dividend expectations among market participants were indicated as being unique to the particular stock. Thus these findings do not support the intra-stock hypotheses pertaining to differences in buyer' sellers' and owners' dividend expectations (Hypotheses 2.1 - 2.4).

6.6

TOTAL RETURN EXPECTATIONS

To investigate the relative optimism of the magnitude of investor's combined price and dividend expectations the internal rate of return implicit in the price and dividend expectations was calculated in the manner indicated earlier. Two computations of the standard deviation of the internal rate of return were made, one employing the historical correlation between price and dividends and

the second, employing the correlations based on the expectations data.

It should be noted that comparisons across stocks of rates of change in the market price or dividend are independent of the relative magnitudes of the price or dividend of the various stocks. However, comparisons across stocks of the internal rate of return are not independent of the relative magnitudes of the dividends of the two stocks. That is, the internal rate of return is based on the cash flow from a security which by definition includes the dividends of the stock. Thus, two stocks for which price and dividend expectations are identical and even with identical market prices will result in different internal rates of return if their dividends are of different magnitudes.

It should also be noted that the internal rate of return calculation makes the assumption of annual reinvestment of the proceeds from the security at a rate at least as great as the computed internal rate.

6.6.1 Inter-Stock Comparison of Investors' Total Return Expectations

The results of pair-wise comparisons of total return expectations are presented in Table 6.32. Results are presented for the uncertainty of total returns based on both expectational and historical correlations.

a) Stocks A and B

The data in Table 6.32 supports the hypothesis

Table 6.32

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR TOTAL RETURN EXPECTATIONS*

<u>Expectation</u> <u>Parameters</u>	<u>Company</u>			<u>Significance</u> <u>Level of</u> <u>Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
Average Mean	.114 (.067)	.173 (.130)	.092 (.075)	.000	.002	.000
Average Std. Deviation	.054 (.056)	.111 (.093)	.089 (.084)	.000	.000	.019
-Expectational						
-Historic	.034 (.045)	.117 (.094)	.082 (.083)	.000	.000	.000
Number	279	234	134			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

that the total return expected by investors associated with Stock B is significantly more optimistic (17.3% per annum) and uncertain (11.1%) than that expected by investors associated with Stock A (11.4% per annum and 5.4% respectively).

b) Stock A and C

The data in Table 6.32 supports the hypothesis that the total return expected by investors associated with Stock C is significantly less optimistic (9.2% per annum) and more uncertain (8.9%) than that expected by investors associated with Stock A (11.1% per annum and 5.4% respectively).

c) Stocks B and C

The evidence in Table 6.32 supports the hypothesis that the total return expected by investors associated with Stock B is significantly more optimistic (17.3% per annum) and uncertain (11.1%) than those of investors associated with Stock C (9.2% per annum and 8.9% respectively).

d) Discussion

As a result of combining the price and dividend expectations for the three stocks, the risk-return trade-off ordering found in the analysis of price and dividend expectations is altered. Here Stock C is indicated as being an inferior to Stock A in terms of the magnitude and variability of expected return. This findings is illustrated in Figure 6.4.

FIGURE 6.4

AVERAGE RISK AND RETURN OF
TOTAL RETURN EXPECTATIONS.

(Reference : Table 6.32)

6.6.2 Intra-Stock Comparisons of Total Return Expectations

The results of comparing the magnitude and uncertainty of buyers' sellers' and owners' expectations of total return are presented in Table 6.33, 6.34 and 6.35.

a) Buyers and Owners

The evidence presented in the above Tables supports the hypothesis that the average magnitude and uncertainty of buyers and owners combined price and dividend expectations were not significantly different over all time horizons. That is, buyers and owners' expectations of total return are indistinguishable in that they are equally optimistic and uncertain.

b) Sellers and Owners

In the referenced Tables, the data supports the hypothesis that the magnitude of sellers' expectations are significantly less optimistic than that of owners in the shorter term but not in the longer term.

Consistent significant differences in the uncertainty of sellers' and owners' expectation were not evident. While sellers were generally more certain in their expectations than owners in the short term for both historical and expectational correlations, difference in uncertainty were only significant for Stock A and then only for expectational correlations. In contrast, short-term differences were significant for Stock C using historical correlation

Table 6.33

INTRA-STOCK COMPARISONS OF SUMMARIZED
INVESTOR TOTAL RETURN EXPECTATIONS*

	<u>Buyers (B)</u>	<u>Sellers (S)</u>	<u>Owners (O)</u>	<u>Significance Level of Comparisons</u>		
				<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
<u>Company A</u>						
Average	.118	.098	.127	.009	.583	.004
Mean	(.063)	(.057)	(.079)			
Av. Std. Dev.	.048	.056	.061	.151	.129	.294
Expectational	(.046)	(.057)	(.064)			
-Historic	.029	.037	.037	.116	.241	.474
	(.033)	(.051)	(.051)			
Number	106	93	80			
<u>Company B</u>						
Average	.178	.159	.173	.280	.785	.334
Mean	(.106)	(.157)	(.143)			
Av. Std. Dev.	.112	.109	.110	.452	.865	.486
Expectational	(.099)	(.120)	(.079)			
-Historic	.126	.105	.112	.282	.293	.386
	(.100)	(.121)	(.079)			
Number	101	27	106			
<u>Company C</u>						
Average	.110	.076	.092	.061	.310	.323
Mean	(.081)	(.089)	(.065)			
Av. Std. Dev.	.113	.099	.076	.298	.130	.088
Expectational	(.116)	(.085)	(.069)			
-Historic	.102	.093	.070	.361	.189	.088
	(.115)	(.083)	(.068)			
Number	26	34	74			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tailed 't' tests.

Table 6.34

INTRA-STOCK COMPARISONS OF SUMMARIZED
INVESTOR TOTAL RETURN EXPECTATIONS:
ONE-AND TWO YEAR HORIZONS*

				<u>Significance</u> <u>Level of</u> <u>Comparisons</u>		
	<u>Buyers (B)</u>	<u>Sellers (S)</u>	<u>Owners (O)</u>	<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
<u>Company A</u>						
Average Mean	.164 (.096)	.101 (.069)	.162 (.107)	.001	.950	.002
Av. Std. Dev. Expectational	.087 (.060)	.071 (.068)	.099 (.081)	.138	.501	.045
-Historic	.052 (.048)	.047 (.061)	.064 (.069)	.331	.577	.114
Number	28	55	33			
<u>Company B</u>						
Average Mean	.208 (.111)	.152 (.099)	.221 (.161)	.024	.613	.016
Av. Std. Dev. Expectational	.143 (.105)	.135 (.146)	.152 (.037)	.414	.578	.326
-Historic	.157 (.105)	.131 (.147)	.154 (.076)	.252	.842	.268
Number	69	17	61			
<u>Company C</u>						
Average Mean	.165 (.087)	.071 (.103)	.150 (.081)	.004	.635	.003
Av. Std. Dev. Expectational	.197 (.123)	.123 (.091)	.156 (.085)	.040	.322	.116
-Historic	.183 (.124)	.117 (.090)	.151 (.080)	.055	.569	.095
Number	12	23	20			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tailed t tests.

Table 6.35

INTRA-STOCK COMPARISONS OF SUMMARIZED
INVESTOR TOTAL RETURN EXPECTATIONS:
LONGER THAN TWO YEAR HORIZONS*

	<u>Buyers (B)</u>	<u>Sellers (S)</u>	<u>Owners (O)</u>	<u>Significance Level of Comparisons</u>		
				<u>B/S</u>	<u>B/O</u>	<u>S/O</u>
<u>Company A</u>						
Average Mean	.102 (.034)	.094 (.030)	.102 (.036)	.126	.933	.145
Av. Std. Dev. Expectational	.034 (.029)	.034 (.021)	.034 (.026)	.480	.939	.487
-Historic	.021 (.021)	.022 (.019)	.018 (.016)	.426	.317	.146
Number	78	38	47			
<u>Company B</u>						
Average Mean	.112 (.049)	.169 (.232)	.108 (.080)	.266	.788	.280
Av. Std. Dev. Expectational	.046 (.029)	.066 (.023)	.054 (.037)	.018	.674	.098
-Historic	.057 (.031)	.062 (.023)	.056 (.038)	.296	.830	.258
Number	32	10	45			
<u>Company C</u>						
Average Mean	.063 (.031)	.087 (.051)	.071 (.041)	.097	.522	.327
Av. Std. Dev. Expectational	.042 (.033)	.048 (.034)	.047 (.027)	.341	.618	.474
-Historic	.032 (.032)	.042 (.033)	.040 (.028)	.266	.602	.433
Number	14	11	54			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve one-tailed t tests.

but not for expectational correlations. Furthermore, differences were significant for Stock C in the longer term.

Thus, there is some indication of significant differences in uncertainty of sellers and owners' expectations of total return (primarily in the short-term). However, the inconsistency of these findings prevents a generalization.

c) Buyers and Sellers

The evidence in the referenced Tables supports the hypothesis that sellers are significantly more pessimistic than buyers for the future return from their respective stocks for time horizons of up to two years but not for longer horizons.

There is little evidence to indicate that these differences in expectations of the magnitude of the return are accompanied by differences in the uncertainty of the expectations. As in the case of sellers and owners' expectations, significant differences in the uncertainty of expectations are unique to the particular stock, although in the short-term, sellers' expectations are consistently more certain than buyers. Thus, buyers' and sellers' expectations of financial return are generally only distinguishable in terms of their optimism for the magnitude of the expectation.

d) Discussion

Differences in the total return expected by buyers, sellers and owners were similar to those found for price

FIGURE 6.5

AVERAGE RISK AND RETURN OF
TOTAL RETURN EXPECTATIONS BY
TYPE OF INVESTOR.

(Reference: Table 6.33)

expectations. Essentially, buyers and owners had indistinguishable expectations for their particular stock while short-term sellers had consistently lower return expectations than either buyers or owners. Only inconsistent evidence of significant differences in perceived risk were found. Thus, as in the case of price expectations, buyers, sellers, and owners, of a particular stock are operating on essentially the same level of uncertainty/risk. This result is illustrated in Figure 6.5.

6.6.3 Inter-Stock Comparisons of Individual Investors' Expectations of Total Return With Control for the Type of Investor and the Time Horizon

Results of further extending the above analysis to inter-stock comparisons of similar types of investors are presented in Tables 6.36, 6.37 and 6.38.

a) Stocks A and B

The data in referenced Tables indicate that in the aggregate and over both time horizons all three types of investors associated with Stock B are more optimistic and uncertain than their counterparts associated with Stock A. These differences in magnitude and uncertainty are highly significant in the aggregate and short-term but only uncertainty is significantly different in the longer-term.

Table 6.36

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR TOTAL RETURN
EXPECTATIONS BY TYPE OF INVESTOR*

	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.118 (.063)	.178 (.106)	.110 (.081)	.000	.326	.001
Av. Std. Dev. Expectational	.048 (.046)	.112 (.099)	.113 (.116)	.000	.004	.967
-Historic	.029 (.033)	.126 (.100)	.102 (.115)	.000	.001	.662
Number	106	101	26			
<u>Sellers</u>						
Average Mean	.098 (.057)	.159 (.157)	.076 (.089)	.028	.089	.018
Av. Std. Dev. Expectational	.056 (.057)	.109 (.120)	.099 (.085)	.015	.004	.716
-Historic	.037 (.051)	.105 (.121)	.093 (.083)	.003	.000	.665
Number	93	27	34			
<u>Owners</u>						
Average Mean	.127 (.079)	.173 (.143)	.092 (.065)	.002	.001	.000
Av. Std. Dev. Expectational	.061 (.064)	.110 (.079)	.076 (.069)	.000	.080	.002
-Historic	.037 (.051)	.112 (.079)	.070 (.068)	.000	.000	.000
Number	80	106	74			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

Table 6.37

INTER-STOCK COMPARISONS OF SUMMARIZED
INVESTOR TOTAL RETURN EXPECTATIONS BY TYPE OF INVESTOR:
ONE AND TWO YEAR HORIZONS*

	<u>Company</u>			<u>Significance</u> <u>Level of</u> <u>Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.164 (.096)	.208 (.111)	.165 (.087)	.024	.485	.139
Av. Std. Dev. -Expectational	.087 (.060)	.143 (.105)	.197 (.123)	.000	.004	.162
-Historic	.052 (.043)	.157 (.105)	.183 (.124)	.000	.001	.510
Number	28	69	12			
<u>Sellers</u>						
Average Mean	.101 (.069)	.152 (.099)	.071 (.103)	.027	.103	.014
Av. Std. Dev. -Expectational	.071 (.068)	.135 (.146)	.123 (.091)	.046	.008	.764
-Historic	.047 (.061)	.131 (.147)	.117 (.090)	.015	.001	.730
Number	55	17	23			
<u>Owners</u>						
Average Mean	.162 (.107)	.221 (.161)	.150 (.081)	.017	.319	.011
Av. Std. Dev. -Expectational	.099 (.081)	.152 (.037)	.156 (.085)	.000	.009	.834
-Historic	.064 (.069)	.154 (.076)	.151 (.080)	.000	.000	.878
Number	33	* 61	20			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

Table 6.38

INTER-STOCK COMPARISONS OF SUMMARIZED INVESTOR
TOTAL RETURN EXPECTATIONS BY
TYPE OF INVESTOR: LONGER THAN TWO-YEAR HORIZONS*

	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
<u>Buyers</u>						
Average Mean	.102 (.034)	.112 (.049)	.063 (.031)	.129	.000	.000
Av. Std. Dev. Expectational	.034 (.029)	.046 (.029)	.042 (.033)	.025	.294	.699
-Historic	.021 (.021)	.057 (.031)	.032 (.032)	.000	.115	.019
Number	78	32	14			
<u>Sellers</u>						
Average Mean	.094 (.030)	.169 (.232)	.087 (.051)	.168	.325	.295
Av. Std. Dev. Expectational	.034 (.021)	.066 (.023)	.048 (.034)	.000	.107	.064
-Historic	.022 (.019)	.062 (.023)	.042 (.033)	.000	.037	.078
Number	38	10	11			
<u>Owners</u>						
Average Mean	.102 (.036)	.108 (.080)	.071 (.041)	.317	.000	.006
Av. Std. Dev. Expectational	.034 (.026)	.054 (.037)	.047 (.027)	.002	.007	.294
-Historic	.018 (.016)	.056 (.038)	.040 (.028)	.000	.000	.010
Number	47	45	54			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

b) Stocks A and C

All three types of investors associated with Stock C are equally or less optimistic and more uncertain than their counterparts associated with Stock A. Differences in the optimism and uncertainty are significant in an inconsistent manner over both horizons although in the short-term, all three types of investors associated with Stock C are significantly more uncertain in their expectations than investors associated with Stock A.

c) Stocks B and C

The data in the referenced Tables indicate that all three types of investors associated with Stock B are more optimistic and uncertain than their counterparts associated with Stock C. In general, the magnitudes are significantly different in both the short- and longer-terms while there are no instances of the uncertainty being statistically different.

d) Discussion

The differences noted in comparisons of aggregates of investors' expectations were found among all three types of investors and over the two selected time horizons. Some inconsistencies were noted which reflect the dependence of these latter comparisons on the underlying price and dividend

distributions and quite possibly on the assumptions regarding the correlation of these distributions. However, the data do indicate that the direction of differences found in Table 6.32 is also found among all three types of investors and across the two time horizons.

6.6.4 Inter-and Intra-Stock Comparisons Involving Analysts' Total Return Expectations

Inter-stock comparisons of analysts' expectations of combined price and dividend return are presented in Table 6.39. Comparisons of analysts' expectations with individuals' expectations of combined return are summarized in Table 6.40.

a) Stocks A and B

As in previous tests, the return expectations for Stock B are indicated as being significantly more optimistic and uncertain than those for Stock A.

b) Stocks A and C

The return expected by analysts for Stock C is significantly more uncertain than that for Stock A but of similar magnitude.

c) Stocks B and C

The total return expected by analysts for Stock C is indicated as being statistically indistinguishable from that for Stock B although expectations for C are on average more

Table 6.39

INTER-STOCK COMPARISONS OF SUMMARIZEDSECURITY ANALYSTS TOTAL RETURN EXPECTATIONS*

	<u>Company</u>			<u>Significance Level of Comparisons</u>		
	<u>A</u>	<u>B</u>	<u>C</u>	<u>A/B</u>	<u>A/C</u>	<u>B/C</u>
Average Mean	.107 (.044)	.152 (.075)	.104 (.087)	.034	.454	.142
Av. Std. Dev. Expectational	.037 (.037)	.103 (.046)	.128 (.129)	.000	.012	.526
-Historic	.025 (.035)	.097 (.045)	.136 (.128)	.000	.004	.316
Number	15	13	13			

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of change. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. Stock A/Stock B and Stock A/Stock C significance tests involve one-tail t' tests; Stock B/Stock C tests involve a non-directional t' test.

Table 6.40

COMPARISONS OF ANALYSTS' AND INVESTORS'
SUMMARIZED TOTAL RETURN EXPECTATIONS*

	<u>A</u> <u>Individual/</u> <u>Analysts</u>	<u>B</u> <u>Individual/</u> <u>Analysts</u>	<u>C</u> <u>Individual/</u> <u>Analysts</u>
Average Mean	.114/.107 (.067) (.044)	.173/.152 (.130) (.075)	.092/.104 (.075) (.087)
Significance	.574	.663	.669
Av. Std: Dev. Expectational	.054/.037 (.055) (.037)	.111/.103 (.093) (.046)	.089/.128 (.084) (.129)
Significance	.105	.583	.304
-Historic	.034/.025 (.045) (.035)	.117/.097 (.094) (.045)	.082/.136 (.083) (.128)
Significance	.645	.162	.155
Number	279/15	234/13	134/13

*The "Average Mean" and "Average Standard Deviation" are in units of annual rate of return. Figures in brackets are standard deviations. Significance levels are expressed as the probability of observed differences in averages occurring by chance. All significance tests involve a non-directional t' test.

uncertain and less optimistic than for Stock B.

d) Discussion

Inter-Stock comparisons of analysts' expectations of combined return result in clearly defined risk and return tradeoffs between Stocks A and B. The distinctions between Stocks A and C, and Stocks B and C were, however, less definite than those obtained from investors' expectations. As in previous differences of this nature, analysts' expectations regarding the variability of expected return for Stock C tend to indicate that stock as being an inferior investment to both Stocks A and B if the relative skewness of the underlying price distribution for Stock C is ignored.

The sensitivity of the average mean rate of return to changes in the average standard deviation (expectational) is less (-.298) between Stocks A and C than that between Stocks C and B (3.562).

6.6.5 Summary of Inter- and Intra-Stock Comparisons of Total Return Expectations

a) Inter-stock Comparisons of Total Return Expectations

The result of combining the price and dividend expectations to yield an average annual rate of return (internal rate of return) expected by individual investors indicates that the expected return from Stock A is the least risky; that from Stock C, roughly 50% more risky than A, and that from

Stock B, roughly 100% more risky than A. Similar to earlier findings Stock B is expected to provide the largest annual rate of return, 17%; however, unlike earlier findings for price and dividend expectations taken separately, Stock A is expected to provide a higher annual rate of return (11%) than Stock C (9%). Thus, although the rate of growth in both the price and dividend for Stock C was significantly greater than that for Stock A the relatively large dollar dividend provided by Stock A (roughly 5 times larger) and the longer time horizons of investors associated with Stock A outweighed the influence of growth expected in the two factors of total return for Stock C. Hence, from the standpoint of average return and risk, Stock A was indicated as being a superior investment in relation to Stock C; although, as indicated earlier, the expected price return for Stock C offers a greater potential for an extreme increase in price than that for Stock A. These findings therefore provide contradictory support for Hypothesis 1.1 and reject the stronger hypothesis (Hypothesis 1.2) that expected return differentials increase more than proportionately with risk differentials.

Comparisons of analysts' expectations of total return indicate that the return from Stock A is least risky, that from Stock B being roughly 200% greater and that for Stock

C roughly 300% greater. However, while Stock C is indicated as being the most risky, the return expected is slightly lower than that expected from Stock A (10% vs. 11%) and less than that expected from Stock B, 15%. Thus, in terms of analysts' expectations, Stocks A and B would be superior investments in relation to Stock C if the skewness of the underlying price expectations was ignored. Further analysis indicates that while analysts and individual investors differ in the relative risk of Stock C vis à vis Stocks A and B, they are in general agreement regarding the magnitude of the annual rate of return expected and the magnitude of the risk. Thus these findings support the efficient market hypothesis (Hypothesis 3) that investors' expectations are consistent with security analysts' expectations regarding the total return and risk potential of the three stocks.

b) Intra-Stock Comparisons of Total Return Expectations

Differences in the total return expected by buyers, sellers, and owners generally followed the same pattern as that found for price expectations. That is, buyers and owners expectations were statistically indistinguishable over all time horizons. Comparisons of sellers and owners expectations and sellers and buyers expectations indicated significant differences in total return expectations but only

for those investors with short-term horizons. For all three stocks, sellers with one or two year horizons expected a lower average rate of return than both buyers and owners with similar time horizons. There was no consistent evidence of significantly different risk differentials. Thus these findings support only Hypotheses 2.1 and 2.3 (partially) of the four intra-stock hypotheses.

6.7 SUMMARY OF MAJOR FINDINGS

The major findings of this Chapter are classified as inter- or intra-stock findings and are summarized below.

6.7.1 Inter-Stock Findings

1. Individual investors expected a higher rate of price appreciation and dividend growth for relatively more risky stocks. This result was also found in expectations of total return for two of the three inter-stock comparisons. The exception to this finding indicated that the oil stock (C) was expected to provide a lower total return and greater risk than the utility stock (A).

2. Only in the case of price and dividend expectations taken individually was there evidence that expected value differentials were more than proportionately greater than expected risk differentials.

3. The skewness of stock market participants'

price expectations was least for the relatively low risk utility stock (A) and significantly greater for the higher risk stocks (B and C). Significant differences in the skewness of dividend expectations were not found.

6.7.2 Intra-Stock Findings

1. For all three stocks, buyers' and owners' price, dividend and total return expectations were statistically indistinguishable. The only consistent evidence of statistically different return expectations among the three types of market participants was found in the case of short-term price and total return expectations. In these instances sellers were found to hold expectations of a relatively low rate of return in relation to the price expectations of either buyers or owners.

2. Individual investors' and security analysts' expectations of the rate of price change, dividend change, and total return were statistically indistinguishable for each of the three stocks. Individuals' and analysts' expectations of risk were indistinguishable in the case of total return for all three stocks; in the case of price expectations for the utility stock (A) and the mineral resource stock (B); and, in the case of dividend expectations for the oil stock (C). Individuals' and analysts' expectations of skewness were indistinguishable for both price and dividend expectations only in the case of the utility stock (A).

CHAPTER VII

SUMMARY AND CONCLUSIONS

In Chapter I three research questions were posed concerning the nature of investors' expectations of financial return. These questions inquired about differences in expectations between stocks and among market participants for any one stock. In Chapter III empirical hypotheses were proposed to investigate these inter- and intra-stock differences in expectations.

The results of testing these hypotheses were presented in Chapter VI and are summarized in this Chapter. Conclusions based on these findings are presented and discussed in the context of their implications for financial theory and research, corporate finance, and the investment industry. Finally, the implications of this study for further research are discussed.

7.1

LIMITATIONS OF THE RESEARCH DESIGN

The findings discussed in Chapter VI are based on the measured expectations of a sample of market participants and a selected group of three stocks. Conclusions drawn from these findings and the implications of these conclusions

are premised on the belief that similar results would have obtained if larger samples of investors and more stocks had been involved in this study.

Three constraints on the external applicability of these findings (and subsequent conclusions) should however be noted.

(a) The response rate to the mailing of questionnaires was approximately 30%; that is, 70% of those investors who received questionnaires did not respond.¹ In assessing the possible influence of the expectations of non-responders on the findings of this study the relevant question to consider is whether or not the return expectations of non-responders are different from those of responders? For example, is there any reason to believe that the price expectations of non-responders would be more or less optimistic or uncertain than the price expectations of responders? In the absence of evidence relating to this issue the null hypothesis is assumed to hold.

(b) The sample of investors in this study excluded institutional investors. Again the question of the representativeness of the measured expectations hinges on the issue of whether or not there is reason to believe that institutional investors' expectations for the various stocks are somehow systematically different from those of the individual investors or security analysts involved in

¹A response rate of 25% had been anticipated. See Chapter V.

this study. The null hypothesis is assumed to hold.

(c) All three stocks involved in this study could reasonably be classified as being 'blue chip' even though two of the stocks involved resource companies. Thus the findings are open to the question of whether or not risk and return differentials of the same general nature would be found for other, more risky classes of stocks. No evidence is available that might resolve this issue.

7.2 SUMMARY OF MAJOR FINDINGS

The major findings presented in Chapter VI are summarized below and classified as inter- or intra-stock findings.

7.2.1 Inter-Stock Findings

(a) Individual investors expected a higher rate of price appreciation and dividend growth for relatively more risky stocks. This result was also found in expectations of total return for two of the three inter-stock comparisons. The exception to this finding indicated that the oil stock (C) was expected to provide a lower total return and greater risk than the utility stock (A).

(b) Only in the case of price and dividend expectations taken individually was there evidence that expected value differentials were more than proportionately

greater than expected risk differentials.

(c) The skewness of stock market participants' price expectations was least for the relatively low risk utility stock (A) and significantly greater for the higher risk stocks (B and C). Significant differences in the skewness of dividend expectations were generally not found.

7.2.2 Intra-Stock Findings

(a) For all three stocks, buyers' and owners' price, dividend and total return expectations were statistically indistinguishable.

The only consistent evidence of statistically different return expectations among the three types of market participants was found in the case of short-term price and total return expectations. In these instances sellers were found to hold expectations of a relatively low rate of return in relation to the expectations of either buyers or owners.

(b) Individual investors' and security analysts' expectations of the rate of price change, dividend change, and total return were statistically indistinguishable for each of the three stocks. Individuals' and analysts' expectations of risk were indistinguishable in the case of total

return for all three stocks; in the case of price expectations for the utility stock (A) and the mineral resource stock (B)²; and, in the case of dividend expectations for the oil stock (C). Individuals' and analysts' expectations of skewness were indistinguishable for both price and dividend expectations only in the case of the utility stock (A).

7.3 CONCLUSIONS

The foregoing findings dealt with the results of inter- and intra-stock comparisons of expectations. This evidence provides support for conclusions regarding inter- and intra-stock similarities and differences in expectations.

7.3.1 Inter-Stock Conclusions

The findings of inter-stock comparisons are consistent with theoretical propositions regarding the form, content, and behavior of investor expectations in the equity valuation process. Specifically, investors were found to hold distributional expectations of price and dividend changes which, on average, reflect a higher mean expectation in the presence of greater variance. The finding

² It is worth noting that at the time of this study there was considerable controversy and uncertainty in the financial and general-interest press regarding the "energy crisis" and possible governmental action involving Canadian petroleum companies. Given this situation it is reasonable to speculate that expectations for the oil stock (C) may have been in a transitory state at the time of the study and that security analysts' expectations reflected increased uncertainty sooner than those of individual investors.

that expectations of total return for the oil stock (C), on average, had a smaller expected value and greater risk than those for the utility stock (A) is contrary to the hypothesized behavior of investor expectations and therefore restricts the above conclusion to the case of price and dividend expectations taken separately.³ Alternatively stated, ex ante risk premiums involving the expected value of expectations do exist for individual elements of return expectations.

The expected-return risk premiums found in this study are also consistent with the proposition that investors expect a more than proportionate difference in expected return for a given risk differential between two stocks. Again this conclusion must be restricted to the case of risk premiums reflected in price and dividend expectations taken individually.

The findings of inter-stock comparisons further support the proposition that ex ante skewness of price expectations is relevant in the valuation process. This conclusion however must be qualified by the assumptions

³ Rationalizations for this instance of contrary findings could involve the inability of the research design to obtain investors' beliefs regarding the correlation between price and dividend expectations; the possibility that investors do not 'expect' in terms of an internal rate of return as employed in this study; the possibility that investors' perceptions of risk are not in terms of the variability per se of the total expected return, etc.

that value is a positive function of right skewness and and that investors do not ignore the right skewness that was observed in their price expectations. If these assumptions are correct then the total risk premium⁴ involved in the valuation process must be defined to include both the expected value and the skewness of the price and dividend expectations taken individually or in a joint distribution.⁵

7.3.2 Intra-Stock Conclusions.

The findings of intra-stock comparisons of individual investors' expectations are consistent with the proposition that sellers of a stock with relatively short investment horizons are less optimistic about the future rate of price appreciation than buyers or owners of that stock. That is, expectations in the marketplace for a particular stock are not homogeneous.

⁴As indicated in Chapter III the total risk premium associated with a stock is also considered to be a function of the expected covariance of a stock's return with the return from the market.

⁵The possible relevance of the asymmetry of price expectations in the valuation process could explain the earlier noted anomaly where the total return expected for the oil stock (C) was smaller and more risky than that expected for the utility stock (A). The negative, expected-value risk premium implied by this finding did not reflect the significantly greater right skewness found in the price expectations for the oil stock. Had the skewness of the underlying price expectations been somehow combined with the expected value of the total return, the total risk premium for the oil stock (in relation to the utility stock) may have been positive.

The findings of intra-stock comparisons of individual investors' and security analysts' total return expectations and risk could be interpreted as the supporting the proposition that all publicly-available information was fully reflected in the market price of the three stocks at the time of the study.⁶ However, in view of the earlier noted instances of significant differences in the risk and skewness of analysts' and individuals' price and dividend expectations taken separately, the opposite conclusion is reached.

7.4 IMPLICATIONS

In answering the research questions put forward in Chapter I (Section 1.2) this study yielded results that have implications for financial theory and research, corporate financial practices, and the investment dealer industry. These implications are discussed in the following sections.

7.4.1 Financial Theory and Research

In Chapter I Robichek was reported as questioning the extent to which the theory of valuation was consistent

⁶This conclusion is based on the assumption that individual investors and security analysts have similar powers of perception and interpretation of information and that the only reason for differences in expectations is differences in information.

with the manner in which stock valuation was actually practiced. This study investigated one aspect of valuation theory; namely, the nature of investors' expectations of financial return. The fact that investors held price and dividend expectations which were generally distributional in nature and evidenced expected-value risk premiums supports existing valuation theory regarding investor expectations. Thus, although disparities between valuation theory and practice may exist, the representations of expectations in valuation theory is indicated as being consistent with the nature of expectations of investors practicing valuation.

In addition to providing insight into the question of disparity between valuation theory and practice, this study and its methodology have indicated the feasibility of quantifying investor expectations in a consistent and objective manner. As Friend has indicated, the direct measurement of investor expectations by survey methods is a necessary condition to achieving "any real progress" in the area of cost of equity capital estimation.

To achieve any real progress in this area in the near-term future, it seems to me to be necessary to survey a comprehensive sample of investors to determine the anticipated rates of return on individual stocks which they buy, sell or otherwise follow. It is of course the ex ante required rates of return rather than the ex post realized rates which are relevant to the measurement of the cost of capital.

⁷Friend, op. cit., pp 270.

The internal rates of return implicit in investors' price and dividend expectations as computed in this study are in fact first approximations to the cost of equity capital (at a point in time) of the three firms involved in this study.⁸ The term "first approximation" is employed in recognition of the as yet unresolved issues involved in reflecting time horizons and, transaction or investment sizes of the various types of market participants, in the computation of a representative absolute magnitude for a firm's required rate of return. Notwithstanding these issues, the methodology employed in this study provides a means of estimating a firm's cost of equity capital that is not directly dependent on ex post data.

⁸A firm's cost of equity capital at a point in time is defined as the magnitude of the return expectations of the marginal investor. Collectively, marginal investors are referred to as the "market" and are defined as those investors who are just willing to hold the stock at the going market price. Since, expected-return maximizing investors accept only those stocks which provide the highest level of return for a given level of risk (variability), the minimum acceptable rate of return for a given level of risk is the maximum rate perceived to be available. Alternatively, investors dispose of a stock when the expected return is less than the maximum perceived to be available. Thus the expectations of an 'appropriately' determined aggregate of market participants would provide a measure of the average marginal investor's required rate of return.

The significance of investor-based, future-orientated data to financial theory and empirical research can be illustrated further by reference to two empirical studies employing ex post data to investigate ex ante phenomena.

Ardetti⁹ investigated the relationship between the required rate of return on equity (dependent-variable) and two types of risk variables (independent variables) - those pertaining to the historical probability distribution of returns from a firm's stock (including the variance and skewness of the distribution), and those pertaining to a firm's financial policies (the payout ratio and the debt-equity ratio). Ardetti's critical assumption was that "in the long run investors receive what they expect. That is, the actual and the required rates are one and the same".¹⁰ This assumption is questionable since it is unlikely that investors would expect to receive an average loss or even an average "super normal" return in the long-run.¹¹

⁹ Ardetti, op. cit.

¹⁰ Ibid., p. 23.

¹¹ Keenan, op. cit., has noted that most empirical valuation studies tend to exclude anomalies such as firms with negative earnings.

Bower and Bower¹² investigated the hypothesis that normalized prices (dependent variable) of common stocks were a function of differences in expectations about earnings growth, payout rate, and differences in investors' required rates of return (independent variable). The discount rate or the rate of return required by investors was not directly entered as an explanatory variable in the hypothesized model, instead it was represented as a function of four other variables; the "marketability", "price variability", co-movement with the market, and "firm effects".¹³ Thus in contrast with Ardeti's study, Bower and Bower employed the required rate of return as an independent rather than a dependent variable.

The foregoing two studies provide examples of the types of financial research that could employ ex ante data to address patently ex ante research questions. This study has demonstrated the feasibility of obtaining the necessary data inputs for such studies.

7.4.2

Corporate Finance

By indicating the feasibility of measuring the expectations of investors who buy, sell, or otherwise

¹²R.S. Bower and D.H. Bower, "Risk and The Valuation of Common Stock", The Journal of Political Economy, (May, June, 1969), pp. 349-362.

¹³Stocks were excluded from Bower and Bower's study if the calculated "normal earnings" were not positive in each of the required data years.

follow a particular common stock this study has indicated the feasibility of obtaining a "reasonably reliable"¹⁴ estimate of a firm's cost of equity capital. Such an estimate of the firm's cost of equity capital would be valuable in computing its overall cost of capital since Friend has indicated that it is "relatively easy to measure the required rate for senior securities".¹⁵

A very significant application of the direct measurement of a firm's cost of equity capital arises in the case of regulated industries. Regulated companies are required to show that their rate of return on invested capital is inadequate before they are authorized to increase their service charges. A primary element in rate hearings is the determination of the firm's cost of equity capital.¹⁶

¹⁴Friend op. cit., p. 270. As indicated in the preceding section, computation of an absolute magnitude for the average marginal investors' required rate of return would involve weighting individual rates of return in an 'appropriate' manner. The development of such a weighting scheme is beyond the scope of this study.

¹⁵Loc. cit.

¹⁶An indication of the substantial effort applied to the estimation of a regulated firm's cost of equity capital is evident from the testimony given in various Bell Canada rate application hearings. For example, see Canadian Transportation Commission, Telecommunication Committee, Bell Canada evidence, B-71-241 and B-73-331.

Soldofsky and Olive have reported that "the two most widely used methods of computing k_e (the cost of equity capital) for the past decade have been the $\frac{E}{P}$ ratio (earnings/price) and the $\frac{D}{MP} + g$ formulations Although the FCC (Federal Communications Commission) evidently accepted $\frac{D}{MP} + g$ as one reasonable method of establishing k_e , one FPC (Federal Power Commission) examiner rejected this approach because he believed that it required defining what buyers and sellers believed that the future earnings, payout ratios, and other factors would be".¹⁷

Thus there is considerable practical interest and justification for the direct measurement of investors' required return on common equity.

A further corporate application of the direct measurement of return expectations is the identification of the dividend component of the total expected return. That is, it is possible to specify the rate of change in a company's annual dividend that is expected by investors who own, or, who are buying stock in a particular company. Such information would quite conceivably be of interest to a firm that was faced with both a need for cash and desire to maintain a steadily growing annual dividend. Confronted with such a situation and an awareness of the rate of growth that investors expected in the annual dividend, a firm's board of directors would have an objective informa-

¹⁷ R.M. Soldofsky, and G.D. Olive, Financial Management, Cincinnati: South-Western Publishing Co. 1974, p. 295-296.

tion input against which it could compare alternative dividend decisions.¹⁸

7.4.3 The Investment Industry

This study found that analysts' and investors' expectations were statistically indistinguishable in terms of the rate of price change, the rate of dividend change, and the total rate of return for all three stocks. However, it was also found that analysts' and investors' expectations frequently differed in regard to the perceptions of risk and extreme changes in price and annual dividend. If analysts and individuals had had identical expectations for the three stocks the implication would have been that, at the time of this study, all publicly available information was fully reflected in the prices of these stocks. Since expectations were 'mixed' rather than identical the implication is that the marketplace for these stocks was not efficient at the time of the study. However, the source of the inefficiency is not identifiable from the data collected in this study. That is, there is no evidence to indicate whether differences in information or in the transformation of information (or both), was the cause of differences in expectations.

¹⁸ Other information inputs are of course involved in the dividend decision, e.g. interest rates, investment opportunities, etc.

The presence of differences between analysts' and investors' expectations raises the question of the existence of 'superior' expectors.¹⁹ If, for example, analysts' expectations are more closely realized' than individual investors then areas for improved communications between analysts and investors will be indicated.

7.5.

RECOMMENDATIONS FOR FURTHER RESEARCH

This study was designed to investigate one element of valuation theory, namely, the nature of investors' expectations of financial return. The study focussed on the form, content, and behavior of price, dividend, and total return expectations.

In future studies involving the nature of investor expectations it would be worthwhile to explicitly investigate the expected dependency of price and dividend expectations rather than rely on approximation to this correlation. Ideally, a joint distribution of price and dividend expectations would be obtained from investors although, to obtain such information, it would probably be necessary to interview investors rather than mail questionnaires.

¹⁹ Since analysts and investors had the same expectations for the rate of price change, dividend change, and total return, the superiority of expectations could be investigated by comparing realized variations in price and dividends with expected variations in price and dividends.

An issue similar to the price-dividend expected dependency question that was not investigated in this study was the expected correlation of a security's return with the investor's portfolio return. As a result, this research was limited to a definition of risk as 'variability' per se and did not address the question of the contribution of a particular stock's return-variance to the variance of an individual's portfolio of marketable securities. Thus, the expected risk premiums reported in this study are a function only of the variance of a stock's expected return and not of the expected covariance of that return with an expected portfolio return. Although the methodology of investigating this broader definition of ex ante risk premiums would be formidable, an initial step might involve determining the extent to which individual investors' portfolio decisions are motivated by the expectations of reducing diversifiable (systematic) risk.

Ex ante data could also be employed in studies designed to investigate the nature of factors associated with the expected rate of return and the risk (variability) of a stock's future return. For example, the expected rates of return (dependent variable) for a cross-section of stocks could be investigated in terms of expected risk and skewness (independent variables). Additionally, the expected risk (variability) for a cross-section of stocks could be treated as a dependent variable in a re-

gression model with variables such as: the debt ratio, the payout ratio, interest coverage, etc., being treated as independent variables. That is, expectational data could be integrated with published financial data which conceivable would provide insight on the formation of expectations.

7.6 SUMMARY

The conclusions and implications of this study presented in the present Chapter are summarized below.

Essentially, the conclusions of this research involve answers to the research questions posed in Chapter I (Section 1.2). Specifically it was concluded that: investors do expect higher return from higher risk stocks; differences do exist between buyers, sellers, and owners expectations; and, all publicly available information was not fully reflected in the market prices of the selected stocks at the time of this study. The conclusions are however subject to qualifications regarding their applicability to different types of return (price, dividend, and total return), to different expectation time horizons, and to different parameters of return expectations.

The implications of this study were indicated as involving; financial theory and research, corporate financial practices and the investment industry. Implications for financial theory involve empirical support for the parametric representation of investor expectation in valuation theory. In terms of research methodology this study had indicated the feasibility of obtaining ex ante data inputs from a cross-section of investors to investigate ex ante phenomena such as investors' required rate of return and perceptions of risk. Implications for corporate financial practices stem from the approximation of a firm's cost of equity by direct measurement techniques; academic and practical support for such an approach was indicated.

Finally, the inconsistencies between security analysts' and investors' expectations implied that the marketplace for the selected stocks did not fully reflect all publicly available information and therefore was inefficient at the time of the study.

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APPENDIX I

MEASURING INVESTOR EXPECTATIONS

3. (a) Which one of the following statements best describes the way you expect the market price of this stock to behave in the foreseeable future?
Increase substantially	☐
Increase moderately	☐
Remain approximately the same	☐
Decrease moderately	☐
Decrease substantially	☐
- (b) Which one of the following statements best describes the way you expect the regular annual dividend per share of this stock to behave in the foreseeable future?
Increase substantially	☐
Increase moderately	☐
Remain approximately the same	☐
Decrease moderately	☐
Decrease substantially	☐
- (c) In your thinking about the future behaviour of the market price and regular annual dividend of this stock in the foreseeable future, roughly how far in the future are you looking?
- Please circle one of the 'times' provided or write your answer in the space provided.
Less than 1 year?	☐	If so, approximately how long?	____	days/weeks/months					
1 year	☐	2 yrs.	☐	3 yrs.	☐	4 yrs.	☐	5 yrs.	☐
More than 5 years?	☐	If so, approximately how long?	____	years					

ANSWER SCALES

I am interested in your opinion regarding the possibility of this stock selling at various prices in the foreseeable future. Please indicate your answer to each one of the questions on this page by placing a check mark (✓) on the Answer Scale opposite each question. Nineteen check marks are requested.

By the time that you have just indicated in 3(c) this stock could be selling at a price different from, or the same as its present price (recently \$42 - \$43).

How possible is it that this stock will be selling in the price range: \$171 to \$210?

How possible is it that this stock will be selling in the price range: \$131 to \$170?

etc. \$.87 to \$105?

\$ 86 10 \$ 737
etc.

\$ 58 10 & 612

• \$ 40 • \$ 522

[illegible]

100

[illegible]

0
9
3
6
7

Book will be selling in the price range: \$ 0 to \$ 9?

10

1

1

10

10

1

Please be sure to answer each and all of these questions.

ANSWER SCALES

How possible is it that the regular annual cash dividend will be in the range: \$.00 to \$.24?

	No Chance	Slight Possibility	Very Small Chance	Fairly Small Chance	Some Possibility	Fairly Good Possibility	Probable	Almost Sure	Certain												
0	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

250

APPENDIX II

TYPES OF PRICE DISTRIBUTIONS OBTAINED
BY PANKOFF AND VIRGIL*

CHART 3

Subjects' Probability Distributions (Firm 1, Period 2)

part 1

*Source: L.D. Pankoff and R.L. Virgil, "Some Preliminary Findings from a Laboratory Experiment on the Usefulness of Financial Accounting Information to Security Analysts," Empirical Research in Accounting, 1970, pp. 41-43.

APPENDIX II (Continued)

CHART 3 Continued

part 2

APPENDIX II (Continued)

CHART 3 Continued

part 3