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Financial Analysis and Planning: An Overview

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ABSTRACT

The main purpose of this paper is to review and synthesize important literature pertaining to financial analysis and planning. This review paper will also show readers how financial data and theory can be integrated with alternative management methodologies in useful financial analysis and planning. Some potential research topics in these areas are also indicated.

Introduction

Financial analysis and planning is one of the most important sub-
jects for business decisions. The main purpose of this paper is to
review and synthesize important literature pertaining to these topics,
and to show readers how financial data and theory can be integrated with
management methodology (e.g., regression analysis, linear programming
technique and computer tools) for useful financial analysis and planning.
Some potential empirical research topics will also be indicated.

The two main principles used to select the papers and classify them
into the ten topics are: (1) to integrate theory with practice; and (2)
to strike a balance between general overview and detailed understanding.
Two kinds of literature are presented in each topic: primary and sec-
ondary literature. Primary literature will be reviewed and synthesized
in each section, while secondary literature will only briefly be mentioned
at the end of each section.

The criteria used to choose the primary articles are (i) the degree
of their importance to financial analysis and planning; (ii) their ease
of understanding by either a BA or an MBA; (iii) the completeness with
which the author(s) explored the particular theory and/or its applica-
tion. The main purpose of secondary papers is to give readers further
information about related topics. Hence, the secondary papers may be
more complicated than primary papers or they can supply the readers with
complementary information about financial analysis and planning.

The material is divided into 10 topics.[1] Section 1 discusses how
accounting information can be used empirically to help in financial

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[1]Articles listed in the end of this paper preceded by a * can
be found in the readings book edited by Lee (1982).

analysis and management. The primary papers discussed in this section demonstrate how statistical tools can be used by a manager to analyze and interpret accounting data and draw meaningful conclusions. Section 2 concerns valuation theory and capital structure. Papers in this section discuss the basic concepts of M&M's propositions, the capital asset pricing model and the option pricing model as well as the interrelationship among these three theories. Possible applications of these theories to financial management are also explored. Cost of capital determination and estimation are the major issues in the papers included in Section 3. The strengths and weaknesses of alternatives cost of capital estimation method are also discussed in this section. Section 4 investigates the theory and practice of investment decision from both an academic and business viewpoint. Possible problems associated with inflation and the introduction of new product are explored in some detail. Section 5 discusses the potential interactions between financing, investment and dividend policies. The impacts of alternative financing policing on the investment decision are analyzed in terms of risk-free debt vs risky debt conditions. Section 6 discusses the possible impacts of alternative dividend policy on the market value of a firm. Unsolved questions related to dividend policy are also indicated. Both the theoretical and practical issues concerning mergers are investigated in Section 7. Papers included in this section will help managers to understand the possible advantages and disadvantages of merger activities for the shareholders of both acquiring firms and acquired firm. Short-term and long-term financial analysis and planning are explored in Section 8 and Section 9 respectively. Papers included in Section 8 emphasize the basic methods and information needed for working capital management; papers included

in Section 9 describe how financial information, theory and techniques can be joined together to perform financial planning and forecasting. Section 10 reviews a variety of papers which sythesize normative and positive theory. Section 11 summarizes the results of this paper. Some suggestions about further research on financial analysis and planning are discussed.

SECTION 1: ACCOUNTING INFORMATION AND FINANCIAL MANAGEMENT

Accounting information has been used extensively in the analysis of such issues as the prediction of firm failure, bond ratings, stock rates of return, as well as in merger study and in beta forecasting. In addition to presenting a general overview of the significance of financial and operating information in financial analysis and planning, the five papers in this section examine specific applications of accounting information in financial management.

First, Chen and Shimerda's (1981) (CS) paper summarizes the empirical results of numerous previous studies of accounting ratios and their significance in both financial analysis and firm failure prediction. Given the lack of a theoretical basis to support the choice of particular accounting ratios from the vast number available, as well as the wide differences in use (predictive, modelling, etc.) to which these ratios are put, CS attempt to simplify the wide number of possible ratio choices to a smaller number of basic financial groups. Through the use of principle component analysis, CS cluster 41 accounting ratios into 12 factor groupings which retain most of the explanatory power of the original amount of information. These 12 groups are further reduced to 7; the high correlations among the ratios in the 12 groups allow one representative

group to be used in place of several of the 12 found significant. The seven most basic financial factor groups are: financial leverage; capital turnover; return on investment; inventory turnover; receivables turnover; short-term liquidity; and cash position. Further research is required to determine which specific ratio from a group can be considered the "best representative" of the group for the particular purposes for which the accounting ratio will be used.

Three of the papers in this section concern the specification of models using accounting information, first, to examine the change over time in firm financial ratios and the adjustment process involved, and secondly, to incorporate various financial ratios as explanatory variables in predicting security returns. Two alternative linear models can be used to incorporate financial ratio information into financial mangement decisions and investment analysis: linear regression and linear discriminant analysis. Linear regression is used by both Lev (1969) and Lee and Zumwalt's (LZ) (1981) paper, linear discrimination analysis is used by Altman (1968) and Pinches and Mingo (1973).

Lev (1969) examines the movement of firm financial ratios across time and attempts to determine if firms adjust financial ratios to some industry norm or standard such as the industry mean. He uses a partial adjustment model to estimate the degree of adjustment of ratios to an industry average and finds evidence that is consistent with the hypothesis of firm adjustment. The speed of adjustment depends on such factors as stability of the industry mean, size of the firm (due to indivisibility of assets and liabilities), and a comparison of the cost of adjustment (institutional constraints or ease of managerial control) against the

cost of divergence (higher interest expense on debt agreements, etc.).
Lev's empirical results indicate that good predictive results can be
expected from both the lagged financial ratio itself and the lagged in-
dustry mean.

LZ's paper incorporates several important financial ratios into a
single index market model and uses them to construct a multi-index security
rate of return generating process model. To perform their empirical study,
rates of return for the jth firm in this multi-index model are linearly
related to market rates of return, dividend policy variables, financing
policy variables, and a profitability measure variable. To investigate
the associations between alternative accounting profitability measures
and security returns, six profitability measures were used: sales/total
assets; EBIT/total assets; net income/total assets; net income/common
equity; EBDT/sales; and net income/sales. LZ's study concludes that
accounting profitability information is an important source of extra-
market information in asset pricing, and the EBIT/total assets and net
income/common equity provide the most consistent empirical results. It
should be noted that the Seemingly Uncorrelated Regression (SUR) tech-
nique is used to improve the efficiency of the estimates in this paper.
This technique is relatively complicated; however, it is not necessary
to follow the exact derivation procedure in order to understand the
essence of the paper.

As an example of a particular application of accounting ratios,
Altman (1968) uses multiple discrimination analysis (MDA) with financial
ratios as variables to estimate financial "Z scores" to predict the
probability of bankruptcy for a firm. Altman describes the MDA technique

in general terms and then develops a linear discriminant function which "best" distinguishes between the two groups under consideration, bankrupt vs. non-bankrupt firms. Altman's results can be summarized as:

> Z Score = f(net working capital/total assets; retained earnings/total assets; EBIT/total assets; market value of equity/book value of debt; and sales/ total assets)

The lower the Z score, the greater is the potential of firm bankruptcy.

Altman goes on to test the function on other samples and finds the accuracy of classification ranges from 95% (a secondary sample of bankrupt firms) to 79% (a group of non-bankrupt firms with negative profits reported). In addition, predictive ability falls below 50% between the second and third year from bankruptcy.

In discussing possible application of the MDA model, Altman develops a "cut-off" rule for Z scores which can be used as a quick indication of credit-worthiness in business loans. The use of Z scores could also be extended to predictors of "downside movement" when analyzing potential portfolio investment choices.

Finally, Pinches and Mingo (1973) (PM) use financial ratios in developing a model to predict bond ratings. Both factor analysis and MDA are used. PM find seven factor groups to have significant explanatory power. In applying the MDA technique, PM use five of the factors (years of consecutive dividends; issue size; NI + interest/interest; long term debt/total assets (5 yr avg.); NI/total assets) and the existence of subordination of the bond issue to develop four discriminant functions. The model predicts bond ratings with accuracy ranging from 69.7% (the original sample) to 56.3% (from a stratified random sample). From a

multiple range test, PM find that no variables in the model can adequately discriminate between Baa and other adjacent bond rating groups. The authors conclude that the model may require different financial or operating variables to increase its explanatory power or that the quantitative data examined in the model may be more highly related to the actual long term potentialities of rated bonds than the more qualitative assessments of the rating agencies.

Accounting information is strongly interrelated with the various other topics presented here. Accounting and operating information are used in many of the empirical investigations presented in the remainder of this paper. Such papers as Kim's (1979) investigation of the effect of inflation on net operating income (part 4) depend on accounting information for their results. In addition, Rappaport's (1981) paper (part 6) on inflation accounting methods and dividend payout is yet another aspect of the use of accounting information in firm decisions. Larson and Gonedes (1969) (part 7) use accounting information to examine a merger problem. Finally, all the financial planning models depend on accounting information to generate the simulated balance sheet and income statements that are their end product.

Some other useful reading papers on the topic of accounting information and its uses in finance include: (1) Eisenbeis (1977), (2) Pinches and Trieschman (1977), and (3) Sinkey (1974).

SECTION 2: VALUATION THEORY AND CAPITAL STRUCTURE

Bond valuation and equity valuation are important to security analysts and financial managers. Classical valuation theory, the M&M theory, the capital asset pricing model (CAPM), and the option pricing model (OPM)

are four important theories of financial analysis and asset valuation. The theories are reviewed and discussed in the various papers presented in this section. In addition, the issue of corporate capital structure is also discussed by reviewing several papers on the subject.

The basic differences between the classical valuation theory and M&M's theory are: the specific impacts of leverage policy and dividend policy on the market value of firm, and the assertion of the existence of an optimal capital structure. Both financing policy and the existence of an optimal capital structure are discussed in this section; dividend policy will be analyzed in Part VI.

In their seminal papers (1958, 1963), M&M considered the cost of capital, corporate valuation, and capital structure. Under certain simplifying assumptions (capital markets are frictionless; firms and individuals can borrow and lend at the risk-free rate; there are no bankruptcy costs; firms issue only two instruments, risk-free debt and risky equity; there are only corporate taxes; and all cash flow streams are perpetuities (i.e., no growth), M&M argued that the corporation will use 100% debt. In his 1977 presidential address paper, Miller reconsiders the issue of optimal capital structure and generalizes the relationship between the market value of an unlevered firm (V) and the market value of a leveraged firm (V) as:

$$V^L = V^u + \frac{[1 - (1 - t_c)(1 - t_{ps})]B_L}{(1 - t_{pB})}$$

where B = total risk-free debt issued by the firm

t_c, t_{ps}, and t_{pB} are the corporate tax rate, personal tax rate on the income from stock, and the personal tax rate on the income from bonds.

Thus, the issue of an optimal structure hinges on certain tax considerations. If both t_{ps} and t_{pB} are 0, then the above equation reduces to $V^L = V^u + t_c B$, the primary finding of the two earlier papers by M&M. Further, Miller argues that the tax advantage of debt can disappear completely when the rates happen to be such that $(1 - t_{pB}) = (1 - t_c)(1 - t_{ps})$. Further, the point where the bond's supply rate (r_s) is equal to the demand rate (r_D), or

$$r_D = \frac{r_0}{1 - t_{pB}} = \frac{r_0}{1 - t_c} = r_s$$

[r_0 is the rate paid on the debt of the tax-free institution, (e.g., municipal bonds)]

defines a market equilibrium level of debt.

Thus, here there will be no optimal capital structure for firms, but perhaps an optimal amount of debt for the aggregate. This sort of analysis may explain the lack of change in D/E ratios over the last 30 years despite the sizeable rise in tax rates in the American economy as well as the transition from an individual- to an investor- dominated market. It should be noted, however, that DeAngelo and Masulis (1980) (DM) have shown that Miller's results are relatively restricted. With more general assumptions, DM show that an optimal capital structure does exist for the individual firm.

To round out an examination of M&M's contribution to this topic, M&M's 1961 article (Part VI) carefully discusses and integrates the four alternative valuation approaches: the stream of dividends; the stream of earnings; the discount cash flow; and the investment opportunity approach. The investment opportunity approach explicitly allows

for the growth opportunities of a firm; thus, this 1961 paper can be read in conjunction with Miller's and Myers' 1977 articles and the other articles in this section to gain a fuller understanding of the valuation process.

The Capital Asset Pricing Model and Option Pricing Model are two particularly important interrelated valuation models. Using an integrated graphical and mathematical method, Sharpe (1964) was one of the first scholars to derive the CAPM. The Option Pricing Model was first derived by Black and Scholes (1973) in terms of stochastic differential equations. However, the degree of mathematical sophistication required to fully appreciate the derivation is beyond the experience of both master's and undergraduate students. Hence, Rendleman and Barter (1979) (RB) develop a two-state option pricing determination process and derive a discrete (binomial) option pricing model (OPM).

RB develop their option pricing model algebraically using a discrete time (vs. continuous time) model. The binomial aspect of the model lies in the specification of stock price movement in terms of a constant (and equal) rise or fall in return through successive discrete time periods. In this sense, the model might be more restrictive than the continuous time model, but its virtue is that the basic outline of the approach (the hedge portfolio, lack of arbitrage opportunities) is the same as the more complex Black and Scholes option pricing model.

The binomial OPM introduced here can be utilized to derive Black and Scholes' continuous option pricing model as defined in both Black and Scholes Galai and Masulis' paper. This is accomplished by letting the length of the period between up or down movements in price become very small and hence the number of periods becomes very large.

Galai and Masulis's (GM) paper take the insight of the OPM provided by Black and Scholes and shows how it may be applied to many of the traditional issues of corporate finance such as dividend policy, acquisitions, divestiture, conglomerate mergers, and investment decisions of various kinds.

GM's analysis uses the fact that equity can be characterized as an option on the firm's value to incorporate the CAPM-derived measure of equity risk, beta, into the option pricing model. From this incorporation, the effects of various firm characteristics on equity risk, such as the face value of debt, debt maturity, leverage, etc., can be ascertained. In addition, a similar analysis leads to similar insight into the relation of these firm characteristics to stock return. GM go on to examine the effects of certain firm actions on firm rate of return, stock risk and stock rate of return under their model. For instance, the effect of firm acquisition (if it leads to greater variability in firm rate of return) will be to lower the firm's debt market value while raising its equity market value; thus, the firm's market-valued D/E ratio will also be changed. In the case of conglomerate mergers, GM show that the resulting firm's debt capacity will, indeed, increase and that, with corporate tax deductibility of interest, this additional capacity will increase the value of the firm. The authors also examine spin-offs (in this case, the value of equity will rise at the expense of debt holders), and change in firm scale (systematic risk is unaffected by changes in scale). Finally, because firm systematic risk is shown to be non-stationary under the OPM, the empirical research testing the efficiency of the market, the validity of the CAPM and other major finan-

cial results must be adjusted to explicitly reckon with the implications of this non-stationarity.

Rubensteins's paper shows how the CAPM can be used to estimate the cost of capital. He uses the risk-adjusted required rate of return as the cutoff rate with which to compare a project's internal rate of return. This criterion, depending on the market price of risk, is thus independent of the firm's particular weighted average cost of capital. Further, the project can then be evaluated independently of the capital firm's existing assets. Rubenstein examines the problem of the capital structure of the firm and quantifies the relation of firm leverage to the risk of the firm and through that to the expected rate of return on equity. The effect of increasing leverage is seen to depend on either the correlation of the market rate of return with the rate of return of the unlevered equity or the unlevered beta. Rubenstein also shows how business (operating) risk and financial risk jointly affect the beta coefficient estimate. In addition, the paper explicitly discusses the relationship between the CAPM and M&M's propositions, which depend on the assumption of a "risk class."

In their review article, Barnea, Hangen, and Senbet (1981) (BHS) discuss the issues concerning market imperfections and their relation to a firm's choice of capital structure. In particular, they examine the effects of agency problems [such problems as information asymmetry (management holding information which cannot be transmitted costlessly to owners), debt financing under limited liability (the conflicts involved between the best interests and protection of shareholders vs. bond holders), and management compensation] and the market solutions to

such agency problems, the existence of impediments to solutions, and in
particular the specific debt policies invoked to handle agency problems.
Both M&M's valuation theory (see particularly Miller (1977)) and the
results from option pricing theory are used to examine the reason for
differences between academicians and practitioners about the effective-
ness of financing policies. Their main conclusions are: (1) When
frictions in the capital market preclude a costless solution to the
agency problem, complex contractual arrangements between the parties
in conflict (such as income bonds, call provisions, and convertible
securities) may arise as solutions. (2) The differences among financial
contracts in the ability to resolve such problems will lead to differ-
ential equilibrium prices for the financial contracts. The firm can
arrive at an optimal capital structure when (at the margin for each
class of contract) the costs associated with each agency problem are
balanced by the benefits associated with the existing yield differentials
and tax exposure.

The financial analysis of non-regulated firms is not necessarily
equivalent to that undertaken for regulated firms. Litzenberger and
Sosin's (1979) (LS) paper compares the capital structure decisions of
regulated vs. non-regulated firms and examines the effects of corporate
taxes and bankruptcy costs on regulated firms' leverage ratios. Although
the interest on debt financing is tax deductible, the necessity in regu-
lated firms of passing such savings along to customers may prevent such
debt savings from increasing the value of shares. However, large leverage
ratios may be viewed as "subsidies" to consumers of the regulated firm's
good. In addition, the effect of bankruptcy on shareholders and customers
will differ depending on the degree of monopoly the regulated firm has

in the market: a large firm (such as Penn Central) results in costs to
both shareholders and customers (vs. the cse with a small, "easily re-
placeable" competitor). Thus, forcing large utilities or railroads to
issue low grade debt, though tending to lower customer rates in the
short run, can be sub-optimal in a social sense in periods of financial
distress.

In the real-world fianncial management, the problem of bankruptcy
cannot be avoided. Bankruptcy prediction has been discussed in Part I
(Altman (1968)). Scott (1976) examines the valuation of debt, equity,
and the firm when bankruptcy is possible, and bankruptcy costs arise
from the assumption that secondary markets for firm assets are imperfect.
Scott shows that the value of equity will be greater than that which is
possible if bankruptcy is ignored since the limited liability protection in
bankruptcy has value not usually recognized explicitly. The value of debt
is seen to be dependent on both the interest payment and the discounted
value of expected proceeds upon bankruptcy. This result also makes it
possible to value differing classes of debt. Under Scott's assumption,
the firm will have an optimal capital structure which depends on the
contractual interest payments to debt as well as the probability of
bankruptcy. Thus, an increase in the leverage value of assets will
allow a greater debt level. Although a specific solution for the optimal
level of interest payments is not possible, the analysis leads to some
interesting results on the liquidation value of assets, the corporate
tax rate, and the distribution of earnings. In particular, Scott shows
that optimal leverage may be related to the collateral value of the
tangible assets held by the firm. That is, if the firm goes bankrupt,

the losses of bondholders are limited to the salvage value of the property held in the firm. Further, a higher corporate tax rate will (as in M&M's analysis) lead to a higher debt level in a firm. Finally, the effect of shifts in the expected return or variance of EBIT is ambiguous; the optimal debt level may increase or decrease depending on the particular values of a firm's probability of bankruptcy, etc. If the probability of bankruptcy is nill, then Scott's model is formally identical to M&M's (1958, 1961) mentioned above. Scott also discusses the debt policy for both unregulated and regulated firms. Because the _social_ costs of bankruptcy to firm customers (firms such as utilities), regulated firms will in general keep debt at a level lower than the optimum for an unregulated firm; that is, these costs will be ignored by unregulated value-maximizing firms but not by regulated firms.

(Author's Note: Two minor corrections should be noted in Scott's paper. First, Equation 1, when X is specified to be normally distributed, is given in the original paper as:

$$V = \frac{(1 - t)((X - R)(1 - F) + \sigma f(b))}{\rho + F}$$

This equation should be modified so that f(b) becomes n[(b - X)/σ], where n[ ] is the density function of a standardized normally distributed random variable.

Secondly, equation 14 should be modified to read:

$$\frac{\partial^2 V}{\partial R \partial 1A} = \frac{\rho(1 + \rho)f}{(\rho + F)^2} > 0$$

Capital structure also impinges on such areas as the firm's financing decision, as shown in Rendleman's (1978) (part 5) paper on corporate

financing under an OPM framework. In addition, capital structure enters as well into some of the constraints used in the financial planning models of Part 9, and Myers (1974) paper (part 5) modelling financing decisions.

Besides the papers discussed in this section, some other suggested references are: (1) Kim (1978), (2) Myers (1977), (3) Reilly and Sidhu (1980), (4) Roll (1977), (5) Taggert (1980), and (6) Tuttle and Litzenbergen (1968).

<div align="center">SECTION 3: COST OF CAPITAL</div>

The cost of capital of a firm is an important factor in determining the optimal mix of debt and equity, and is crucial in the investment decision process. The four papers presented here examine different issues arising under the general subject of the cost of capital. First, Henderson's (1979) paper attempts to reconcile the popular weighted average cost of capital (WACC) estimation method with the theoretically more rigorous CAPM and M&M definitions of the cost of capital. Chen (1978) examines the determination of the cost of debt capital in the light of the CAPM and the recently developed continuous-time option pricing model (OPM). Higgins (1974) uses a finite growth model to obtain empirical estimates of the cost of equity capital for a particular group of firms, the electric utility industry. Finally, Haley and Schall (1978) examine the uses to which the cost of capital is put, the assumptions under which these uses may be accurate and the general acceptability of the concept of the cost of capital in the field of finance.

Henderson uses the CAPM and M&M's model of equity rate of return (1963) (which have been discussed in Part 2) to show that the weighted average cost of capital is a justifiable estimation method. That is,

Henderson shows that the WACC equation is equivalent to both the security market line risk-adjusted rate of return and the M&M model of equity rate of return. To do this, he derives a generalized WACC equation: he uses the general rule that the cost of capital is the minimum after-tax return on I dollars of investment such that the value of the firm is undiminished (or $\delta V/\delta I = 1$), and equates this expression with the formula for the value of a firm in terms of returns to both equity and debt. With this generalized form, Henderson then shows its algebraic equivalence to the two other cost of capital measures. Thus, the WACC is given a more rigorous foundation in finance theory.

The debt cost of capital, an integrated part of a firm's cost of capital, is defined as the equilibrium required rate of return on a risk-free corporate bond and on a risky corporate bond. Chen's paper reviews some recent developments in the theory of risky debt and examines more systematically the determinants of the cost of debt capital.

In particular, a static and a dynamic model are examined in order to determine the components controlling the cost of debt capital. Both a static single period CAPM model (under uncertainty) and the dynamic continuous time option pricing model are used to show that the market value of a leveraged firm is the sum of four components:

> (the market value of the unlevered firm) + (the present value of the tax shelter generated by the tax deductibility of interest payments) - (the present value of the costs associated with bankruptcy) - (a term that summarizes the limited liability of bondholders).

The final result obtained using the continuous time OPM is the same as that derived under the static two-period CAPM. Further, it should be

noted that these four determinants of the cost of debt capital are different from the results obtained in M&M's Proposition I with taxes (discussed in Part 2). Chen also notes that other possible issues concerning the cost of debt capital, such as differential personal taxes, managerial incentives, and agency costs may upon analysis provide further insight into the determinants of the cost of debt capital.

M&M's (1966) paper developed a cross-sectional method to estimate the cost of capital for the utility industry. Higgins' paper develops a finite growth valuation theory to integrate the discounted cash flow cost of capital model with both the Gordon growth model and M&M's valuation of "extraordinary" growth opportunities to derive a generalized cost of capital estimation model for the utility industry. The estimation equation regresses market value of equity against the income from new investment and the amount of equity financing used in that new investment to derive an estimate of the cost of equity capital in the utility industry. In Higgin's model, finite growth potential is explicitly considered, and values for new investment are derived from population trends rather than extrapolated from past investment figures. The dividend issue is also empirically examined, since the issue of dividend policy and the market value of shares is related strongly to the use of the finite growth model in utility cost of capital estimates.

In the paper entitled, "Problems with the concept of the cost of capital," Haley and Schall (HS) indicate that the concept of the cost of capital has historically served three purposes: as a guide for financial decisions, as a standard for investment decisions, and as a link between financing and investment decisions. They carefully investigate the con-

ditions under which certain cost of capital concepts can become either misleading or irrelevant. By reviewing M&M's cost of capital definition HS demonstrate that the weighted cost of capital can be both misleading and inefficient since income streams may not be perpetual, discount rates may change over time, and a firm's risk class is not independent of its financial structure. They show that the use of the cost of capital to find the level of debt which maximizes firm value is an indirect circuitous method. Further, the value of an unlevered firm which is used in this process is, as they point out, an unobservable quantity and must be estimated. Even with a more operation definition for the cost of capital, HS show that its use can be misleading.

In addition to these particular works, papers outlined in other sections also bear upon the subject of the cost of capital. For instance, Rubenstein's paper (1973) (previously discussed in Part 2) discusses the concepts underlying the weighted average cost of capital and the CAPM methods and their applications. He also graphically demonstrates that the CAPM method is superior to the WACC in that it explicitly takes into account the systematic risk of investment projects.

In a matter closely related to the determination of the cost of capital, there has been extensive work done on defining and clarifying the concept of the "earnings" of the firm. Earnings can be classified as either accounting earnings or economic earnings. Haley and Schall (1979) discuss the difference between these two alternative earnings measurements in detail, and Scapens (1978) has developed methods for relating accounting earnings to economic earnings. Olson (1979) has shown mathematically that accounting figures are random variables that

can be used to determine the market value of a firm. Thus, it has been shown that accounting earnings can be used as a proxy for economic earnings to determine both the value of a firm and the cost of capital.

Cost of capital estimation should be based upon the valuation theory discussed in Part II as well as the considerations of practical usefulness. In addition, a practical market value determination for both equity and debt and capital budgeting decisions will generally rely upon accurate cost of capital estimates. Therefore, papers in this part should be read jointly with those listed in Part II and IV.

Additional references which the reader may find useful include: (1) Arditti (1980), (2) Brigham and Gordon (1968), (3) Scapen (1978), (4) Van Horne (1980), and (5) Weston and Brigham (1981).

SECTION 4: CAPITAL BUDGET AND DECISION MAKING

The capital budgeting decision process involves consideration of a wide variety of issues that are fundamental to finance. After Hastie's (1974) review of current methods, both Myers and Turnbull's (1977) and Chen and Boness' papers examine the CAPM and its use in defining a cut-off rate for investment decisions. Myers and Turnbull consider the issue of growth opportunities and how they affect the calculation of a beta estimate for a firm, while Chen and Boness (1975) adjust the CAPM to take inflation explicitly into account. Inflation can also affect the other components of the capital budgeting decision, and Cooley, Roenfeld and Chew (1975) (CRC) examine the various ways in which capital budgeting decisions can be altered through the varying effects of infla-tion on capital budget components. Kim examines the inflation effects

empirically. Finally, Van Horne considers the new project in the context of the capital budgeting process.

Hastie's paper reviews current alternative capital budgeting methods and summarizes managers' opinions on their advantages and disadvantages. This paper serves to bridge the separate concerns of academicians and practitioners and can aid the student in constructing a compromise view of theory and practice in capital budgeting.

The CAPM can be used to estimate the required rates of return or risk-adjusted discount rate for capital budgeting decisions (see Rubenstein (1973) in Part 2). Myers and Turnbull's paper investigates the advantages and disadvantages associated with use of the CAPM in capital budgeting decisions.

They find that it is possible to use the CAPM in capital investment decisions provided that the right asset beta estimate is used to calculate the discount rate. However, the right asset beta estimate depends on a number of factors, including project life, the growth trend of expected cash flow, and the pattern of expected cash flow over time. Beyond measurement problems, the use of a beta measure for risk may lead to biased required rate of return for investment if firms have growth opportunities. As M&M have discussed (1961) (Part 2), the actual market value of a firm can be decomposed into a "perpetual" value and a value associated with the growth opportunities of the firm. Growth opportunities, if considered as options on the purchase of additional productive capacity, will then usually have larger systematic risk than the tangible productive assets already in place. Thus, the observed beta will be an overestimate of the true beta in firms with growth opportunities since

it is derived in part from the valuation of the intangible growth options. Hurdle rates using this beta will be higher than required, causing capital investment for growth firms to be lower than it should be.

Chen and Boness (CB) incorporate uncertain inflation into the CAPM using an analysis process similar to Mossin's. They derive a security pricing equation which contains an explicit consideration of a stock's inflation risk. The expected return of a security can be expressed as:

> risk-free rate + (market price of risk)(the covariance between the stock's rate of return and that of the market portfolio the covariance between the stock's rate of return and the random inflation rate).

The market price of risk (or the market risk aversion factor) is, as in the traditional CAPM, the same for all securities and is similar to Mossin's results. The additional covariance term, if positive, indicates that the stock will have a lower expected return than that under a traditional CAPM; such a stock is called "inflation averse." The results also indicate that the traditional CAPM will overstate (understate) a company's risk if it has a positive (negative) inflation covariance term.

In its particular effect on capital budgeting decisions, CB's results indicate that the traditional market price of risk (used to compare a project's internal rate of return with a risk-adjusted required rate of return) will tend to be <u>overstated</u> in times of uncertain inflation. Thus, firms will invest <u>less</u> in inflationary times than is actually warranted by the inflation-adjusted CAPM.

The relationship between inflation and capital budgeting has been extensively investigated by academicians and practitioners. Cooley,

Roenfeld and Chew's (CRC) paper presents a normative capital budgeting
procedure that explicitly incorporates anticipated inflation and allows
for uncertainties in real cash flows.

CRC relax the various assumptions about inflation implicit in the
usual NPV calculations; specifically (1) the inflation rate (though
implicit in the discount rate) is constant over time; (2) the varying
sensitivities of revenues and costs to inflation are unaccounted for;
(3) the implicit inflation rate is known with certainty. The authors
relax these assumptions (and others) in turn to derive a model that is
not restricted by these simplifications. CRC first derive real cash
flows (deflated to the current price level) and then incorporate a
factor into the discount rate which adjusts for varying risk premiums
over the periods. The authors then consider the effects of varying
inflation rates over the investment's lifetime and then adjust the NPV
equation further to reflect the differences in the sensitivities of cash
inflows vs. cash outflows which give rise to the expected net cash flow
in any one period. The component of cash flow representing depreciation
charges is recognized as inflation independent, and thus its calculation
must be explicitly separated out from net cash flows and deflated to a
real term. Finally, CRC consider the effect of uncertain inflation;
that is, the uncertainty arising from variations in inflation can be
considered explicitly along with their interaction with business risk
adjustments. Although estimates of the various components may be dif-
ficult, the revised capital budgeting procedure presented in this paper
has the virtue of explicitly adjusting for the many factors which bear
importantly in capital budgeting decisions.

Kim examines the varying effects of inflation on investments, specifically the calculation involved in a net present value analysis. Although Nelson's (1976) analysis finds that firms will suffer an "inflation tax" due to depreciation at historical costs, and thus will undertake lower investment in inflationary periods, the general lag of wage costs behind the price level, as well as the observation that low inflation (3%) can be a driving force for investment, seem to point to an offsetting inflationary impact. Kim derives a model to test the inflationary impact on net operating income and empirically test the determinants of inter-firm differences in investment under inflation. He finds that the sensitivity of net operating income and the size of depreciation charges are two major components of the inter-firm differences. More specifically, NOI which is highly sensitive to inflation will encourage firm investment, while large historical depreciation charges tend to depress investment under inflation. Thus, inflation affects individual firm investment decisions differently, depending on their particular operating characteristics and capital/labor ratio.

Van Horne (1969) considers the problem of capital budgeting for new products. He uses the concept of a product life cycle to measure the extent and duration of uncertainty in cash flows for new products. By considering the possible distribution of cash flows for a new product, an estimate of the time of resolution of uncertainty concerning the new product can be obtained through calculations. In addition, the new product must be considered in conjunction with the total firm product mix; with information on the marginal effect of the new product on expected value and variance of return and the duration of uncertainty

for the firm, criteria can be developed to reach an accept-reject deci-
sion. By considering the pattern of uncertainty with and without the
new product, management can gain greater flexibility in affecting the
firm's value over time.

The capital budgeting decision process for a regulated firm is not
exactly identical to that of the unregulated firm. Regulations may lag
for a regulated firm. The possible implications of regulation lag on
capital budgeting decisions can be found in Brigham and Pettway (1973)
and Elton and Gruber (1977).

Finally, the investment decision can be related to the financing
decision as well as to the dividend payment decision. Myers (1974)
(listed in Part 5) and Spies' paper (listed in Part IX) both are based
on the simultanity of the financing, investment and dividend decisions
in a firm's actual operations. In addition, Myers and Turnbull's paper
relies heavily on cash flow considerations, a topic which is investi-
gated further in Section 8.

Additional useful references on this subject are below: (1) Fama
(1977), (2) Myer (1977), and (3) Shall, Sundem and Geijsheek (1978).

SECTION 5: FINANCING DECISIONS

Financing, investment, and dividend decisions are three major
areas in financial management. In analyzing the theoretical aspects of
these decisions, financial economists have derived ideal conditions for
firm operations in which both financing and dividend decisions become
irrelevant. Unfortunately, the ideal conditions used by financial
economists are not indicative of real world conditions. Therefore, it
is important for students of finance to understand how financing and

dividend decisions can affect the market value of a firm. The financing decision is discussed in this part and the dividend decision is discussed in Part VI.

In an imperfect market, new equity financing and dividend policy are interrelated. Due to flotation costs for new issues, as well as the possible downward sloping demand curve for new shares, internal financing is generally cheaper than new equity financing. However, shareholders may favor higher dividends because of transactions costs in selling equity, legal constraints on capital gains usage, uncertainty resolution, or tax considerations (especially for institutions). Van Horne and McDonald (1971) (VHM) consider the issues involved in new equity vs. internal financing use. The paper uses a cross-sectional model to test whether companies which both pay dividends and engage in new equity financing have P/E ratios greater than companies which do not. If they do, then it may be asserted that investors have a net preference for dividends and that this preference exceeds the cost differential involved in new equity financing. VHM regress P/E ratios for two groups, utilities and electronics companies, against estimates of expected growth rate (of dividends), dividend payout, and risk (in this case, not beta but a leverage statistic). Their findings are consistent in the first case with net investor preference for dividends, and also show that excessive new equity use increases the cost of equity financing relative to retained earnings. The results, however, are limited in their generalization over other years and other industries. In addition to this paper, Miller and Upton (1976) have used the CAPM to analyze the lease vs. buy decision; Gordon (1974) uses a capital budgeting decision pro-

cedure and M&M's basic valuation model to derive a general solution to lease vs. buy decisions.

The view that financial structure does not affect investment and financing decisions is contradicted under the option pricing model (developed by Black and Scholes) applied to equity valuation. Working wthin this framework, Rendleman's (1978) paper extends Merton's (1974) risky perpetual bond valuation model to an analysis of corporate financing and investment policy when tax deductibility of interest payments is considered. The effect of tax deductibility is two fold: since the debt service requirement is reduced, the firm's asset base can grow larger, with a resulting increase in equity value; (2) firm bankruptcy will be delayed due to the extra cushion provided by the interest payment tax reduction. Rendleman's results are similar to those obtained by Galai and Masulis (Part 2), in that debt value may decrease if investment projects increase the riskiness of the firm's asset base or if the projects are financed by an increase in unsubordinated debt. Thus, the firm's financing decisions are interrelated with the firm's capital structure. The shareholders will favor financing and investment decisions different from those favored by a firm's creditors. In addition, Rendleman briefly considers the advantage of mergers in increasing firm debt capacity and thereby the tax benefit of interest payment deductibility.

Myer's (1974) paper presents a a general model of the interaction between a firm's financing and investment decisions. Myer's objective function for a firm incorporates investment and financing decision variables, in particular the level of debt and the amount of new equity and

dividends paid. The first order conditions for a maximum show that the contribution of an investment project must be adjusted for its effects on other investment and financing options (especially the firm's debt capacity and its sources and uses constraints). Myers uses the shadow prices of the firms debt and dividend constraints to derive a general capital budgeting rule adjusted for the interaction of investment and financing decisions. He uses this formulation to examine capital budgeting decisions under M&M's definition of equity rate of return and the traditional WACC formulation, and finds that the latter two definitions of the cost of capital can lead to large errors in estimating the value of undertaking a project.

The decision to lease or buy is an important financing decision. Using perfect capital market assumptions, Lewellen, et al., first examine the value of leasing arrangements to the lesee and the lessor, and explicitly derive firm value in terms of investment purchase price, lease payment, and depreciation tax savings (for the lessor). In a perfect market, with neither firm leveraged, L et al find that the lease versus buy decision is a matter of indifference. However, with leverage, leasing arrangements will diminish borrowing capacity in the lessee while increasing it in the lessor by an equal amount. Further, the authors develop a managerial decision rule for evaluating leasing arrangements in terms of asset expenditure flow saved, net of salvage value, depreciation tax advantages, and borrowing capacity lost. The authors conclude that environmental factors which can bring about significant differences in the costs of asset purchase vs. asset leasing (those factors include the ability of the lessor to acquire the asset more cheaply than

the lessor, to derive a higher salvage value, to depreciate the asset more quickly, or to lever the transaction to a greater extent than the value of lender claims to it under the lessee) will seldom actually exist for a firm.

Papers in previous parts have also considered the financing and dividend decisions. Galai and Masulis' paper (1976) (Part II) uses Black and Scholes' (1973) option pricing model to examine the firm's investment and financing decisions. Galai and Masulis demonstrate that such decisions are interrelated, even in the absence of bankruptcy costs and tax deductibility of interest. Chen (1978) (Part V) discusses the cost of risky debt and its relation to the financing decision.

In addition to the papers included in this section, the reader may want to refer to the following papers: (1) Gordon (1974), (2) Kim (1978), (3) Martin and Scott (1976), and (4) Martin and Scott (1980).

SECTION 6: DIVIDEND POLICY

The five articles reviewed here range from M&M's classic 1961 article in which it is shown, under various market assumptions, that dividend policy plays no part in share valuation, to Black's (1976) assessment of the contradictory theories, all extremely plausible, on the desirability of dividends. In addition, Litzenberger and Ramaswamy's (1979) paper provides an elegant reworking of the traditional CAPM to include tax effects (and thereby dividend yield). Lee's (1976) paper provides an analytical framework to analyze empirical tests on the dividend effect. Finally, Rappaport's (1981) article stresses the practical implications of inflation-adjusted accounting methods on the firm's decision to pay out dividends, and at what level they will be paid out.

In their well-known article "Dividend policy, growth, and the valuation of shares," Miller and Modigliani (M&M) examine a wide variety of issues concerning dividend policy. First, they use a recursive valuation formula to show the irrelevance of dividend policy to share holders in a world without taxes. They also show that the "dividend stream" valuation approach is equivalent to three other valuation approaches, i.e., the income stream approach, the discount cash flow approach, and the investment opportunity approach.

In addition, M&M derive a firm valuation equation which explicitly incorporates the existence of "favorable" investment opportunities for the firm (those generating returns greater than the cost of capital) and relate this growth component to the usual definition of "growth" companies. M&M also analyze the relationship between the growth rates of price per share, earnings per share, and dividend per share in terms of the amount of external and internal financing, and they use the concept of the "informational content" of dividends to explain why, under the assumption of uncertainty, a change in a firm's dividend rate is often followed by a change in the market price of a firm's stock. In addition, M&M use the concept of a "clientele effect" to argue that each corporation will tend to attract to itself a group of shareholders who prefer the particular pay-out ratio of the firm. Finally, M&M argue that the favorable tax treatment of capital gains is undoubtedly the primary systematic imperfection in the market.

In the real world, both the corporate tax rate and the personal tax rate are important to dividend decisions. The possible impacts on share valuation and dividend payout of the favorable tax treatment of capital

gains was first investigated by Farrar and Selwyn (1967) and Brennan (1970). The results of these two papers are reviewed and extended by Litzenberger and Ramaswamy (LR). LR's paper derives an after tax version of the CAPM. The primary difference between the CAPM with tax and the more traditional CAPM is that under tax considerations the dividend yield becomes an additional determinant of stock return. The coefficient of the dividend yield in the pricing equation contains terms related to investor wealth and utility, as well as the individual investor's marginal tax rates. Although extremely complicated, the dividend yield term is expected to have a positive coefficient. LR use several relatively complicated econometric models to show that the dividend yield is indeed important for explaining the market value of a firm. More specifically, LR estimate that for every dollar increase in return in the form of dividends, the investor will require an additional 23 cents in before-tax return.

It should be mentioned that there are other methods than those used by LR to investigate the importance of dividend policy on financial analysis and planning. For example, two early studies, Gordon (1959) and Friend and Puckett (1964) investigated empirically the relationship between price per share, dividend per share and retained earnings per share. Though there are some problems associated with these approaches, they remain among the primary alternative methods to understand the impact of dividends on the market value of a firm.

Lee's paper reviews the results obtained by Gordon (1959) and Friend and Puckett (1964) and generalizes their cross-sectional model by using a generalized functional form (GFF) specification for a model.

The GFF model uses the data to specify the particular equational form
with which to investigate dividend yield effects on share price. Lee
shows that the choice of the particular equational form used in the
statistical test will significantly affect the empirical findings. He
finds that the more accurate functional form for dividend effect tests
is the non-linear form, and that with this form, the dividend effect on
share return) is not significantly different from the effect of retained
earnings.

Rappaport's paper analyzes the potential impact of inflation ac-
counting on the earnings of a firm and on its dividend payment decision.
Although constant dollar adjustments (adjusting costs by the changes in
the purchasing power of the dollar) or current cost adjustments (re-
stating changes in specific, or current cost of replacement, terms rather
than in general price changes) may seem to provide a more reasonable
earnings figure from which to calculate dividends, Rappaport shows that
both these new methods can be faulted for not reflecting changes in
selling prices, in productive capacity, or in working capital and fixed
capital investment due to changing expected sales growth. He concludes
that a company's maximum affordable dividend depends on its financing
policy and the projected cash flow consequences of its planned growth
in investment, rather than on previous years' accrued accounting earnings
performance, whether calculated on an inflation-adjusted basis or not.
He shows that maximum affordable dividend payment ratios depend very
strongly on assumptions concerning sales growth rates and investment
rates. Thus, inflation-adjusted methods of accounting must be used
cautiously when determining the dividend payout of a firm.

In his paper entitled, "The dividend puzzle," Black discusses the inconsistencies between the theories concerning the desirability of dividends and the actual practice of corporations and investors. Theories such as that developed by M&M use restrictive assumptions (such as an assumption of no taxes, or no differential tax treatment between dividends and capital gains) to show analytically that dividend policy does not matter. However, almost all successful firms pay dividends, and dividend policy is a major concern of financial managers. Black goes on to examine the theoretically derived effects of taxes (within this framework, firms will pay little or nothing out as dividends) and the information effect of dividends (unexpected increases in dividends may signal better future earnings performance by the firm). He next considers the differing dividend preferences of shareholders vs. bondholders (bondholders should prefer lower dividends since a dividend payout means fewer assets will remain in the event of bankruptcy). However, Black continues, shareholders may also prefer lower dividends if they result in lower cost of raising investment funds. Irrational beliefs may play a part in the investor insistence on dividends. Also, the portfolio implications of holding high versus low dividend stocks are simply unknown. Black concludes that we are presently unable to show that dividends matter, though we are also not willing to assert that dividends definitely do not matter. Therefore the effectiveness of dividend policy must still be regarded as a puzzle.

M&M's (1961) paper also considers firm and share valuation issues; and so it can be read as part of Section 2. In addition, Rappaport's paper adds another dimension to the use of accounting information in

firm decisions (part 1). More recently, Litzenberger and Ramaswamy, Bar-Yosef and Kolodny (1976), Blume (1980), Lee and Forbes (1980, 1981) and Djarraya and Lee (1980) have used different methods to show empirically that dividend policy matters. It should also be noted that Miller and Scholes (1978, 1981) and Ehrber (1979) have theoretically as well as empirically reexamined the yield-related tax effect of dividends.

SECTION 7: MERGERS: THEORY AND EVIDENCE

Merger related issues are of interest to both academicians and practitioners. A financial manager must know the possible implications of a merger to stockholders (both buyers and sellers) as well as, in a broader sense, to society. The three papers in this section examine a number of issues relating to firm merger: the determination of the exchange ratio in a merger; the kinds of acceptable empirical methods that can be used to investigate the relationship between tender offers and stockholder returns; and the possible effects of a conglomerate merger.

To investigate the impacts of merger on stockholder returns, either the CAPM method or one of the non-CAPM methods can be used. A non-CAPM method has been used by Shick (1972), Shick and Jen (1974) and others. The CAPM approach has been used by Lev and Mandelker (1972), Halpern (1973), Mandelker (1974), and others; the various works and their findings are discussed in the review article by Mueller. In his review paper, Mueller reviews the empirical research on the effects of conglomerate mergers in the last three decades.

Given the differences in the kinds of mergers which have taken place in the last 30 years (from oligopolistic mergers to "conglomerate"

mergers of essentially unrelated firms), Mueller surveys the hypotheses developed to explain the new types of merger activity in the 60's. Mueller classifies major explanations concerning the benefits of mergers into two groups: neo-classical and managerial. Included in the neo-classical explanations are such explanations as: tax benefits (tax loss carryovers between firms), a cost of capital benefit (through increased firm size, thus lower borrowing costs), bankruptcy cost reduction (through diversification in the sources and timing of earnings), a positive diversification effect (unrelated again to the diversification of earnings), "P/E magic" (related to capital gains brought about by evaluating a combined firm at the higher P/E of the conglomerate), redeployment of corporate capital (to higher marginal uses), replacement of incompetent managers (the acquisition of internal efficiency through merger), and economic disturbance (causing a discrepancy between asset value and stock price). Other theories concern a managerial pursuit of growth or more speculative motives. Empirical evidence from the recent merger wave is reviewed, including the impact of mergers on profitability, on stock returns, and on risk performance. In addition, the evidence on merger success in terms of firm characteristics as well as on merger related changes in firm efficiency, are detailed. Finally, the question of industry concentration through merger activity is addressed. A synthesis of the empirical evidence leads Mueller to conclude that mergers do not result in favorable returns to the merging firms.

Dodd and Ruback (1977) (DR) use a CAPM approach to study empirically the relationship between tender offers and stockholders returns. DR review three possible hypotheses concerning corporate acquisition and

formulate empirical results which should arise under successful or un-
successful tender offers under each hypothesis. Under the "monopolistic"
hypothesis, a corporate takeover resulting in monopoly market power
should generate monopoly rents. Thus, successful acquisition should
result in positive returns for the target and/or acquired firm and nega-
tive returns for unsuccessful (costly) tender offers. Under the "synergy"
hypothesis, the increased productive efficiency of the firms real assets
should lead to positive returns if the offer is successful, and, again,
negative returns if unsuccessful. Under an "internal efficiency"
hypothesis, the target firm receives valuable information regarding
their internal inefficiency. With the expectation that this efficiency
will be corrected, target firms will experience positive returns under
both successful and unsuccessful offers. The returns to the bidding
firms depends on the existence of competition in the offer, and whether
the offer is eventually successful. Finally, the zero impact hypothesis
predicts that positive returns prior to tender offers are the result
solely of causes unrelated to the tender offers. Thus, the timing of
the positive returns will be able to distinguish this hypothesis. The
cost of unsuccessful tender offers should lead to negative returns for
both the target and bidding firms.

Thus, the "monopolistic," "synergy," and "internal efficiency"
hypotheses each predict non-negative abnormal performance for stock-
holders of firms engaged in successful tender offers. For an unsuc-
cessful tender offer, the monopolistic and synergy hypotheses predict
zero or negative returns for all stockholders. The internal efficiency
hypothesis, on the other hand, predicts a non-negative return for stock-

holders of target firms in unsuccessful offers. Besides using the standard Cumulative Average Residual (CAR) residual technique to investigate the impacts of tender offers on stockholder returns, Dodd and Ruback also use a dummy regression technique to detect a possible shift of risk.

Their empirical results indicate that target firms experience positive abnormal returns under both successful and unsuccessful tender offers. For 12 months prior to the tender offer, all bidding firms experienced positive returns. However, only successful firm earn positive returns in the offer month itself. The evidence is then consistent with the internal efficiency hypothesis and inconsistent with the synergy, monopolistic, and zero impact hypothesis. (Other kinds of updated switching regression techniques for detecting structural changes of rates of return for merging firms can be found in Lee, Shick and Jen (1977).)

In light of the two objectives of a firm concerning the rate of earnings growth and the level of operating risk and the relation of these objectives to business combinations, Larson and Gonedes (LG) examine the accounting problem of finding a stock exchange ratio for two combining firms. In their model, both maximum and minimum exchange ratios are derived for the managers of acquiring and acquired firms, respectively, to determine their bargaining ranges. The model incorporates the expected earnings multiple (the P/E ratio, itself a function of the expected growth rate and required rate of return) of the combined firm with the expected price per share of the combined firm, and the expected return, to elucidate the behavior of the minimum and

maximum exchange ratio over the possible values of the expected exchange ratio consistent with the conditions of both parties as a function of the expected earnings multiple.

Higgins and Schall (1975) have examined the relationship between corporate bankruptcy and conglomerate merger. They found that conglomerate merger can either increase or decrease the market value of equity. The three papers by Mueller, Dodd and Rubach and Larson and Gonedes can give financial managers enough theoretical and empirical knowledge of conglomerate mergers to support their decisions concerning proposed mergers.

SECTION 8: WORKING CAPITAL MANAGEMENT

Financial planning and analysis can be either for the short term or the long term. Short-term analysis is generally preferred to as working capital management. This area includes the management of cash, short term securities, inventory control, and account receivables collection. Long-term financial planning, on the other hand, essentially refers to the determination of a firm's investment, financing, and dividend policies. There is, of course, some interaction between short-term and long-term planning.

The four papers included in this section will demonstrate basic concepts and procedures for short-term planning and will discuss the relationship between short-term and long-term planning.

Stone's (1973) paper uses some long-term financial planning models (discussed in Part IX) and computer simulation techniques to develop a cash planning and credit-line determination model. A financial statement simulation is also developed. The basic modelling concept used by

Stone will also help the reader to understand the long-term planning models to be examined later in Part IX. Stone also demonstrates some interactions between long-term and short-term planning, due in most part to errors in short term borrowing, of credit line determination, and of short term securities managements.

Stone and Hill's (1980) (SH) paper focuses on four decision areas: selection of a concentration bank or banks (banks serving as central cash pools), the methods to transfer cash from one bank to another, the assignment of a particular transfer method to particular pairs of depositor-concentration banks, and the assignment of a deposit bank (those feeding into a concentration bank). The authors use the cash transfer scheduling framework provided in Stone and Hill (1981) and incorporate the decision variables concerning deposit and concentration banks into a unified programming model. SH explicitly treat the components of the decisions (such as bank cost and cash scheduling period) and model then mathematically into an interrelated system. Once the transfer schedule has been determined, the problem of deposit and concentration banks becomes one of location assignment. In addition, the authors show that an organized search procedure can substitute for a programming solution.

Sartoris and Spriull's (S&S paper shows that goal programming (GP) can be used in working capital decisions to achieve the two essentially conflicting goals of profitability and liquidity. In the GP model, the objective function is formulated in terms of the absolute deviation from a number of stated goals; thus the GP model allows for more than one objective function (vs. the linear programming technique). The model

developed by S&S incorporates as one of its goals the more standard maximization of NPV subject to purely technological contraints (absent any working capital goals). This is done by solving a linear programming problem to obtain a level of profits, and deviations from this level become one of the goals in a more general CP problem incorporating certain working capital constraints (i.e., specific quick ratio, current ratio, cash balance, etc.). The GP model is developed through a numerical illustration of its application. The sensitivity of its results to priority parameters can be investigated. In addition, the priority of goals can be changed to obtain alternative solutions.

Quarterly accounting data becomes more important in working capital management. Gentry and Lee use an X-11 time-series decomposition model to analyze quarterly income statement data. They find that there are time, firm, and ledger effects in quarterly accounting data. These results shed some light on the possible applications of both short-term and long-term financial planning models in financial management.

In their paper, Stone and Hill discuss the problems associated with the timing and amount of cash transfers, concentrating on cash transfer scheduling for cash concentration. The authors' starting points are the current available methods for cash transfer and contemporary practice. The necessity to minimize cost (usually tied to the frequency of transactions) while also minimizing the interest lost on standing balances and maximizing the benefit of dual balances (the availability of the same funds to the company at two different banks due to lags in balance clearing) leads to a formulation of the cash transfer problem as a programming problem. The constraints relate to the necessity of

maintaining at least a minimum balance and an average balanace commen-
surate to bank services.

Additional references to which the reader may wish to refer are:
(1) Gentry (1973), (2) Lewellen, McConnell and Scott (1981), (3) Maier,
Robinson and Vander Weide (1981), and (4) Pan, Nichols and Joy (1977).

SECTION 9: FINANCIAL PLANNING AND FORECASTING

Financial planning and forecasting is the synthesis of theory and
practice. Linear programming and simultaneous equation systems are
two major alternatives for performing financial planning and analysis.
In the programming model, an objective function is maximized and dif-
ferent constraints are introduced to the model. The simultaneous equa-
tion model does not explicitly maximize an objective function; it does,
however, specify explicitly the interrelationship between investment,
financing, and dividend policy. To specify the above-mentioned models,
all material discussed in Parts I through IX are used either explicitly
or implicitly.

In his paper, Professor Eckstein (1981) discusses the integration of
quantitative analysis into corporate planning, particularly the contri-
bution which quantitative systems (data bases, softward, consulting
support) can make to specific areas of business decision. The author
outlines six corporate planning functions, and details ways in which
information systems available can contribute to greater accuracy and
clearer forecasts. Some of the planning areas are: monitoring the
environment (aided by forecasts of key economic and market indicators)
identifying growth markets (using forecasts of industry group growth
and their sensitivity to real income growth), predicting costs and

productivity trends (based on inflation and energy and wage cost trends),
targeting long term growth (through comparisons intra-industry), ana-
lyzing acquisition and divestiture opportunities (by monitoring cash
generation and growth potential in firm divisions, and by analyzing key
financial criteria related to a company's particular growth needs),
assessing international opportunities (based on such factors as national
export and import rank and growth trends, as well as production costs
and their expected trends), and planning a company's financing (based
in part on interest rate projections as well as on the various component
system discussed above).

Carlton, et al., (1973) discuss and review the theory and practice
of alternative financial policy models. The authors specify some of the
weaknesses involved in the budget-compilation types of models (those
that assemble decisions at various levels of the firm into a cohesive
budget statement), including a lack of explicit consideration of broad,
long term company objectives, the emphasis on satisficing through trial
and error rather than on maximization of some explicit goal, and the
reliance on accounting specifications rather than financial policy.
After this discussion of the possible weaknesses of the various financial
planning models, the authors use an example to show how contemporary
finance theory can be incorporated into a firm's model inputs to generate
financially sound decisions (dividends, working capital levels, financing
sources). The philosophy of model building within the firm's financial
decision-making process is explicated to derive useful rules and goals
to be used in a more specific company setting.

Both Spies (1974) and Stern (1980) show the importance of explicitly considering the dynamic characteristics of financial planning. Spies' model focuses on capital budgeting and relates the major components of firm decisions (new debt and equity financing, long term investment, dividends, and short term investment) to the capital budgeting process through a sources and uses of funds identity. Spies proposes a simultaneous capital budgeting model. The exogenous variables required by the system are: cash flow (net profits and depreciation allowances), net investment in short term assets, the corporate bond rate, the rate of return expected by the company on long term investments, and the present debt/equity ratio. Estimates of the coefficients of the equations are used to analyze the adjustment of the various exogenous variables to capital budgeting decisions along industry groupings. He illustrates empirically the interdependence of various components of capital budgeting and examines the relative speed and extent of adjustment of the various components and their relative place in corporate planning. Spies' model thus takes investment, financing and dividend policy into account simultaneously. Dynamic simulation processes for investigating the impacts of three alternative policies are also discussed.

Stern's paper first evaulates the use of conventional accounting tools as measures of corporate performance. He then develops an analytical framework for financial management in accordance with M&M's theories and other financial valuation theories.

In an early paper, Carlton (1970) formulates a model which integrates finance, economic, and accounting theory to develop a linear programming structure for firm decision making. A dividend stream

valuation equation is used to develop a non-linear objective function in terms of maximum share price over a planning horizon set by the firm. To develop the related constraints, accounting information, economic theory and finance theory are jointly employed to justify the specifications. Carlton uses balance sheet and income statement relationships to specify constraints in terms of sources and uses of funds, and after tax profits, both expressed through balance sheet and income statement accounts. The model then incorporates equity relationships, more specifically constraints on convertible activity and equity offerings by the firm. Investment opportunities for the firm are used to establish project screening standards, and to relate such decision variables to the sources of funds. Finally, explicit consideration is make for policy constraints originated by the firm, i.e., restrictions on dividend payment, target capital structure, etc. Despite the complexity of the equation system (and the assumptions underlying their formulation), the constraints used by Carlton can be classified as either definitional or policy constraints. The author provides an illustration of the model, starting with current income statement and balance sheet figures and decisions concerning desired firm characteristics and generates a five year forecast of balance sheets and income statements for the firm. Thus, this model can be used to forecast important financial variables in addition, it can be used to perform related sensitivity analysis.

In addition to Carlton's model, Warren and Shelton (1971) use simultaneous equations to construct a twenty equation system describing the interrelationship among different financial decision variables. The model is formulated to simulate the effects of firm decisions given

assumptions concerning sales, P/E ratio, retention rate, etc. The equation system contains four general solutions: (1) generation of sales and EBIT; (2) generation of total assets required; (3) financing for the desired level of assets; (4) generation of per share data. Sales are the driving force for the equation system and the level of sales is linked systematically to asset requirements (current assets and net fixed assets). The desired level of assets if then used to determine financing needs and sources of financing. Finally, given the amount of new external equity, an estimate of share price, EPS, and dividends can be made. This model can be used both to forecast the basic financial variables and to perform related sensitivity analysis. The system also has value to financial analysts who are concerned with forecasting share price (vs. the results obtained with a maximization model such as that formulated by Carlton).

Finally, Francis and Rowell (1978) extend Warren and Shelton's model to consider 10 sectors of a firm's operations (including pricing, production costs, industry sales, and risk). The system of equations is essentially recursive (as in WS's model), but each sector's equations are solved simultaneously. Again, sales is the driving force for the system, and it in turn determines production levels and capital requirements. However, what is new is that pricing decisions (as well as production costs) can be considered explicitly before income generated can be estimated. This in turn affects the financing required. Risk is also added as a determinant of the cost of financing. The sensitivity of the equation system to various parameter changes is also discussed.

(Author's Note: Three minor corrections should be noted in Francis and Powell's paper. First depreciation (D) and interest expense (I) should be eliminated from the definition of DC in Appendix A. Secondly, in Equation 9, depreciation (D) should be subtracted. Thirdly, in the AAE/RMSE computations, the AAE errors should not be negative.)

Additional references to which the reader may wish to refer include: (1) Davis, Caccapplo and Chandry (1973), (2) Elliot (1972), (3) Gershefski (1969), (4) Myers and Pogue (1974), (5) Porter (1977), and (6) Taggert (1977).

SECTION 10: AN OVERVIEW OF FINANCE THEORY AND PRACTICE

In the last nine sections, both positive and normative finance theory and methods have been explored in great detail. In this part, four review papers are discussed.

In two important review papers by Weston (1981) and Beranek (1981), the authors carefully review finance theory in the past, present and future. Beranek examines some of the key positive issues, such as dividend policy irrelevance, cost of capital and investment decision criteria, agency costs, and the effects of differing tax rates on asset valuation. Under each of these areas arise numerous areas of inquiry in normative finance. The author then goes on to summarize the vast amount of unanswered questions in the more specifically normative areas dealing with financial planning (the development of dynamic financial models), capital budgeting (measurements of risk, the effects of inflation, venture capital acquisition), capital structure (the existence of an optimal structure, lease financing), short term financing, and other topics (such as multinational firms, the empirical viability of data

bases used in finance research, regulated firms, etc.). The paper is a readable summary of major empirical concerns under the more applied branch of finance.

Weston's paper serves to summarize some of the major theoretical achievements of the past decade and attempts to integrate these developments into the broader context of finance theory. Weston considers such topics as models of asset markets (particularly Roll's critique of the CAPM and the related development of the arbitrage pricing model), the nature of the firm (agency problems and information asymmetry), the development of the option pricing model, and the many studies concerning firm merger.

Weston's summary touches briefly upon many of the advanced topics in finance and is valuable in its effort to show the relationship of these new theoretical developments to the pioneering work of the 50's and 60's.

Pogue and Lall's (1974) paper provides a brief discussion of the important concepts in corporate finance theory. Their overview of the subject includes consideration of the proper objective of the firm, the determination of firm (and stock) market value and its relation to firm investment and financing decisions, decision rules for firm investment, and the incorporation of the various corporate finance theories into a mathematical system for financial planning. Overall, this paper synthesizes most of the material covered in Parts 1 through 9, and integrates the various areas into a planning model (see particularly Section 9 as well).

The theory of finance rarely incorporates a consideration of the microeconomic aspects of market operations, and, in particular, the existence of property rights and contractual obligations that underlie an asset's value. In considering the legal basis of asset value, Jensen and Meckling (1978) (JM) maintain that the federal government is destroying two vital instruments of U.S. economic growth: the system of contract rights and the large corporation. JM argue that political democracy is basically incompatible with the free market system. Because government officials desire to increase votes, campaign funds, etc. accruing to them, they will seek to capture the benefits of control over assets in the economy. That is, through their power over property rights (such as the limitation on asset use represented by wage and price controls, environmental and land use policies), and through the ability to abrogate contracts (the government regulation of such large scale bankruptcy proceedings as the Penn Central, or the change in indenture status of NYC municipal bond holders by the MAC agreement), the government seeks to derive political benefits from an expansion of their sphere of influence. More particularly, the result of such diminution in the certainty of property rights and contract terms is the gradual destruction of the viability of firm activity and the decline in firm value.

Additional references include: (1) Colley and Heck (1981), (2) Lewellen (1969), and (3) Norgaard (1981).

SECTION 11: SUMMARY AND CONCLUDING REMARKS

This review article has attempted to show that there is a way to integrate theory and method to produce meaningful financial analysis and planning. This paper hopefully shows the reader the importance of

financial analysis and planning, and indicates how the empirical results of financial analysis and planning can be evaluated. Further, the paper attempts to direct the reader to some resources which will aid him in actually performing financial planning.

Possible empirical research directions include: (i) the investigation of the trade-off between a programming approach and a simultaneous equation approach to financial planning and forecasting; (ii) the use of econometric simultaneous equation technique to improve the results of this approach to financial planning and forecasting; (iii) the investigation of the complementary between overall financial planning and forecasting and the individual capital budgeting decision; and (iv) the use of more robust theories, such as option pricing theory and agency theory, to improve the specification of the models used for financial planning and forecasting.

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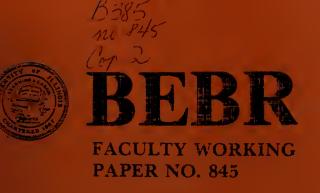
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Rate Base Valuation Methods and Firm Efficiency

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