A simulation model of corporate finances: A study of the companies listed on Karachi stock exchange

Ayub, Mehar

1998

A SIMULATION MODEL OF CORPORATE FINANCES:

A STUDY OF THE COMPANIES LISTED ON KARACHI STOCK EXCHANGE

BY

DR. AYUB MEHAR

DIRECTOR,
KARACHI INSTITUTE OF ECONOMICS AND TECHNOLOGY
KARACHI (PAKISTAN)
1998

Address: B-98, Kehekshan Society, Malir Halt, Karachi 75210 (PAKISTAN).
Phone: 4581196, 4582639 Fax: 4581196.
Email: ayubmehar@yahoo.com

A SIMULATION MODEL OF CORPORATE FINANCES:

A STUDY OF THE COMPANIES LISTED ON KARACHI STOCK EXCHANGE

JEL Classification Number: C15; C51; G30; G31; M41;

Key Words: Simulation Modeling; 3SLS; Above the Line Profit; Generalized Accounting Principles; Predictive Power; Dividend Policy;

ABSTRACT

The study is a part of the series of financial models included in a doctoral dissertation completed at the Karachi University (Mehar: 1994). An Econometric model has been constructed in the study and a Three-Stage Least Square (3SLS) technique was applied for the estimation of the model.

The results reveal some interesting observations. It has been found that both the components of equity financing - Paid up capital (OSCAP) and Reserves Funds (SURPLUS) - play a central role in the determination of the liquidity position of a firm. It has also been found that Debt Financing may be a cause of the deterioration in the liquidity position of a firm.

I. INTRODUCTION

Financial simulation models have become an important addition to the quantitative toolkit of the financial analysts, economists and corporate planners. They are particularly valuable for financial planning because they provide a consistent framework that simultaneously accounts for the entire interrelationship in a firm's financial structure. By simulating the model into the future one can forecasts and analyze the effects of economic conditions and policies on the firm's financial position, in alternative financial strategies. The models can be used to generate Pro-forma annual accounts i.e. the balance sheet and income statement that would apply in future under specific assumptions about Capitalization, Debts, Equity, Retained Earnings, Profits, Cash Balances, Receivables, Payables and Inventories etc.

A major advantage of simulation is to be able to handle complex problems that are impossible to solve via analytical approaches. In our study, only models of a mathematical and symbolic nature will be dealt with ones that can be computerized. The results from the computer program/ software can then be analyzed.

An econometric model that does not produce forecasts of acceptable quality cannot be considered seriously as a model for the testing of economic hypothesis. Of course, econometricians assume that econometric predictions are reasonably reliable and they believe them to be also more accurate than predictions generated with alternative techniques. Any discrepancy between forecast and actual performance should be blamed on both model specification errors and erroneous a priori judgement regarding the values assigned to exogenous variables. The first type of error depends on econometricians' ability in understanding the accounting process and techniques of modeling. In order to understand the second kind of error, we simply have to observe that when a forecaster start to construct the econometric model, he will have to decide which economic or financial phenomena the model will describe and which it will not. The phenomena which is not described (also called exogenous) are monetary and fiscal policies, agricultural output, and international environment (upon which firm has only limited impact). Although such economic variables remain exogenous, they will still appear in the model and therefore have to estimate one way or the other to allow the model to run.

For any of the financial indicators wherein policy makers and managers are interested, the forecasters will identify and select those factors which are contributing to or explaining most of the indicators' behavior or trend. In selecting such explicit factors the econometricians will rely on both statistical techniques and economic theories. Econometric techniques do not only help us in selecting the most significant explicit factors, they also determine numerically how each factor is actually contributing in explaining the behavior of the economic and financial indicators.

These are the reason to apply an econometric based simulation modeling in financial analysis of the joint stock companies. By such a model one can study the real determinants of the financial structure of a listed company.

In this study we constructed a model of corporate finances at firm level. The study is a part of the doctoral dissertation completed at the Karachi University (Mehar: 1994).

II. OBJECTIVES OF THE STUDY

The objective of the study is to design a simulation model for financial planning of joint stock companies under various conditions and scenarios. The objective of the model is to generate pro-forma financial statements that describe the financial condition of the firm for any assumed pattern of capital structure in the future. Particular attention has been paid to the determination of Short-term Borrowing, Cash Accounts, Credit Sales, Dividends, Fixed Assets and Additional Funds through Internal Equities.

All the major factors and components of the corporate finance, namely Sales Revenue (SALES), Equities (EQUITY), Paid up Capital (OSCAP), Reserves and Surplus Funds (SURPLUS), Accounts Receivables (DBTRS), Inventories (SLCTOCK), Short Term Financing (CURLIBL), Long Term Debts (LTDBT), Dividend Pay out (DIVEDN), Petty Cash and Bank Balances (LASST), have been included in the analysis. The constitutional and legal parameters of the Pakistan economy have also been incorporated. Within such a quantitative framework, even inadequate explanation point out the many gaps that have to be closed before we may processes further. Our simulation model may be used for the following purposes: -

1) Preparation of the Pro-forma Annual Accounts (Balance Sheet, Income Statement, Cash or Funds Flow Statement and the key indicators of the financial position).
2) Forecasting for the financial position of a firm (The liquidity and leverage position of a company).
3) Measurement of the impacts of Sales, Profit and Dividend on the Net Worth of a firm.
4) Quantification of the impacts of managerial decisions on the firm's financial position.

In Pakistan, the methodological issues in corporate finance have not received much attention. Ready-made formulae and ratio analysis are applied for the estimation of various 'stochastic' relationships. Here a gap has been observed between financial analysts and econometricians. The financial analysts have a little knowledge about the econometrics and applied economics. So they can not derive or modify the formulae according to the local requirements. Naqvi, Kemal and Rashid (1982), AERC (1988), Mehar (1992), and PIDE (1992) have applied econometric techniques in the construction of the simulation models. But, all of those studies are concerned with macroeconomics. They do not cover the financial modeling of the joint stock companies and the structure of corporate' accounts. Surprisingly, PIDE (1992) and AERC (1988) did not include the corporate sector and financial market in their macro-econometric models. An attempt is made in the study to fill the vacuums.

III. REVIEW OF THE LITERATURE

In the literature of corporate finance, the use of simulation model is a relatively new development. There are a number of studies [(Brackus, Brainard and Tobin: 1980); (Robert and Philip : 1982); (Kramer, Moverick, Fase and Van : 1990); (Hughes : 1991); (Bandt and Jacquinot : 1992); (Gerald, Brald and Thomas : 1992) and (MEFISTOTE : 1992)] where simulations' models have been applied in the corporate finance. The estimation and application of financial models have been originated by the academicians, but now it is a fast growing area in the corporate world. The large corporations are hiring financial modelers as a part of the top-level financial management.

The studies on the corporate finance in Pakistan [(Barings: 1994); (Mehar: 1994); (Mehar and Salam: 1994); and (ASK Securities: 1994)] are based on the financial accounting and arithmetic calculations. While, the studies on the financial economics in Pakistan [(Bilgrami and Nishat : 1990); (Nishat and Saghir : 1991); (Mehar, Javed and Aijaz : 1992) and (Nishat and Saghir : 1992)] are focused on the regression analysis. Such studies, no doubt, provide useful information and analysis on the relationship between the economic and financial variables. However, they do not cover the legal, managerial and accounting aspects of the corporate finance.

This study is based on the assumption that financial variables in a balance sheet and income statement have a circular relationship and a firm can not change the magnitude of a variable without affecting the others. So, the model deviates from the traditional theories of limited impacts. The relationship among the variables has been presented in figure: 1.

In the literature of corporate finance, many capital structure models are based on the assumptions that managers of large corporations always act in the shareholders' interests (e.g., Modigliani and Miller, the static trade-off theory, and the pecking order theory). The theory of optimal capital structure has been hotly debated since the irrelevance and tax shield propositions of Modigliani and Miller (1958, 1963). The using agency theory, on the other hand, identifying situations in which managers may deviate from value maximizing financing decisions and pursue their own self interest (Jenson and Mecking: 1976). The argument rests of the assumption that managers who are responsible for financial decisions are unable to diversify their human capital (Fama: 1970). According to the agency theory, incentive compensation schemes, direct equity ownership (Jensen and Mackling : 1976) and monitoring by the Board of Directors (Fama and Jensen : 1973) and major shareholders (Sheilfer and Vishny: 1986), mitigate the incentive conflict between managers and shareholders.

Jensen and Macling (1976), see the modern corporation as a nexus of contracts. They suggest that the firm's ownership structure, executive compensation, and control mechanisms are interrelated. Subsequent theoretical research reinforces such a link. Ross (1977) presents a model for an optimal capital structure to maximize managers' wealth.

It is concluded in the various studies that corporate investment, dividend, compensation and financial policies are interrelated and the debt & equity are alternative "Governance Structures" rather than just "Financial Structures". A firm with higher asset specificity will find debt financing very expensive. Williamson (1988) also suggests that the board of directors' acts not only to monitor the management team, but also "as a way by which to reduce the cost of capital for projects that involve limited redeployability".

Debt may also impose costs on the firm. [(Lintenberger and Horne : 1978); (Scott : 1977); (Kim : 1978)and (Smith : 1980)]. A number of agency costs associated with debt have also been identified. Such costs are associated with claim dilution (Fama and Miller: 1972) and under investment (Myers: 1977).

A noted agency cost is the conflict between managers and shareholders due to financing decisions. Such conflict could arise as a result of differential in risk exposure. Shareholders may care only about the systematic risk of a firm's security because they hold well-diversified portfolios. Managers, on the other hand, may be more concerned with the firm's total risk.

Although, agency theory recognizes the conflict between managers and shareholders, it also identifies some potential solutions to the problem of risk aversion. First, compensation contracts can be designed so they relate managers' compensation to their performance (Holmstrom: 1982). Haugen (1991) and Smith and Watts (1992) have argued that stock options may motivate managers to increase the firm's risk. Smith and Watts (1922) also argue that executive action planes control the under leverage problem. According to the authors, managers have incentives to increase the firm's leverage as the percentage of their compensation in unexercised stock options increases. However, the reverse could also be true. Second, direct managerial equity investment makes the interests of managers and shareholders more compatible (Jensen and Meckling: 1976).

Shareholders expects to the board who are not under the control of the chief executive officer (CEO), can monitor managers more effectively (Fama and Jensen: 1973). Monitoring by outside board members, supported by Morck, Shleifer and Vishny (1988) may improve the financial structure of the firm. In addition, by concentrating ownership, shareholders can monitor the management team more effectively (Shleifer and Vishny : 1986). The empirical work provides indirect support for the argument that ownership concentration creates stronger incentives to monitor managers (Brickley, Lease and Smith : 1988).

There is also large literature on the role of the stock market in the efficient allocation of risk [(Arrow : 1964); (Leland : 1978) and (Hirshleifer : 1972)]. But, relatively less work on its roll in

guiding investment in corporations. However, there are two strands of literature that do link stock prices and investment decisions: q-theory in Economics and capital budgeting in Finance.

Although, there are differences among the models, these are all consistent with the conclusion that leverage is not only an outcome of the governance and incentive structure of the firm, but also a part of that structure.

Hill (1987) developed a model of shares' valuation. Model consists of four simultaneous equations. According to him equity capitalization rate depends on 'Risk element' and 'Return on shareholders wealth'. By and large it was a modification of capital assets' pricing model (CAPM). Moreover, Jensen and Meckling (1976), suggest that managerial equity investment is an important determinant of the firm's capital structure. On one hand, as manager's stock in the firm rise, higher leverage becomes more attractive, since leverage increases the share price and thus the value of the managers' holdings. On the other hand, at sufficiently high levels of ownership, managers are unlikely to hold a well-diversified portfolio and increase in leverage can impose a high cost on their human capital. Therefore, they may reduce the risk of the firm (Smith: 1987). If risk is reduced by under leveraging, we might observe an inverse relationship between leverage and managerial ownership beyond some level.

IV. THE DATA AND VARIABLES

A) FINANCIAL ACCOUNTING ASPECTS OF THE MODEL.

We adopted an econometric approach in this study. However, it is useful to recall the main insight of financial accounting on which the most of the corporate finances' models are based. The accounting and the economic approaches in the literature are differed fundamentally. The accounting studies focus attention on the preparation of the flow of funds (where from funds comes and where to go). While attention in the economic theories are paid on the behavior of investors and managers; that why funds from come and why to go. Consequently, those studies on answering various questions that are not addressed by the accounting literature. The Generally Accepted Accounting Policies have been followed in the study and the standard accounting definitions and formats have been adopted for the presentation of variables in the financial statements.

Various companies have different accounting policies. Particularly in Depreciation Accounting, Inventories Valuation and Bad Debts Estimates, policies may be significantly differed. We adopted a methodology where effects of accounting policies have been minimized. Moreover, we converted all the accounts into a "Uniform Accounting System".
The structure of the complete model may be seen in figure: 3. However, from the accounting point of view model may be categorized in the following four blocks:

(a) Balance sheet ---- Debit side.

The following variables are included: -

1) **Liquid Assets (LASST):** Petty Cash Accounts, Bank's Balance and Short-term Investment in portfolios and Commercial Papers are included in those assets. All the heads of accounts, which can be, shortly and easily converted into cash, have been, defined as Liquid Assets.

2) **Accounts Receivables (DBTRS):** They cover Sundry Debtors, Bills Receivable, Pre-paid Expenses and Accrued Income. This head of accounts covers Trade Debtors mainly, but Pre Paid Expenses and Accrued Income have also been included in the head. It is net of bad and doubtful debts.

3) **Closing Inventories (CLSTOCK):** The ending stock of Finished Goods, Work-in-Progress and Raw Materials are included in this account. All the inventories are based on the first-in-first-out (FIFO) method of cost accounting.

4) **Current Assets (TCRASST):** Total Current Assets are the sum of Liquid Assets and Non-Liquid Assets (Accounts Receivables and Closing inventories).

5) **Fixed Assets at Cost (FASSTC):** We are taking all of Fixed Assets at their historical value. For the uniformity in accounting policy, we applied the Reserves Fund Method for Depreciation Accounting. The Assets are appeared in the financial statements at their historical value, while Accumulated Depreciation Fund Account has been created at the credit side of the balance sheet.

6) **Total Assets and Properties (TOTASST) :** This shows the amount in the footing of a balance sheet. It is the summation of total investment at book value.

(b) Balance sheet ---- Credit side.

On the credit side, we categorized the liabilities and equities in the following heads: -

1) **Paid up Capital (OSCAP):** It indicates the Ordinary Shares issued by a company. It is notable that partly paid shares can not be subscribed in Pakistan. So, only fully paid shares have been included in the ordinary share's capital. Paid up capital consists of Initial Public Offering, Sponsors' Equity and Right or Bonus issued in the past.

2) **Surplus and Reserves Funds (SURPLUS):** It is the summation of the outstanding balances in the ledgers of those accounts, which have been created at below the line. Such accounts may have different accounting titles like Capital Reserve Account, Dividend Equilibrium Fund, Contingent Liabilities, Retained Earnings, Un-appropriated Profit, Statuary Reserve Account etc. According to our definition, the outstanding and unpaid balances of below the line income are considered as a Surplus and Reserve Fund (SURPLUS). Shares Premium Account, Preliminary Expenditures and all of those accounts for which, the Board of Directors has discretionary powers are included in this head.

3) **Equity (EQUITY):** It is the summation of paid up capital (OSCAP) and Surplus and Reserves Fund (SURPLUS). It indicates the Owners' Equity or Net Worth of a company.

4) **Accumulated Depreciation Fund (ACMDEP):** It shows the balance in the Depreciation Fund of Fixed Assets. Depreciation is a permissible expenditure in tax accounting and its accounting has legal dimensions. So, Depreciation Fund can not be a part of the equity. However, some time accounting depreciation may be greater than tax depreciation. This excess depreciation would be a part of the directors' discretion (Lee Vs. Neuchatel Asphalete Co: 1889). But, for simplification we have assumed that Depreciation expenditures are provided at above the line.

5) **Long Term Debt (LTDBT):** This is a broad category of liabilities. In this head, all those financing have been included which can not be considered as Equity Financing or Current Liabilities. So, the head covers Borrowing from Financial Institutions, Bonds or Debentures issued by a company, Internally Generated Funds at above the line profits (e.g. Pension Funds; Gratuity; Depreciation Fund etc.) and Preference Share Capital. Because, Preference Shareholders are not the owners of a company (Bond Vs Barrow Hoemalite Steel Co.: 1902).

6) **Employed Capital (CAPITAL):** This is the aggregate amount of Equity and Long-term Debts.

7) **Current Liabilities (CURLIBL):** This source of finance represents the Short- term Payables. It covers Sundry Creditors (Accounts Payables), Bills (or Notes) Payables, Unearned income and Outstanding expenditures etc.

8) **Total Equity and Liabilities (TOTLIBL)**: It is the amount in the footing of a balance sheet, on credit side.

(c) Appropriation of Profit and Loss Accounts.

The following have been included in the third block of variables: -

1) **Sales Revenue (SALES) :** They indicate the Annual Revenue from business activities of a company.

2) **Cost of Goods Sold (CGS)**: It represents the direct expenditure involved in the Cost of Goods sold. They have been extracted from the trading accounts of the companies.

3) **Net Profit before Tax (NPBT)**: It is the difference between the total income and total expenditures. A negative net profit indicates net loss. The cost of goods sold, administrative expenditures, financial expenses and the selling and distributions expenses are included in total expenditures. Similarly, operating and non-operating incomes are included in the total income.

4) **Provision for Income Tax (TXPROV):** It shows the estimated tax liability for the current year. Its estimation does not depend on accounting policies only but legal requirements are also a major factor of the estimation.

5) **Net Profit after Tax (NPAT):** It is the Divisible Profit from the current year's income. The directors have discretionary powers to use this profit for the business enhancement. The decision regarding the distribution or retention of this profit is made in the annual general meeting of a company.

6) **Dividend (DIVEDN):** The variable shows the Dividend declared out of Profit or Reserves and Surplus Account of a company. It is a below the line account and depends on the director's discretion, subject to the Companies Ordinance 1984 and the Securities and Exchange Ordinance 1969.

7) **Retained Earnings (RTNTN):** This is the residual of net profit after tax and dividend payments. It may consist of the different heads of accounts.

(d) Key Ratios and Indicators.

Following key ratios and performance indicators have also been introduced in the simulation and projections to show the financial position of a company under various policies: -

1) **Cash Flow (CFLOW):** This is the difference between the amount of Cash shown in the last and the present year's balance sheet. The Cash Flow can also be extracted from the Cash book of a company.

2) **Net Current Assets (NCRASST):** This indicates the working capital of a company. It is applied to measure the solvency position of a firm.

3) **Change in the Capital (CHCAP):** The variable shows the change in the employed capital over the last year. In fact, it is the real investment in a company in economic term.

4) **Acid Test Ratio (ACIDTST):** This is an indicator of the liquidity position. It shows the availability of Liquid Assets for the repayments of Short-term Debts.

5) **Current Ratio (CRNTR):** It is also an indicator to measure the solvency of a firm. Basically it is the ratio of Current Assets to Current Liabilities. The ratio is also recommended by the State Bank of Pakistan, in the prudential regulations to measure the liquidity position of a firm.

6) **Average Rate of Depreciation (DEPRAT):** It means weighted average rate of depreciation. It is calculated through the division of the Annual Depreciation Cost by the Historical Value of the Foxed Assets.

7) **Dividend to Equity Ratio (DIVTOEQ):** It is the rate of return on equity at book value. It is net of retention.

8) **Dividend Yield (DYIELD):** It is the rate of return on equity at market value. So to say, it is the rate of return to the shareholders from the company.

9) **Gearing Ratio (GEARING):** This is one of the famous measures of debt position. This ratio shows the percentage of debt in employed capital of a firm.

10) **Leverage Ratio (LEVRG):** Basically it is the debt-equity ratio. A higher leverage ratio leads to higher chances of the bankruptcy.

11) **Pay out Ratio (PAYRTO):** It is the percentage of profit declared as dividend. In fact, it shows how much profit has distributed among the shareholders and how much retained for investment.

12) **Retention ratio (RTNRTO):** It is the residual of pay out ratio. This shows the percentage of profit retained for reinvestment in the company.

13) **Self-Financing Rate (SFINRT):** It is calculated through the division of Retained Earnings by the Change in Capital. It shows that how much investment (addition in the employed capital) is being generated by the internal resources of a company.

14) **Valuation Ratio (VRATIO):** This is a ratio between market value (market capitalization) and book value of a firm. A higher valuation ratio indicates a good reputation of a company in the secondary market.

The above mentioned variables have been summarized in table: 1. While, figure: 1 shows a simplified picture of the interrelationship between the variables.

B) THE DESCRIPTION OF THE DATA

The model has been estimated through the pooled data of annual audited accounts of 225 companies listed on the Karachi Stock Exchange. These accounts cover the period of 1980 to 1994 giving us 3375 observations (225 companies and 15 years). The data have been obtained from a variety of sources, depending upon the definitions and the nature of the variables. A large data on different variables have been extracted from the annual reports of the listed companies. However, the data for some variables have also been extracted from various issues of the Pakistan Economic Survey (Government of Pakistan: 1996, 1988, 1986, 1982), the Budget in Brief (Various years), the Explanatory Memorandum of the Budget (various years), and Annual Reports of the State Bank of Pakistan (State Bank of Pakistan: 1995-96, 19990-91, 1986-87, 1982-83).

All the variables are in million of rupees except D2, D6, D7 and TIME which are the dummy and trend variables. Those variables have been defined in table: 2. While, their economic justifications have been discussed in the next section. 'Time' is a trend variable, taking 1980 as 1 and so on. The description and abbreviated names of the variables are listed in table: 2.

C) THE INDUSTRIAL BACKGROUND OF THE COMPANIES .

The analysis covers the eight important sectors of the Pakistan Industry. The companies are classified on the basis of their products. The following are a brief description of the sectors, which have been included in the analysis:

(a) Textile Sector.

Eighty-nine companies are belonged to this sector. Two out of them belong to the public sector. Companies in this sector have large variation in the size of capital. The majority of the companies are working at small scale in relative term, but some belong to the leading industrial groups. For example, Kohinoor Industries (Saehgal group), Crescent Textile (Crescent group), Dewan Textile (Dewan group), Saphire Fibres (Nishat/ Mansha group) etc are included in the leading groups of companies. The sector covers the spinning, weaving and composite units of the textile industry.

(b) Chemical and Pharmaceutical Sector.

This is a capital-intensive sector of the industry. Almost, all of the companies in the sector belong to the multinational corporations. The local subsidiaries of the multinational corporations are listed and registered in Pakistan. Their products have been classified into three groups namely A, B, and C. Those Groups have been formed by the Ministry of Health, on the bases of the importance of a product for health. Group 'A' indicates the life saving drugs. The Ministry of Health controls the prices of those products. The Cost of Production in the industry depends on the imported raw material largely from the parent companies. So, pricing policies of the parent companies play an important role in determination of the Cost of Production. The Research and Development Expenditure is another major cost of companies in the sector.

(c) Engineering Sector.

This is also a capital-intensive sector. One-third companies of the sector belong to the public sector. It is relatively a small sector, from the number of companies' point of view.

(d) Sugar and Allied Product Sector.

This is a seasonal industry in Pakistan. Its raw material has to be acquired before the starting of a production or sales cycle. To, maintain the current ratio and a positive working capital is a difficult task for companies in the sector. Companies in the sector also earn some profits through the various by-products.

(e) Paper, Printing and Allied Products.

Nine out of ten companies in the sector belong to the private sector. Most of the companies in the sector belong to the big industrialist groups of Pakistan.

(f) Cement Sector.

It is one of the highly capital intensive industry. Although, now, more than 15 companies have been listed but due to the constraint of time-series in our pooled data only 5 companies have been included in this sector. Energy is the most important input in the production of cement. Companies in this sector are applying two different type of production process (Wet process and Dry process). Transport and Packaging is another important element of the cost in this sector. Due to the physical nature of the product, its transportation and packaging is one of the main components of the cost of goods sold. Due to rush delivery and shortage of cement in the country, cement is sold on cash on delivery (COD) or cash before delivery (CBD) basis. So, companies in this sector have good liquidity position.

(g) Fuel and Energy Sector.

The majority of the companies in this industry belong to public sector. However, now, government is encouraging to private investment in this sector. Companies in the sector can be classified into fuel and energy sections. Pakistan State Oil (PSO), Karachi Electric Supply Corporation (KESC), Sui-Southern Gas Company (SSGC) and Sui-Northern Gas Company (SNGC) are the important names in the sector. The Collection of cash at spot in fuel sector and cash from the monthly billing

for energy consumption determine the liquidity position of the companies. This is the answer that why companies in this sector have higher cash balances. Not only Petty Cash and Bank Balances of those companies should be higher but Cash disbursement requirements are also higher for those companies. They have to pay the cost of their inputs to the Pakistan National Refinery and Oil and Gas Development Authority. So, the higher cash balances do not imply the excess cash balance.

(h) Others Product's Sector.

This is a broad category of the listed companies. Foods, Transportation, Services, and the all other companies are included in this sector.

From the organizational set up point of view, the companies have been classified into public and private sectors.

TABLE : 1

LIST OF ACCOUNTING VARIABLES

SR. NO	DESCRIPTION OF VARIABLE
Balance Sheet ------ Assets (Debit) Side	
1	Cash and bank accounts (CASH)
2	Short term investment (INVST)
3	Liquid assets (LASST)
4	Accounts receivables (DEBTRS)
5	Closing inventories (CLSTOCK)
6	Total current assets (TCRASST)
7	Fixed assets at historical cost (FASSTC)
8	Total assets and properties (TOTASST)
Balance Sheet ------ Liabilities (Credit) Side	
1	Ordinary shares capital (OSCAP)
2	Reserves and surplus funds (SURPLUS)
3	Shareholders' equity (EQUITY)
4	Accumulated depreciation funds (ACMDEP)
5	Preference shares capital (PSCAP)
6	Bonds / debentures (DBNTUR)
7	Other fixed liabilities (OFXDLIB)
8	Total Fixed liabilities (LTDEBT)
9	Employed capital (CAPITAL)
10	Current Liabilities (CURLIBL)
11	Total liabilities (TOTLIBL)
Trading, Profit and Loss Accounts	
1	Sales revenue (SALES)
2	Opening inventory (OPSTOCK)
3	Cost of production (CSTPRD)
4	Closing inventory (CLSTOCK)
5	Cost of goods sold (CGS)
6	Gross profit (GP)
7	Operating expenditures (EXPENS)
8	Operating income (INCOM)
9	Depreciation for the year (DEPRCT)
10	Other revenue (OINCOM)
11	Net profit before tax (NPBFTX)
Distribution of Profit and Flow of Funds	
1	Provision for corporate tax (TXPROV)
2	Net profit after tax (NPAFTX)
3	Dividend declared for the year (DIVDND)
4	Bonus shares issued (BNSSHR)
5	Retention / retained earnings (RTNTN)
Financial Indicators and Key Ratios ------ Stock Concept	
1	Cash Flow (CFLOW)
2	Net current assets (NCRASST)
3	Change in capital (CHCAP)
4	Acid test ratio (ACIDTST)
5	Current Ratio (CRNTR)
6	Average Rate of Depreciation (DEPRAT)
7	Dividend to equity Ratio (DIVTOEQ)
8	Dividend yield (DYIELD)
9	Gearing ratio (GEARING)
10	Leverage ratio (LEVRG)
11	Pay-out ratio (PAYRTO)
12	Retention ratio (RTNRTO)
13	Self-financing rate (SFINRT)
14	Valuation ratio (VRATIO)

FIGURE 1
THE SIMULTANEITY IN THE FINANCIAL STRUCTURE OF A FIRM

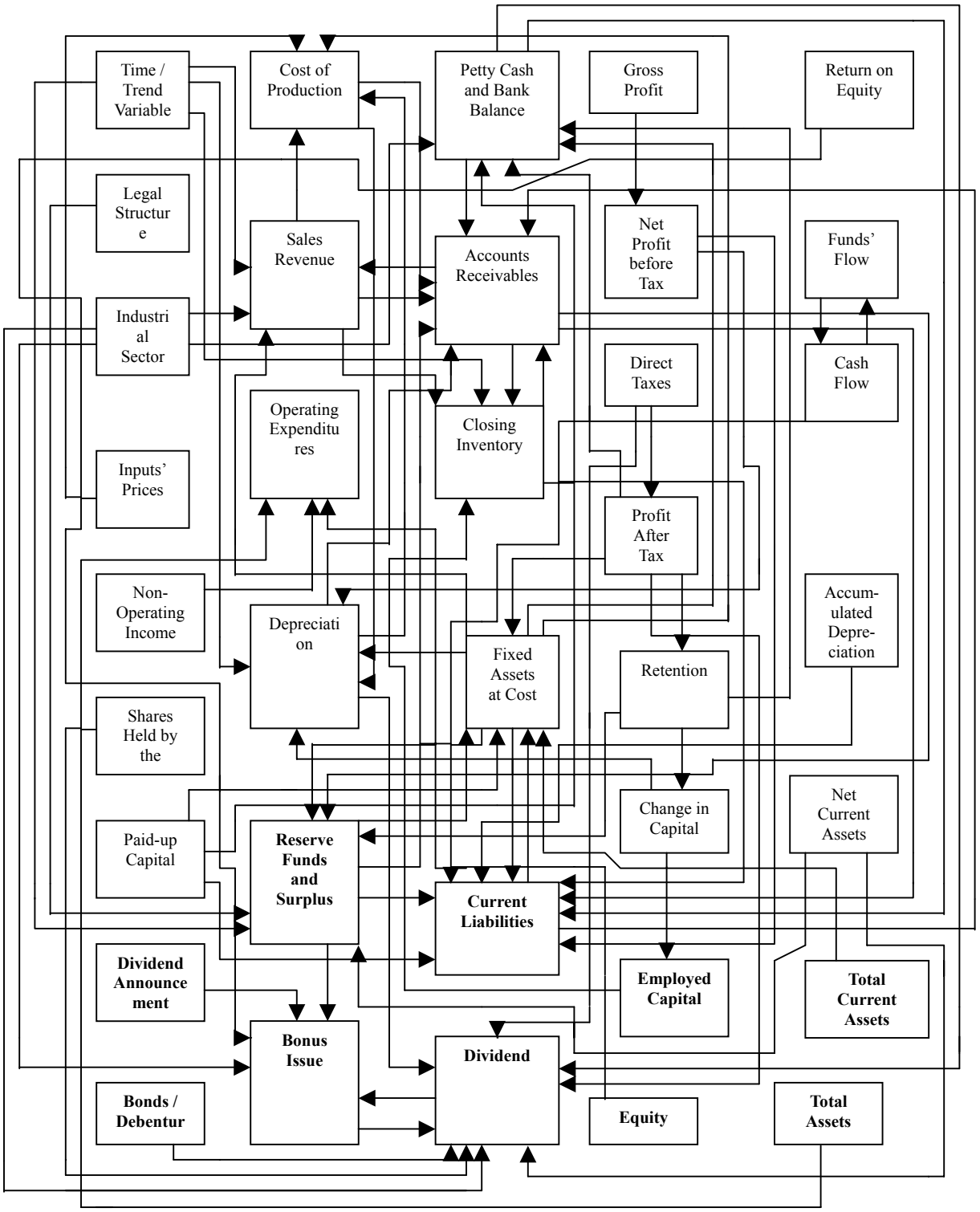

TABLE: 2
DESCRIPTION OF THE VARIABLES

SR. NO.	VARIABLE	DESCRIPTION
(A) SYSTEM VARIABLES : ENDOGENOUS BY BEHAVIORAL EQUATIONS.		
1	CLSTOCK	Value of merchandize inventories at closing date.
2	CURLIBL	Current liabilities.
3	DEBTRS	Accounts receivables including bills/ notes receivables and pre paid expenses.
4	DIVIDEN	Amount of dividend declared
5	FASSTC	Fixed assets at cost
6	LASST	Balance of petty cash plus bank accounts (liquid assets)
(B) ACCOUNTING VARIABLES : ENDOGENOUS BY IDENTITIES.		
7	ACMDEP	Accumulated depreciation
8	CAPITAL	Equities plus fixed (long term) liabilities
9	CFLOW	Cash flow as per cash flow statement
10	CHCAP	Change in capital
11	EQUITY	Shareholders' equity
12	NCRASST	Net current assets
13	NPAFTX	Net profit after tax
14	OSCAP	Ordinary shares (paid up) capital.
15	RIGHT	New issues in the form of right shares
16	RTNTN	Retention / Retained earnings
17	SURPLUS	Outstanding balance of retained earnings (surplus and reserves funds)
18	TCRASST	Total current assets
19	TOTASST	Total assets and properties (footing of balance sheet)
20	TOTLIBL	Total equity and liabilities (footing of balance sheet)
(C) FINANCIAL RATIOS AND KEY INDICATORS		
21	ACIDTST	Acid test ratio
22	CRNTR	Current ratio
23	DEPRAT	Average depreciation rate
24	DIVTOEQ	Dividend on equity
25	DYIELD	Dividend yield
26	GEARING	Gearing ratio
27	LEVRG	Leverage ratio
28	PAYRTO	Pay out ratio
29	RTNRTO	Retention ratio
30	SFINRT	Self-financing rate
31	VRATIO	Valuation ratio

DESCRIPTION OF THE VARIABLES

SR. NO.	VARIABLE	DESCRIPTION
(D) POLICY VARIABLES : EXOGENOUS		
32	BNSSHR	Bonus shares issued by the company during the year
33	CSTPRD	Cost of production
34	DEPRCT	Annual depreciation on fixed assets
35	LTDEBT	Long-term debt including loan from financial institutions, preference share capital, bonds, debentures and other fixed liabilities
36	NPBFTX	Net profit before tax
37	NS	Number of shares issued by the company
38	PRUM	A part of reserve funds represents money raised by premium on shares issued by the company.
39	SALES	Net sales revenue
40	SHNMBR	Number of shares held by the management (board of directors)
41	SHPRIC	Average share price during the year
42	VFIRM	Value of firm (market capitalization)
43	$ACMDEP_{(T-1)}$	One year lagged accumulated depreciation
44	$CAPITAL_{(T-1)}$	One year lagged employed capital
45	D2	Dummy variable equal to one if company belong to chemical / pharmaceutical industry
46	D6	Dummy variable equal to one if company belong to cement industry
47	D7	Dummy variable equal to one if company belong to fuel and energy sector
48	$LASST_{(T-1)}$	One year lagged liquid assets
49	$OSCAP_{(T-1)}$	One year lagged paid-up capital
50	$SURPLUS_{(T-1)}$	One year lagged reserves and surplus account
51	TIME	Time (trend) variable equal to one for 1981-82.
52	TXPROV	Provision for income tax

FIGURE: 2
SPECIFICATION OF THE MODEL

No.	Explained Variable	Explanatory Variables	Expected Sign
1.	Liquid Assets	Fixed Asset at Historical Cost	+
		Net Profit After Tax	+
		Retained Earnings	-
		Special Characteristics of Cement Industry	+
		Special Characteristics of Fuel and Energy Sector	+
2.	Accounts Receivables	Sales Revenue	+
		Short-term Liabilities	+
		Reserve and Surplus Funds	+
		Cost of Production	-
		Liquid Assets	-
		Depreciation	-
3.	Closing Inventories	Sales Revenue	+
		Accounts Receivables	-
		Time / Trend Variable	+
4.	Fixed Assets at Historical Cost	Total Current Assets	-
		Short-term Liabilities	+
		Paid up Capital	+
		Reserve and Surplus Funds	+
		Net Profit After Tax	+
5.	Short-term Liabilities	Liquid Assets	+
		Accounts Receivables	+
		Closing Inventories	+
		Fixed Assets at Historical Cost	+
		Paid-up Capital	-
		Reserve and Surplus Funds	-
		Accumulated Depreciation	-
		Net Profit Before Tax	-
		Cash Flow	-
6.	Dividend	Net Profit After Tax	+
		Net Current Assets	+
		Bonus Shares	-
		Tax Provision	-
		Shares Held by the Directors	+
		Special Characteristics of Pharmaceutical and Chemical Industry	+

V. ESTIMATION METHODOLOGY.

(A) THE QUANTITATIVE TECHNIQUES :

The procedure, which is described in this section, is related to the literature on economic hypothesis and the literature on the econometric modeling. In construction of a simulation model, two things are important: -

The insights are provided by the overall solution of the model allows us to distinguish the more important variables from the less important ones, enabling us to revise the model by specifying the equations whose performance are poor (Edward and Rao: 1990). On the basis of this criterion, we included only significant explanatory variables in the model.

It is obvious that if we are interested to improve the accuracy of the financial forecasts, more explicative factors will have to be taken into consideration. The model becomes then multidimensional and understandable only to quantitative oriented economists.

Our model is based on a "Micro level" study. First, we developed a model on firm level. Then, we aggregated the outcomes to reach at " Macro level".

A system of equation is the natural technique to address the questions we have posed. The system of equations provides a useful tool in disentangling the effects of incorrect influences of causality among the policy choices. Although, single equation estimation has been the technique of choice in empirical analysis of financial policies, the use of a system of equation is not unprecedented. Peterson and Bensesh (1983), McCabe (1979), and Jensen and Zorn (1988) each examine firm policy decisions within such a system.

In view of the above, we estimated the structural equations, by Three Stage Least Square (3SLS) technique. Our system of equations includes twenty equations. Our development of this system follows the classical form for estimation of structural equations. We begin with the Liquid Assets (LASST), Accounts Receivables (DBTRS), Closing Inventories (CLSTOCK), Fixed Assets (FASSTC), Current Liabilities (CURLIBL) and Dividend (DIVDN) that are the focus of this analysis. To these, we added a vector for explanatory variables that capture the real attributes of firms, and estimate a system of structural equations.

At closing we have two ends: -

(1) At initial level, we kept exogenous to profit (NPBT). It can be internally determined. While, Tax provision (TXPROV) is based on legal structure of the tax system

(2) At the second end , choice between Retained earnings (RTNTN), Bonus shares (BONUS), Right issue (RIGHT), and Premium on right issue (PRUM) depend upon :-
    a) Size of net profit after tax (NPAT) and
    b) Reaction by the stock market.

In the model, there are 11 key ratios and indicators other than 6 behavioral equations and 14 accounting identities. The Figure: 4 shows a complete anatomy of the model.

Our model is consists of twenty equations, six of which are stochastic. So, we have twenty endogenous variables of which six are explained by stochastic equations and the remaining defined by the accounting identities, which close the model. The model is thus mathematically complete having twenty-one predetermined variables. All the lagged variables e.g. last year's Liquid Assets (LASSTt-1), last year's Depreciation Fund (ACMDEP t-1), last year's paid up

capital (OSCAP t-1), last year's Reserves and Surplus (SURPLUS t-1), and trend variable (TIME) are treated as exogenous variables.

B) THE MODEL SPECIFICATION:

An econometric model of financial planning is often a mixture of accounting framework and economic theories. Financial economists provided theoretical background for the model in different studies. We have merged the various functional approaches within a complete simulation model, which finds its statistical base in an accounting framework as presented in figure: 3. One of the properties of the model is that managerial and legal parameters - in the context of Pakistan - have been incorporated in the simulations. This implies that the estimates and forecasts can be simulated in realistic scenarios.

The specifications of the individual equations are briefly discussed as follows: -

(a) Liquid Assets (LASSTS).

The first equation of the model explains the volume of the Liquid Assets (LASSTS) in a Balance Sheet. Petty Cash, Short-term Investment and Bank Balance are the components of the Liquid Assets (LASSTS). There are three major determinants of Liquid Assets (LASSTS):

(a) **Fixed Assets at their historical value (FASSTC):** A higher value of fixed assets (FASSTC) always requires a higher value of Liquid Assets (LASSTS). Bandt and Pascal (1992) found a positive correlation between Capital and Cash Flow. (By definition, Cash Flow is the Change in Liquid Assets). According to our hypothesis Liquid Assets are positively correlated with Fixed Assets. An increase in the Fixed Assets will lead to the increase in Depreciation Expenditure, so, availability of the funds will be increased without a decline in the Cash Balance.

(b) **Retained Earnings (RTNTN):** They also determine the Liquid Assets (LASSTS). It is commonly observed that higher retention leads to increase in the Cash Balance with a credit balance in Surplus and Reserve Fund (SURPLUS). The retention shows that firm has a positive profit but it is not disbursing the profit. So, the Cash Earning will not go out from the company. In fact, Depreciation (DEPRCT) plays a role to decrease Cash Outflow at above the line and the Retained Earnings (RTNTN) decrease the outflow of cash at below the line.

(c) **Net Profit after Tax (NPAT):** It also plays an important role in the determination of Liquid Assets (LASSTS) of a company. It is generally thought that profit and liquidity have significant positive correlation.

Besides those three explanatory variables, two dummy variables have also been incorporated to capture the impacts of the Cash Flow patterns of the Cement Industry (D6) and the Energy sector (D7).

(b) Accounts and Notes Receivables (DBTRS) .

It has been hypothesized that Reserves Fund and Surplus (SURPLUS), Short-term Liabilities (CURLIBL), Liquid Assets (LASST) and Sales Revenue (SALES) have direct relationship with the Receivables from Debtors (DBTRS). All of those variables lead the improvement in liquidity position of a firm; while, a good liquidity position leads a soft policy for sales on credit. Mian and Smith (1972) included Sales Revenue (SALES) in the equation of the Receivables from Debtors (DBTRS) as a proxy of market power.

It is also commonly intuitive that addition in the Cost of Production (CSTPRD) and Depreciation Expenditures (DEPRCT) leads the lower sale on credit. So, they also have been taken as independent variables.

(c) Closing Inventories (CLSTOCK).

Mats, Cury, Frank and Khan (1982) estimated that Inventories in balance sheet cover one third of the total assets' value. However, the specification of the Closing Inventories (CLSTOCK) is not a simple task. Traditional studies in cost accounting recommend Economic Order Quantity (EOQ), and Buffer Stock techniques. Such techniques are based on the assumption that sales volume is be equal to the production volume. So, it is hypothesized that Closing Inventories (CLSTOCK) depend on Sale Volume (SALES) largely. A higher amount of sales (SALES) implies a higher volume of Closing Inventories (CLSTOCK). It is also hypothesized that the Receivable from Debtors (DBTRS) is a substitute of Closing Inventories (CLSTOCK). So, in the presence of a higher amount of Receivables (DBTRS) the volume of Closing Inventories (CLSTOCK) should be lower.

Moreover, time (TIME) is a most important factor of the Closing Inventories (CLSTOCK). Time indicates the addition in the value of Inventories (CLSTOCK) over the years. This also incorporates the effects of the improvement in Inventory Management, Storage Facilities, Buffer Stock Estimation and Economic Order Quantity (EOQ) levels.

(d) Fixed Assets at Historical Cost (FASSTC).

Some important and interesting aspects of the equation of Fixed Assets at Historical Cost (FASSTC) will be discussed in the next section. The explanatory variables of the Fixed Assets (FASSTC) are Paid up Capital (OSCAP), Reserves and Surplus Fund (SURPLUS), Total Current Assets (TCRASST), Net Profit after Tax (NPAT) and Current Liabilities (CURLIBL).

Equities (OSCAP plus SURPLUS) are obviously one of the most influential factors of the acquisition of Fixed Assets. So, its inclusion in the model is obvious. A higher magnitude of Current Assets (TCRASST) may be a cause of lower investment in Fixed Assets (FASSTC), because, total financing will be distributed between the two categories of assets.

(e) Short Term Liabilities (CURLIBL).

It is hypothesized that Short-term Financing depends on the equity capital of a firm (EQUITY). The equity financing is higher, the short-term financing will be lower. The payments of Staff Salaries, Utility Bills, Bills of the vendors and the suppliers of raw material etc. will not be delayed if a firm has a higher equity. However, to isolate the effects of Paid up Capital (OSCAP) and Reserves and Surplus Fund (SURPLUS), both the variables have been included individually. Depreciation Fund (ACMDEP) is also a source of financing. So, it may be a substitute of the Short-term Financing (CURLIBL). The components of the Current Assets - Liquid Assets (LASSTS), Receivables from Debtors (DBTRS) and Closing Inventories (CLSTOCK) - may also be a cause of the change in the Current Liabilities (CURLIBL), because of management decision to maintain the Current Ratio or Working Capital level. If, a firm want to maintain a higher value of Liquid Assets (LASSTS) the Current Liabilities (CURLIBL) may also be increased. Moreover, a positive relation between the Current Liabilities (CURLIBL) and Receivables from Debtors (DBTRS) is commonly viewed; Because, a large Sales on Credit will tight the liquidity potential of a firm. As a result, firm will has to purchase the inputs on credit basis. Similarly, Cash Flow (CFLOW) is a phenomenon of Liquidity Position. If Cash Flow (CFLOW) increases, the Current Liabilities (CURLIBL) will decrease.

It is also hypothesized that Fixed Assets (FASSTC) will lead to increase in Short- term Financing (CURLIBL).

Net Profit before Tax (NPBT) is an indicator of the availability of funds; so, in the presence of higher profits the Short-term Financing (CURLIBL) may decrease. It is notable that we are incorporating Profit before Tax (NPBT) because, the payments of Short-term Liabilities are made before the payment of taxes.

(f) Equity (EQUITY) and Long term Financing (LTDBT)

It is obvious that all the assets and Current Liabilities (CURLIBL) depend on some explanatory variables. So, either Equity (EQUITY) or Long-term Debt (LTDBT) must be residual (balancing amount) in credit side of a balance sheet. However, because of the dependency of debts on external factors - availability of external funds, rate of interest, credit rating and status of a company etc. - we are considering Long-term Debt (LTDBT) as an exogenous variable. The institutional borrowing through the public sector commercial banks generates a large part of the Long-term Debts Financing (LTDBT) in Pakistan. The size of institutional borrowings depends on the credit policy prepared by the State Bank of Pakistan. The social and political factors may also determine the availability and conditionally of the Long-term Debts Financing (LTDBT).

These are the reasons that why the studies on investment behavior do not include debts or interest rate as an explanatory variable, in the developing countries. The non-economic factors of debt financing and the lack of adequate information are the other reasons for the exclusion of interest rate. A conventional view among the financial analysts is that a higher debt to equity ratio and earnings per share are closely linked. A higher level of debt financing leads to lower level of equity (or lower number of shares). So, Earning per Share will increase, but the hypothesis is not proved in the recent studies.

(g) Dividends Pay out (DIVEDN).

For any of the financial indicators wherein financial planners and managers are interested, the forecaster will identify and select those factors which are contributing to or explaining most of the indicators' behavior or trend. Empirical investigations tell us that Net Profit after Tax (NPAT), Working Capital (NCRASST) and Insider shares in equity (SHNMBR) affect the firm's decision regarding dividend pay-out (DIVEDN). Brittain (1966) verified a positive relationship between dividend (DIVEDN) and Net Profit after Tax (NPAT).

So, we also included those variables in our model. Working capital (NCRASST) is included in the equation as an indicator of the probability of Cash Dividend.

Econometric techniques, do not only help us in selecting the most significant explicative factors, they also determine numerically how much each factor is actually contributing in explaining the behavior of economic indicators. For some sectors income tax and statuary reserves are predetermined in Pakistan. They more depend on legal and constitutional structure of Pakistan than the economic behavior. Provision for Tax (TXPROV) is a below the line head of account. So, it has been included in the equation of dividend (DIVEDN). Bonus shares may be a substitute of Dividend; so, we also included this variable in the dividend's equation.

Companies in chemical and pharmaceutical sectors belong to the large multinational groups. They do not emphasis on Retained Earnings. Because, their investment depends on their Initial Equity (Parent companies' investment). So, they have higher pay out ratio. Therefore, a dummy variable (D2) has been introduced in the equation to capture the phenomenon.

It is also observed that a high percentage of shares held by management (Board of Directors) lead the high dividend. So, we also included the number of shares held by the Board of Directors (SHNMBR) as an explanatory variable. In most of the studies, insider ownership (SHNMBR) has been assumed to be an exogenous factor. According to Jenson, Solberg and Zorn (1992) Insider Ownership (SHNMBR) choice are endogenous outcomes of value- maximizing behavior. However, due to the limitation in our study, we are considering it as an exogenous variable.

FIGURE: 3

THE MODEL IN FUNCTIONAL FORM
STRUCTURE OF CORPORATE FINANCE

A) Behavioral Equations :

1. LASST = f (CONST, FASSTC, NPATX, RTNTN, D6, D7)
2. DBTRS = f (CONST, LASST, CURLIBL, SURPLUS, DEPRCT, SALES, CSTPRD)

3. CLSTOCK = f (CONST, DBTRS, SALES, TIME)
4. FASSTC = f (CONST, CURLIBL, SURPLUS, OSCAP, NPATX, TCRASST)
5. CURLIBL = f (CONST, LASST, DBTRS, CLSTOCK, FASSTC, SURPLUS, OSCAP, ACMDEP, CFLOW, NPBTX)
6. DIVEDN = f (CONST, NPATX, NCRASST, BNSHR, TXPROV, SHRNBR, D2)

B) Accounting Identities :

7. $CFLOW = LASST - LASST_{(T-1)}$
8. TCRASST = LASST + DBTRS + CLSTOCK
9. NCRASST = TCRASST – CURLIBL
10. TOTASST = TCRASST + FASSTC
11. TOTLIBL = TOTASST
12. NPATX = NPBTX – TXPROV
13. RTNTN = NPATX – DIVEDN
14. $SURPLUS = SURPLUS_{(T-1)} + RTNTN + PRUM$
15. CAPITAL = TOTLIBL – CURLIBL
16. EQUITY = CAPITAL – LTDBT
17. OSCAP = EQUITY – SURPLUS
18. $RIGHT = OSCAP - OSCAP_{(T-1)} - BNSHR$
19. $CHCAP = CAPITAL - CAPITAL_{(T-1)}$
20. $ACMDEP = ACMDEP_{(T-1)} + DEPRCT$
21. ACIDTST = LASST / CURLIBL
22. CRNTR = TCRASST / CURLIBL
23. DEPRAT = DEPRCT / FASSTC

C) Key Ratios :

24. DIVTOEQ = DIVDEN / EQUITY
25. DYIELD = DIVDEN / VFIRM
26. GEARING = LTDBT / CAPITAL
27. LEVRG = LTDBT / EQUITY
28. PAYRTO = DIVIDEN / NPATX

THE MODEL IN FUNCTIONAL FORM
STRUCTURE OF CORPORATE FINANCE

D) Exogenous Variables :

29. RTNRTO = RTNTN / NPATX
30. SFINRT = RTNTN / CHCAP
31. VRATIO = VFIRM / EQUITY
32. DEPRCT = DEPRCT
33. SALES = SALES
34. CSTPRD = CSTPRD
35. LTDBT = LTDBT
36. NPBTX = NPBTX
37. TXPROV = TXPROV
38. BNSHR = BNSHR
39. SHNMBR = SHNMBR
40. SN = SN
41. SHPRIC= SHPRIC
42. VFIRM = VFIRM
43. PRUM = PRUM
44. $LASST_{(T-1)} = LASST_{(T-1)}$
45. $ACMDEP_{(T-1)} = ACMDEP_{(T-1)}$
46. $SURPLUS_{(T-1)} = SURPLUS_{(T-1)}$
47. $OSCAP_{(T-1)} = OSCAP_{(T-1)}$
48. $CAPITAL_{(T-1)} = CAPITAL_{(T-1)}$
49. TIME = TIME
50. D2 = D2
51. D6 = D6
52. D7 = D7

**** Where, 'CONST" is used for the constant term / intercept of the equation.***

FIGURE: 4
ANATOMY OF THE MODEL

(A) Analysis of the Data

1) Estimated Period	1980-1994
2) Ex-post Forecasts	1995 -1997
3) Ex-ante Forecasts	1998-1999
4) Number of Companies	225
5) Number of Industrial Sectors	8

(B) Distribution of the Companies

Industrial Sector		**Legal / Organizational Set up**		
		Total	**Public Sector**	**Private Sector**
1	Textile	89	2	87
2	Chemical and Pharmaceuticals	20	2	18
3	Engineering	24	8	16
4	Sugar and Allied	17	1	16
5	Paper, Printing and Allied	10	1	9
6	Cement	5	4	1
7	Fuel and Energy	12	7	5
8	Others	48	11	37
	Total :	225	36	189

(C) Analysis of Variables

1) Total Variables : 52
2) Endogenous Variables : 31

   a) System Variables : 06
   b) Accounting Variables : 14
   c) Key Ratios and Indicators : 11

3) Exogenous Variables : 21

   a) Exogenous in the Model : 12
   b) Dummy Variables : 03
   c) Lag Variables and Time : 06

ANATOMY OF THE MODEL

(D) ANALYSIS OF THE EQUATIONS

1) Number of Behavioral Equations : 6
2) Number of Accounting Identities : 14
3) Number of Key Ratios and Indicators : 11
4) Number of Estimated Parameters : 40

   a) Number of Constants : 06
   b) Slopes of Exogenous Variables : 10
   c) Slopes of Endogenous Variables : 24

      i) Behavioral Endogenous : 9
      ii) Accounting Endogenous : 15

(E) Distribution of Estimated Parameters (Slopes)

Endogenous by Behavioral Equations		Endogenous by Accounting Identities		Exogenous	
Variable	**No. of Para-meters**	**Variable**	**No. of Para-meters**	**Variable**	**No. of Para-meters**
CURLIBL	2	SURPLUS	3	SHNMBR	1
FASSTC	2	TXPROV	1	DEPRCT	1
DBTRS	2	NPAFTX	3	SALES	2
CLSTOCK	1	NCRASST	1	CSTPRD	1
LASST	2	NPBFTX	1	BNSHR	1
		CFLOW	1	TIME	1
		ACMDEP	1	D2	1
		TCRASST	1	D6	1
		RTNTN	1	D7	1
		OSCAP	2		
	9		15		10

V. THE RESULTS AND SIMULATIONS

A) THE SIGNIFICANCY AND LIMITATIONS OF THE PARAMETERS**.**

The estimated equations have been shown in table: 3. The estimated t-ratios, F-statistics, and the adjusted coefficient of determination (R^2) are also listed in table: 3.

All the equations have good fits. The high values of F-statistics confirm the validity of the results. The t-ratios are also highly significant, reflecting that the explanatory variables are the significant determinants of the dependent variables.

Our analysis has some potential limitations. First, our data employ a broad definition of the Long-term Debts (LTDBT). It covers the Debts from Commercial Banks, Debts from Development Finance Institutions, Corporate Bonds, Fund Generated at Above the Line (Pension Fund, Depreciation Fund, Redemption Fund) and even Preference Share Capital. So, the net effects of debt on financing pattern can not be clearly captured. Sometimes, the source and type of debt may be more important than the size of debt.

Second, off balance sheet financing is a common practice for funds' raising. For example, we highlighted the factors of Fixed Assets, but a firm can finance the Fixed Assets through leasing. We do not know how much of the total variation is the result of variation among explanatory variables and how much is due to the lease financing facility. Similarly, we do not have the data on interest rates. Thus, we can not identify the variation in the Long-term Debts attributable to differential in interest rates.

Third, we can not incorporate the socio-political and the socio-economic factors like as subsidized debts to a company, concession and relaxation in various taxes, political advantages in terms of cost of utilities.

In closing identities we estimated the Long-term Debts and Equity. We concluded that if a firm has not enough profit for retention and Bonus, it would have to choose an option between the Right Issue, and Debt Financing. However, the funds raising either by the Debt Financing or by the Right Issue is not a simple matter. Chadwick (1987) recognized the effects of funds' providers' attitude, external environment, characteristics of the particular industry and financial structures of the other firms within the sector on the financial structure of a company.

Finally, we cannot convert the corporate accounts completely in a uniform system, because of large variations in the accounting policies regarding Inventory Valuation, Depreciation Accounting, and the Creation of Secret Reserves.

B) IMPLICATIONS IN THE RESULTS.

We examined several hypotheses that predict the variation in the financial structures of a firm. Our primary focus is to provide a better understanding of the relative importance of financial and dividend policies. The empirical results are robust to alternative measures of the independent variables. Our methods also suggest that Equity Capital is important in explaining both the Fixed Assets and the Current Assets of a company. The results reveal the following interesting observations:

1) The first important observation is that we provide evidence of a strong association between the volume of Fixed Assets and Short-term Liabilities. This is consistent with the observation that firms also rely on Short-term Capital Budgeting. We also document a reliably positive association between the existence of a Reserve Fund and Fixed Asset.
2) Another important finding is that the " Bonus shares" is not a substitute of the "Cash dividend". But, both are complements. It can be viewed at Pakistani stock market.

3) Time is the strongest variable, which explains the size of Closing Inventories.
4) A negative relationship between the Retained Earnings and Liquid Assets is observed. The reason is that an increase in Retained Earnings indicates the urgent cash requirement of a firm. Because, for long term investment firm can arrange Equity and Debt financing. But for urgent nature expenditure firm arrange through retention. As a result firm has to decrease the Liquid Assets.
5) Insider ownership leads the higher dividend pay out. It is commonly observed in the market that closed companies pay higher dividend.

Now we discuss the implications in the results by individual equations.

(a) Liquid Assets (LASSTS):

After Tax Profit (NPATX) is a major source of cash flow, while the volume of Non-current Assets is also a cause of higher Cash Balance; Because Cash will not flow out by Depreciation and above the line deductions.

Results do not accept the hypothesis of a positive relation between Cash Balance and creation of Reserves at below the line. There is a significant negative relation between Liquid Assets and Retention. This implies that avoidance from dividend payment despite of higher profits, is an indicator of the weak liquidity.

A higher liquid balance of the companies in the cement and energy sectors shows that cash dealings in those companies are significantly higher.

(b) Accounts receivables (DBTRS) :

It is observed that five percent of Sales Revenue is generated through credit facility. It indicates the direct relation between Sales and Receivables. The results are consistent with Mian and Smith (1972) study. Higher Depreciation Expenditures (DEPRCT) and the higher Cost of Production (CSTPRD) will lead a tendency of avoidance from Sale on Credit. In case of a higher Cost of Production, company will prefer to sale on cash bases. Closing Inventories and Liquid Assets have been classified as a substitute of Receivables. While, financing through Retained Earrings (RTNTN) and Short-term Liabilities (CURLIBL) leads the enhancement in Accounts / Notes Receivables.

(c) Closing Inventories (CLSTOCK) :

Specification of this equation has some interesting implications. It is interesting that twenty-nine percent of incremental inventories will be generated through Sales enhancement. Sales on credit have been confirmed as a substitute of Closing Inventories. Time is proved as a most important variable in determining the level of Inventories.

(d) Fixed Assets at Historical Cost :

We considered fixed assets at their historical value, so that effect of any appreciation and depreciation may excluded. A negative sign with the Total Current Assets in the equation shows the distribution of total financial resources between the Current and Non-current Assets. The parameter associated with the Current Assets (TCRASST) indicates that Forty-three percent of additional resources will be transferred in the Current Assets and addition in the Fixed Assets will be 2.3 times of addition in the Current Assets (TCRASST). A forty-three percent deletion in Current Assets will create a hundred percent additional debit balance in the Non-current Asset.

It is also estimated that 17.40 percent of the additional Fixed Assets are financed by the Short-term measures financing (CURLIBL). Such a part of financing may be the rental payment of finance lease, or current installments of the Long-term Debts.

Addition in Equity - either through Paid up Capital (OSCAP) or through Retention (RTNTN)- will be a cause of enhancement in Fixed Assets. The addition in Fixed Assets will be three times more as of addition in Equity. Surprisingly, Short-term Financing also leads to enhance the volume of Fixed Assets. While, Net Profit has a negative relation with Fixed Assets.

(e) Current Liabilities (CURLIBL) :

It is also proved that Equity Capital and particularly Reserves and Surplus Fund (SURPLUS) is a substitute of Short-term Liabilities (CURLIBL). Similarly, Depreciation Fund for Fixed Assets is also a substitute of Short-term Financing. It is evident that a higher Net Profit before Tax (NPBT) and Cash Inflow (CFLOW) are the causes of decrease in Short-term Liabilities (CURLIBL). Liabilities like payments of Outstanding Bills for Utilities, Salaries, Fringe Benefits, and Vendor's Payments etc. can be paid through Net Profit before Tax (NPBT). The increases in the components of Current Assets (TCRASST) - Liquid Assets (LASST), Receivable (SBTRS), and Inventories (CLSTOCK) - are the other causes of increase in Current Liabilities.

(6) Dividend Pay out (DIVIDEN):

Our evidence provides less support for the hypothesis that firm use working capital for payment of dividend. Although, the estimated coefficient of the Net Current Assets (NCRASST) is significantly negative, the economic impact of this variable is trivial. The results are consistent; however, with the hypothesis that firms with more insider holdings pay more dividend. Our examination of the determination of dividend, support the hypothesis that firms with more net profit (NPAT), pay more dividend. This result is consistent with Brittain's finding (1966).

We also found that companies in the Chemical and Pharmaceutical sector pay higher dividend as compare to companies in other sectors.

Another interesting thing, in relation with dividend, has also mentioned that issuance of bonus shares (BONUS) is not a substitute of cash dividend (DIVDEN) but, to some extent, it is classified as a complement of the cash dividend (DIVDEN).

TABLE : 3
ESTIMATED RESULTS (3SLS)

Equation Number	Dependent Variable	Independent Variable	Coefficient	T-Statistic	R-Square	F-Statistic
1.	LASST	CONST	0.779	1.12	0.5435	394.08
		FAASTC	0.069	18.11		
		NPATX	0.614	9.80		
		RTNTN	- 0.348	- 4.37		
		D6	13.548	2.92		
		D7	23.142	6.48		
2.	DBTRS	CONST	7.635	5.38	0.9823	11536.19
		SURPLUS	0.266	16.85		
		CURLIBL	0.275	62.27		
		LASST	-0.424	- 9.15		
		DEPRCT	-0.788	- 7.90		
		SALES	0.051	12.71		
		CSTPRD	-0.024	- 6.06		
3.	CLSTOCK	CONST	50.422	8.51	0.9215	4846.30
		DBTRS	- 0.982	-135.86		
		SALES	0.290	50.46		
		TIME	3.435	3.93		
4.	FASSTC	CONST	-26.948	- 3.83	0.9148	3544.37
		OSCAP	3.294	18.80		
		SURPLUS	3.288	77.96		
		TCRASST	- 2.306	- 21.83		
		NPATX	- 1.595	- 4.79		
		CURLIBL	2.469	22.90		
5.	CURLIBL	CONST	7.232	5.89	0.9536	3770.99
		OSCAP	-0.424	- 3.34		
		SURPLUS	-0.442	- 27.52		
		LASST	1.055	22.31		
		FASSTC	0.174	24.496		
		NPBTX	-0.283	- 4.88		
		CFLOW	-0.316	- 4 .18		
		ACMDEP	-0.164	- 18.77		
		DBTRS	0.938	103.58		
		CLSTOCK	0.908	103.91		
6.	DIVEDN	CONST	-1.022	- 5.96	0.8305	1114.52
		NCRASST	-0.035	- 12.85		
		NPATX	0.155	19.35		
		SHNMBR	0.627	26.51		
		TXPROV	0.297	25.10		
		BNSHR	0.103	2.17		
		D2	1.319	2.48		

C) THE SIMULATIONS AND PREDICTIVE POWER

To test the validity of the model in future, we have forecasted for the year from 1995 to 2000. We have taken following assumptions for the future projections:

(1) Net Profit before Tax (NPBFTX), Sales Revenue (SALES), and Cost of Production (CSTPRD) will increase by ten percent per annum.
(2) Average tax rate will be remained constant.
(3) There will be no change in management holding of shares.
(4) Market capitalization has forecasted on the base of a simulation study completed at the Karachi University (Mehar: 1994).
(5) Long term debt (LTDBT) will increase by five percent per annum compounded.
(6) Average depreciation rate is assumed at 9.5 percent.
(7) There will be no issue of bonus shares for the years of projections.

The results of ex-post and ex-anti simulations have been presented in appendix: II. We have observed that our ex-post simulations are closed to actual outcome. It is an indicator of the reliability and predictability of the model. We have also calculated the predictive power of the model through historical simulations. We applied three different test of predictability, namely: -

1) Mean Absolute Error (MAE)
2) Root Mean Square Percentage Error (RMSPE)
3) Thiel Index of Inequality

The model has been proved as a good toolkit for the predictions of the overall size of investment and financing. Similarly, it can predict the working capital requirement in future. By using the model, we can easily predict the solvency and liquidity position of a firm. On the basis of the model, we have prepared pro-forma accounts. The consolidated pro-forma accounts have been shown in appendix: II. The key ratios and indicators have also been shown in appendix: II.

It is important that, in our model Sales and Net Profit before Tax are exogenous variables. Those variables are strongly related with the socio-economic and market conditions. Market will determine the prices, sales volume, input cost, capital expenditures and other factors of profit. The model can be extended by endogenization of those variables. However, at this level we can not extend the model due to our limitations.

We observed in this study that the prediction of investment pattern (Structure of Assets) is relatively easy. While, prediction of financing pattern (Structure of Liabilities) is relatively a difficult task.

TABLE : 4
PREDICTIVE POWER OF THE MODEL

No	VARIABL	MAE	RMSPE	THIEL INDEX
1	LASST	1797	0.2069	0.0804
2	DBTRS	5050	0.3821	0.1572
3	CLSTOCK	2737	0.0792	0.0283
4	FASSTC	25324	0.2263	0.0951
5	CURLIBL	3371	0.0740	0.0241
6	DIVDEN	404	0.1764	0.1132
7	CFLOW	1150	4.2790	0.2798
8	TCRASST	6184	0.1205	0.0390
9	NCRASST	2759	16.9869	0.3813
10	TOTASST	27462	0.2108	0.0822
11	TOTLIBL	27462	0.2108	0.0822
12	RTNTN	404	0.2033	0.1542
13	SURPLUS	8741	0.3126	0.2552
14	CAPITAL	24136	0.3744	0.1285
15	EQUITY	24136	0.6946	0.2225
16	OSCAP	32877	1.5925	0.4467

VI. SUMMARY AND CONCLUSION.

We attempted to construct a financial policy model to study the various aspects of Corporate Finance. We found that both the components of Equity Financing e.i. Paid up Capital and Reserve Funds play a central role in the determination of Liquidity Position of a company. Other major findings are as follows: -

(1) Receivables from Customers and Payable to Vendors are complements. If, Short-term Lending increases, the Short-term Borrowing will also be increased.

(2) Short term financing is also a factor of the investment in Fixed Assets.

(3) A good inventory-management leads to decrease the Sales on Credit and increase the Purchases on Credit.

(4) It is concluded from the simulation exercise, that firm's behavior will be varied by the levels of growth. For example, Working Capital has a U-shape relationship with the Equity. It indicates that at initial level working capital will decrease with the increase of paid-up capital. However, after a certain level of paid up capital working capital will start to increase. This change in working capital is due to the change in Current Liabilities. At the initial stage of growth in Equities, Current Liabilities will decrease then they will start to increase. On the bases of this relationship we can conclude that at initial level of growth firm do not (or can not) care for its liquidity position or Current Ratio.

(5) It has also been observed that companies finance their Fixed Assets through Short-term Financing. However, the magnitude and pattern of change in the Current Assets

is so complicated. The rate of change in Current Assets will be smaller at initial stage but later on it will be greater.

(6) On the base of simulation exercises, it is concluded that working capital would decrease with the increase in Fixed Assets. But, after a certain level it will increase. In brief, Working Capital has a U-shape relation with the Fixed Assets. The results indicate that the Liquidity Position of a firm will be deteriorated by the addition in Fixed Assets in the short term. But, in the Long-term, a large addition in Fixed Assets will be a cause of improvement in the Liquidity Position of a firm.

(7) It is interesting that Long-term Debt is a cause of the deterioration in Liquidity Position of a firm. It may be a result of the repayments of debts in regular installments.

REFERENCES

1. A.E.R.C., 1988 "**Macro-econometric Model of the Pakistan Economy**", Karachi: AERC.

2. Agrawal. A., and G Mandelker, 1987 **"Managerial Incentives and Corporate Investment and Financing Decisions"**, Journal of Finance, September 1987, 823-838.

3. AICPA, 1986 "**Accounting Trends and Techniques**", New York, The American Institute of Certified Public Accountants.

4. Altman, Edward, 1968 "**Financial Ratios Discrimination Analysis and the Prediction of Corporate Bankruptcy**", Journal of Finance, September 1968, 589-609.

5. Arrow, Kenneth J**.,** 1964 **"The Role of Security in the Optimal Allocation of Risk-Bearing**", Review of Economic Studies, 1964, 91-96.

6. ASK Securities, (Various Issues) "**Economic and Financial Review**", Karachi, ASK Securities, Karachi Stock Exchange.

7. Bandt Olivier de and Jacquinot Pascal, 1992 "**The Financing of Corporate Firms in France – An Econometric Model**", The Economic Modeling, July 1992, 253-269.

8. Baring Securities, 1994 "**Pakistan Stock Market Review**", September 1994.

9. Bilgrami, N and M. Nishat, 1990 "**The determinants of Corporate Savings in Pakistan -A Case Study of Companies, Registered with Karachi Stock Exchange**", Karachi: The Applied Economics Research Center, University of Karachi: Discussion Paper No.137, 1992.

10. Brackus D., Brainard W.C., Smith G., ant Tobin J., 1980 "**A Model of US Financial and Non-financial Economic Behavior**", Journal of Money, Credit and Banking, 1980 (12), 259-293.

11. Brittain, 1966 "**Corporate Dividend Policy**", Brooking Institutions Papers, 1966.

12. Chadwick, L., 1987 **" Financial Structure**", The Newsletter of the Chartered Association of Certified Accountants, February 1987, 12-19.

13. Edward, E. Ghartey, and U.L.G. Rao, 1990 "**A Short run Forecasting Model of Ghana**", Economic Modeling, July 1990, 290-308.

14. Fama, E.F., 1970 "**Efficient Capital Market: A Review of Theory and Empirical Work**", Journal of Finance, May 1970, 383-417.

15. Fama, E.F., and J. MacBeth, 1973 "**Risk, Return, and Equilibrium: Empirical Tests**", Journal of Political Economy, May-June 1973, 607-636.

16. Fama, E.F., and M.H. Miller, 1972; " **The Theory of Finance**"; Holt, Rinehart and Winston, New York, 1972.

17. Gearald R., J. Donald, P.Solberg and S. Thomas (1992); "**Simultaneous Determination of Insider Ownership, Debt and Dividend Policies**", The Journal of Financial and Quantitative Analysis, 27 (2), 247-263.

18. Government of Pakistan, "**Investment Finance Companies Rules**", Islamabad: 1987.

19. Government of Pakistan, Various Issues, "**Economic Survey**", Islamabad, Ministry of Finance.

20. Government of Pakistan, Various Issues, "**Explanatory Memorandum of the Budget**", Islamabad, Ministry of Finance.

21. Government of Pakistan, Various issues, "**Budget in Brief**", Islamabad, Ministry of finance.

22. Government of Pakistan, Various Issues, "**Statistical Year Book of Pakistan**", Islamabad, Federal Bureau of Statistics.

23. Harriss , Milton and Artur Raviv, 1991,"**The Theory of Capital Structure**", Journal of Finance, 46, 297-355

24. Hill, R.A., 1987 "**Shares Valuation Theories**", The Newsletter of the Chartered Association of Certified accountants, May-June 1987.

25. Hirshleifer, J.,1972 " **The Private and Social Value of Information and the Reward to Incentive Activity**", American Economic Review, 1972 (61), 561-574.

26. Holmstrom, Bengt and Jean Tirole, 1982 " **Market Liquidity and Preference Monitoring**", Journal of Political Economy 101, 678-709.

27. Hughes, Merritt, 1991 "**General Equilibrium of a Regional Economy with a Financial Sector – Part I: An Accounting Framework with Budget and Balance Sheet Linkages**", Journal of Regional Science, 1991 (4), 385-396.

28. Inman, Mark L.,1987b "**Multivariate Analysis**", The Newsletter of the Chartered Association of Certified Accountants, March 1987b, 16-28.

29. International Accounting Standard Committee, (Various Issues), "**International Accounting Standards Exposure and Approved Drafts**", London.

30. International Accounting Standard Committee, 1989 " **Consolidated Accounting Statements and Accounting for Investment in Subsidiaries**", London: IAS No.28.

31. International Accounting Standard Committee, 1989 "**Accounting for Investment in Associates**", London: IAS No.28.

32. International Accounting Standard Committee, "**Comparative Position of IAS-2 with Accounting Rules and Principles in Certain Major Areas around the World**", London: Earnest and Whinney International.

33. Jensen, G. and T. Zorn, 1988, "**An Empirical Examination of the Capital Structure Decision in a Simultaneous Equations Framework**", University of Nebraska, Department of Finance, Working Paper, 1988.

34. Jensen, G., Solberg S.P., and Zorn, T.S., 1992 "**Simultaneous Determination of Insider Ownership, Debt and Dividend Policies**", Journal of Financial and Quantitative Analysis, 1992 June, 247-263.

35. Jensen, M. and W. Meckling, 1976 "**Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure**", Journal of Financial Economics, October 1976, 305-360.

36. Karachi Stock Exchange (1980-1994), "**Annual Reports of the Companies"**. Karachi.

37. Karachi Stock Exchange, 1994 " **Rules and Regulations**", Karachi.

38. Kim E. Han and John J. McConnel, 1978, "**Corporate Merger and the Co-insurance of Corporate Debt**", Journal of Finance, January 1978,

39. Kim Yong H. and Joesph C. Atkins, 1978 "**Evaluating Investments in Accounts Receivable: A Wealth Maximization Framework**", Journal of Finance, May 1978, 413-412.

40. Kramer, P. Van Den Bosch, Movrik T.J., Fase M.G. and Van Navta Lemake, 1990, "**FYSION Macroeconomics in Computer Graphics**", Economic Modeling, April 1990, 148-160.

41. Leland, Hayne, 1978, "**Information, Managerial Choice and Stockholder Unanimity**", Review of Economic Studies, 1978 (45), 527-534.

42. Litzenberger Robert H. and James C.V. Horne, 1978, "**Elimination of the Double Taxation Dividends and Corporate financial Policy**", Journal of Finance, June 1978, 737-749.

43. Matz, Curry, Franks and Khan, A.R.1982; "**Cost Accounting: An Emphasis to Management**", Karachi: ICMAP.

44. Mayer C.,1988 "**New Issues in Corporate Finance**", European Economic Review, 1988, 1167-1189.

45. McCabe, G.M. 1979, "**The Empirical Relationship Between Investment and Financing: A New Look**", Journal of Financial and Quantitative Analysis, 1979 March, 119-135.

46. MEFISTOTE, TEAM, 1992, "**A Model of the French Financial System at the Bank of France-MEFISTOTE Version 1 (Modeling the Evolution of Financial Stocks)**", Economic Modeling, 1992 July, 211-252.

47. Mehar, M. Ayub K. and M.T. Salam, 1994 "**Equity Analysis – 1994 : An Overview**", ASK Securities, Karachi Stock Exchange.

48. Mehar, M. Ayub K., 1992 " **A Forecasting Model of Public Finance: An Experience from the Pakistan Economy**", M. Phil Dissertation, Karachi: AERC.

49. Mehar, M. Ayub K., 1993 "**Multivariate Analysis for Financial Comparison of Companies in Pharmaceutical Sector**", Economic and Financial Review, 1993.

50. Mehar, M. Ayub K., 1993 "**Tax Revenue Forecasting**", Report Submitted to the Central Board of Revenue (CBR)", Karachi " Applied Economics Research Center.

51. Mehar, M. Ayub K., 1994 "**Stock Stabilization Fund**", Report Submitted to the President Karachi Stock Exchange (Guarantee) Limited.

52. Mehar, M. Ayub K., 1994, "**A Simulation Model of Corporate Finances: A Study of Companies Listed on the Karachi Stock Exchange**", Karachi. Ph.D. Dissertation.

53. Mehar, M. Ayub K., Sohail Javed, and Samina Aijaz, 1993, "**Short Term Financing, Accounts Receivables, and Liquidity Position of the Firm**", Pakistan Economic and Social Review, 1993 (2).

54. Mian L.Shehzad, and Clifford W. Smith, 1972, "**Account Receivable Management Policy: Theory and Evidence**", The Journal of Finance, 1972 (1), 169-200.

55. Modigliani, F. and M .Miller 1958 " **Some Estimates of the Cost of Capital to the Electric Utility Industry 1954-57**", American Economic Review, June 1958, 261-297.

56. Modigliani, Franco and Merto H. Miller, 1963 "**Corporate Income Taxes and the Cost of Capital: A Correction**", American Economic Review, 1963 (53), 433-443.

57. Morck, R., Sheleifrer A., and Vishny R., 1988, "**Management Ownership and Corporate Performance: An Empirical Analysis**", Journal of Financial Economics, March 1988, 293-316.

58. Myers, S., 1977, "**Determinants of Corporate Borrowing**", Journal of Financial Economics, 1977 (November), 147-175.

59. Myers, S.C., 1984, "**The Capital Structure Puzzle**", Journal of Finance, July 1984, 575-592.

60. Naqvi, S.N.Haider, A.R. Kemal, Rashid Aziz and Associates, 1982, "**The PIDE Econometric Model of Pakistan Economy (1959-60 to 1978-79**)", Islamabad: The PIDE.

61. Nishat, M. and Saghir, Asif, 1991, " **The Stock Market and Pakistan Economy 1964-87**", Savings and Development, 1991 (2), 131-146.

62. Nishat, M. and Saghir, Asif, 1992, "**The Impact of Monetary and Fiscal Policy Action on Stock Market in Pakistan**", Karachi: The AERC, Discussion Paper No.165.

63. P.I.D.E., 1992, "**Macro Econometric Model of Pakistan Economy**", Islamabad, Pakistan Institute of Development Economics.

64. Peterson, P.P. and GA Bennett, 1983, " **A Reexamination of the Empirical Relationship between Investment and Financing Decision**", Journal of Financial and Quantitative Analysis, 1983 (18), 429-453.

65. Robert B. Anthonyson and J. Philip Cooper, 1982, "**Simulation Model for Corporate Planning**", Cambridge, Mass. Dynamic Associates Incorporated, 1982.

66. Ross Stephen A., 1977, "**The Determination of Financial Structure: The Incentives Signaling Approach**", Bell Journal of Economics, Spring 1977, 23-40.

67. Scott, James, 1977 "**Bankruptcy, Secured Debt and Optimal Capital Structure**", Journal of Finance, 1977 (32), 1-19.

68. Shleifer, A. and R. Vishny, 1986, "**Large Shareholders and Corporate Control**", Journal of Political Economy, June 1986, 461-488.

69. Smith, Cliord W., Jr., and Ross L. Watts, 1992, " **The Investment Opportunity Set and Corporate financing, Dividend and Compensation Policies**", Journal of financial Economics, 32, 263-292

70. Smith, Janet Kiholm, 1987, "**Trade Credit and Informational Asymmetry**", Journal of Finance, 1987 (62), 863-871.

71. Smith, Keith,1980, "**Readings on the Management of Working Capital**", West Publishing Company.

72. State Bank of Pakistan, (Various Issues), "**Annual Report** ", Karachi.

73. State Bank of Pakistan, Various Issues, "**Balance Sheet Analysis**" Karachi: The State Bank of Pakistan.

74. Welch Ivo, 1994, "**The Cross-Sectional Determinants of Corporate Capital Expenditures: A Multinational Comparison"**, UCLA Working Papers.

75. Williamson, G.H., 1987, " **An Approach to Modeling in Business and Industry via Simulation**", The Newsletter of the Chartered Association of Certified Accountants, November, 23-29.

76. Williamson, O.E. 1988**, " Corporate Finance and Corporate Governance", The** Journal o Finance.

APPENDIX: I

ACTUAL DATA

CONSOLIDATED BALANCE SHEET: DEBIT SIDE

(RS. / MILLION)

YEAR	Liquid Assets	Receivables	Inventories	Non-Liquid Current Assets	Total Current Assets	Fixed Assets at Actual Cost	Fixed Assets at Written Down Value	Total Assets
1980	2727	4036	15411	19447	22174	34769	23637	45811
1981	2690	4884	18142	23026	25716	38955	26133	51849
1982	3113	6089	20789	26878	29991	45186	29932	59923
1983	4202	6499	22127	28626	32828	52155	34585	67413
1984	4275	7207	24979	32186	36461	64948	42046	78507
1985	5530	8612	27204	35816	41346	75741	49885	91231
1986	6269	10195	29411	39606	45875	84619	55325	101200
1987	5827	11132	32291	43423	49250	92105	59392	108642
1988	7615	12077	37049	49126	56741	106048	67599	124340
1989	10597	14076	43709	57785	68382	133818	81907	150289
1990	15767	17929	52179	70108	85875	162249	104643	190518
1991	20398	22457	64021	86478	106876	192533	124258	231134
1992	21553	23135	79180	102315	123868	242023	164747	288615
1993	27815	28357	93786	122143	149958	296090	192049	342007
1994	36244	32283	106828	139111	175355	356437	244750	420105

CONSOLIDATED BALANCE SHEET: CREDIT SIDE

(RS. / MILLION)

YEAR	Paid up Capital	Reserves and Surplus	Owners' Equity	Long-term Debt	Employed Capital	Short-term Liabilities	Total Equities and Liabilities
1980	7083	5376	12459	9834	22293	23518	45811
1981	7614	6505	14119	11994	26113	25736	51849
1982	8552	7760	16312	15345	31657	28266	59923
1983	9185	9038	18223	18324	36547	30866	67413
1984	10663	10856	21519	22177	43696	34811	78507
1985	12158	13213	25371	25593	50964	40267	91231
1986	13092	17888	30980	26640	57620	43580	101200
1987	14385	18704	33089	29381	62470	46172	108642
1988	16359	20686	37045	32563	69608	54732	124340
1989	19183	25197	44380	40420	84800	65489	150289
1990	24420	35268	59688	49370	109058	81460	190518
1991	28740	38141	66881	61589	128470	102664	231134
1992	43185	43134	86319	83313	169632	118983	288615
1993	48853	51208	100061	92468	192529	149478	342007
1994	63180	60457	123637	119525	243162	176943	420105

SOLVENCY AND PROFITABILITY

(RS. / MILLION)

YEAR	Cash Dividend	Cash Flow	Net Current Assets	Net Profit After Tax	Retained Earnings
1980	805	0	-1344	1402	597
1981	942	-37	-20	1715	773
1982	1050	423	1725	1900	850
1983	1134	1089	1962	2178	1044
1984	1230	73	1650	1920	690
1985	1586	1255	1079	2617	1031
1986	1824	739	2295	3740	1916
1987	1948	-397	3078	3290	1342
1988	2312	1743	2009	4872	2560
1989	2892	2982	2893	5879	2987
1990	2967	5170	4415	6684	3717
1991	2980	4631	4212	6490	3510
1992	4756	1155	4885	7226	2470
1993	4805	6262	480	8977	4172
1994	5385	8429	-1588	10236	4851

KEY RATIOS AND INDICATORS

(CONSOLIDATED POSITION)

YEAR	Acid Test Ratio	Current Ratio	Rate of Depreciation	Dividend to Equity Ratio	Dividend Yield	Gearing Ratio	Leverage Ratio	Pay Out Ratio	Retention Ratio	Self Financing Rate	Valuation Ratio
1980	0.12	0.94	5%	0.06	0.12	0.44	0.79	0.57	0.43	---	0.54
1981	0.10	1.00	5%	0.07	0.14	0.46	0.85	0.55	0.45	0.20	0.48
1982	0.11	1.06	6%	0.06	0.11	0.48	0.94	0.55	0.45	0.15	0.58
1983	0.14	1.06	6%	0.06	0.09	0.50	1.01	0.52	0.48	0.21	0.73
1984	0.12	1.05	5%	0.06	0.06	0.51	1.03	0.64	0.36	0.10	0.91
1985	0.14	1.03	5%	0.06	0.07	0.50	1.01	0.61	0.39	0.14	0.87
1986	0.14	1.05	6%	0.06	0.07	0.46	0.86	0.49	0.51	0.29	0.79
1987	0.13	1.07	6%	0.06	0.06	0.47	0.89	0.59	0.41	0.28	0.96
1988	0.14	1.04	6%	0.06	0.06	0.47	0.88	0.47	0.53	0.36	1.03
1989	0.16	1.04	5%	0.07	0.07	0.48	0.91	0.49	0.51	0.20	0.99
1990	0.19	1.05	5%	0.05	0.06	0.45	0.83	0.44	0.56	0.15	0.81
1991	0.20	1.04	5%	0.04	0.04	0.48	0.92	0.46	0.54	0.18	1.02
1992	0.18	1.04	6%	0.06	0.02	0.49	0.97	0.66	0.34	0.06	2.53
1993	0.19	1.00	5%	0.05	0.02	0.48	0.92	0.54	0.46	0.18	2.14
1994	0.20	0.99	5%	0.04	0.01	0.49	0.97	0.53	0.47	0.10	3.27

APPENDIX: II

SIMULATED DATA

CONSOLIDATED BALANCE SHEET: DEBIT SIDE

(RS. / MILLION)

YEAR	Liquid Assets	Receivables	Inventories	Non-Liquid Current Assets	Total Current Assets	Fixed Assets at Actual Cost	Fixed Assets at Written Down Value	Total Assets
1980	3,122	6,119	13,880	19999	23,121	43,493	32,361	66,614
1981	3,530	7,062	16,917	23979	27,509	42,101	29,105	69,610
1982	4,038	8,399	20,085	28484	32,522	41,915	26,418	74,437
1983	4,605	9,530	23,982	33512	38,117	40,209	21,392	78,326
1984	5,471	10,670	26,975	37645	43,116	45,498	23,357	88,614
1985	6,484	11,761	30,516	42277	48,761	53,070	26,903	101,832
1986	7,463	12,686	32,178	44864	52,327	60,666	29,734	112,993
1987	7,876	14,368	34,423	48790	56,666	66,762	30,308	123,428
1988	9,462	15,437	42,023	57460	66,922	76,232	33,883	143,153
1989	11,786	18,116	47,096	65212	76,998	97,249	47,757	174,247
1990	14,168	22,827	55,609	78435	92,603	127,360	69,074	219,964
1991	16,308	30,118	68,743	98861	115,169	151,311	82,448	266,480
1992	20,373	33,757	81,396	115153	135,526	198,292	115,799	333,817
1993	24,956	38,781	89,731	128511	153,467	257,414	158,695	410,882
1994	29,953	45,101	104,081	149182	179,135	319,978	203,088	499,113
EX-POST SIMULATIONS								
1995	32717	49819	100433	150252	182969	351976	197838	534944
1996	35848	55080	110195	165275	201122	387173	192063	588296
1997	39292	60974	120828	181802	221093	425891	185711	646984
EX-ANTE SIMULATIONS								
1998	43080	67566	132417	199983	243063	468480	178723	711542
1999	47247	74924	145060	219984	267231	515328	171037	782558
2000	51830	83127	158860	241987	293817	566860	162582	860677

CONSOLIDATED BALANCE SHEET: CREDIT SIDE

(RS. / MILLION)

YEAR	Paid up Capital	Reserves and Surplus	Owners' Equity	Long-term Debt	Employed Capital	Short-term Liabilities	Total Equities and Liabilities
1980	28,234	5,376	33,610	9834	43,444	23,170	66,614
1981	25,407	5,984	31,391	11994	43,385	26,224	69,610
1982	22,379	6,694	29,072	15345	44,417	30,019	74,437
1983	18,187	7,647	25,834	18324	44,158	34,168	78,326
1984	19,406	8,194	27,599	22177	49,776	38,838	88,614
1985	22,929	9,199	32,128	25593	57,721	44,111	101,832
1986	27,919	11,131	39,051	26640	65,691	47,302	112,993
1987	29,979	12,569	42,548	29381	71,929	51,499	123,428
1988	35,779	15,003	50,783	32563	83,346	59,808	143,153
1989	45,897	18,044	63,941	40420	104,361	69,886	174,247
1990	63,579	21,298	84,877	49370	134,247	85,716	219,964
1991	72,900	24,064	96,964	61589	158,553	107,927	266,480
1992	97,108	26,261	123,369	83313	206,682	127,136	333,817
1993	139,450	29,097	168,547	92468	261,015	149,867	410,882
1994	170,652	31,761	202,413	119525	321,938	177,175	499,113
EX-POST SIMULATIONS							
1995	215252	35356	250608	125501	376109	158835	534944
1996	253541	39716	293257	131776	425034	163262	588296
1997	285221	44918	330139	138365	468504	178480	646984
EX-ANTE SIMULATIONS							
1998	320168	51046	371215	145283	516498	195044	711542
1999	358727	58193	416920	152548	569468	213091	782558
2000	401276	66459	467735	160175	627910	232767	860677

SOLVENCY AND PROFITABILITY

(RS. / MILLION)

YEAR	Dividend	Cash Flow	Net Current Assets	Net Profit After Tax	Retained Earnings
1980	1,003	0	-49	1,402	399
1981	1,107	408	1,284	1,715	608
1982	1,190	508	2,503	1,900	710
1983	1,225	567	3,949	2,178	953
1984	1,374	866	4,278	1,920	546
1985	1,611	1,013	4,651	2,617	1,006
1986	1,808	980	5,025	3,740	1,932
1987	1,853	412	5,167	3,290	1,437
1988	2,437	1,586	7,114	4,872	2,435
1989	2,838	2,324	7,111	5,879	3,041
1990	3,430	2,382	6,887	6,684	3,254
1991	3,724	2,140	7,242	6,490	2,766
1992	5,029	4,065	8,390	7,226	2,197
1993	6,141	4,583	3,600	8,977	2,836
1994	7,573	4,997	1,960	10,236	2,663
EX-POST SIMULATIONS					
1995	7666	2764	24133	11260	3594
1996	8027	3131	37860	12386	4359
1997	8425	3444	42614	13624	5199
EX-ANTE SIMULATIONS					
1998	8863	3788	48019	14987	6124
1999	9344	4167	54140	16485	7141
2000	9873	4584	61050	18134	8260

KEY RATIOS AND INDICATORS
(CONSOLIDATED POSITION)

YEAR	Acid test Ratio	Current Ratio	Rate of Depreciation	Dividend on Equity	Dividend yield	Gearing Ratio	Leverage Ratio	Pay out Ratio	Retention Ratio	Self-financing Rate	Valuation Ratio
1980	0.13	1.00	4%	0.03	0.15	0.23	0.29	0.72	0.28	---	0.20
1981	0.13	1.05	4%	0.04	0.16	0.28	0.38	0.65	0.35	-10.33	0.21
1982	0.13	1.08	6%	0.04	0.13	0.35	0.53	0.63	0.37	0.69	0.32
1983	0.13	1.12	8%	0.05	0.09	0.41	0.71	0.56	0.44	-3.68	0.52
1984	0.14	1.11	7%	0.05	0.07	0.45	0.80	0.72	0.28	0.10	0.71
1985	0.15	1.11	8%	0.05	0.07	0.44	0.80	0.62	0.38	0.13	0.68
1986	0.16	1.11	8%	0.05	0.07	0.41	0.68	0.48	0.52	0.24	0.63
1987	0.15	1.10	8%	0.04	0.06	0.41	0.69	0.56	0.44	0.23	0.74
1988	0.16	1.12	8%	0.05	0.06	0.39	0.64	0.50	0.50	0.21	0.75
1989	0.17	1.10	7%	0.04	0.06	0.39	0.63	0.48	0.52	0.14	0.69
1990	0.17	1.08	7%	0.04	0.07	0.37	0.58	0.51	0.49	0.11	0.57
1991	0.15	1.07	7%	0.04	0.05	0.39	0.64	0.57	0.43	0.11	0.71
1992	0.16	1.07	7%	0.04	0.02	0.40	0.68	0.70	0.30	0.05	1.77
1993	0.17	1.02	6%	0.04	0.03	0.35	0.55	0.68	0.32	0.05	1.27
1994	0.17	1.01	6%	0.04	0.02	0.37	0.59	0.74	0.26	0.04	2.00
EX-POST SIMULATIONS											
1,995	0.21	1.15	11%	0.03	0.03	0.33	0.50	0.68	0.32	0.10	1.01
1996	0.22	1.23	11%	0.03	0.02	0.31	0.45	0.65	0.35	0.09	1.26
1997	0.22	1.24	0.11	0.03	0.02	0.30	0.42	0.62	0.38	0.12	1.23
EX-ANTE SIMULATIONS											
1998	0.22	1.25	0.11	0.02	0.02	0.28	0.39	0.59	0.41	0.13	1.21
1999	0.22	1.25	0.11	0.02	0.02	0.27	0.37	0.57	0.43	0.13	1.18
2000	0.22	1.26	0.11	0.02	0.02	0.26	0.34	0.54	0.46	0.14	1.16

SUMMARY OF PROFIT AND LOSS ACCOUNTS
(CONSOLIDATED INCOME STATEMENTS)

(RS. / MILLION)

YEAR	TIME	Opening Inventories	Cost of Production	Closing Inventories	Cost of Goods Sold	Sales Revenue	Gross Profit	Other Income	Other Expenses	Net Profit Before Tax
1980	1	12000	57425	15411	54014	61344	7330	800	5791	2339
1981	2	15411	68855	18142	66124	74675	8551	1178	6850	2879
1982	3	18142	81657	20789	79010	89669	10659	830	8268	3221
1983	4	20789	93955	22127	92617	104481	11864	951	9439	3376
1984	5	22127	107270	24979	104418	117189	12771	1303	10741	3333
1985	6	24979	120665	27204	118440	134146	15706	1656	13225	4137
1986	7	27204	126872	29411	124665	145223	20558	2475	17836	5197
1987	8	29411	137627	32291	134747	156126	21379	2206	18703	4882
1988	9	32291	166966	37049	162208	185522	23314	2019	18216	7117
1989	10	37049	189423	43709	182763	209772	27009	2054	20622	8441
1990	11	43709	231970	52179	223500	252162	28662	2332	21162	9832
1991	12	52179	290245	64021	278403	312773	34370	3056	27588	9838
1992	13	64021	330893	79180	315734	358688	42954	3301	34817	11438
1993	14	79180	370927	93786	356321	405099	48778	5343	39677	14444
1994	15	93786	423810	104081	410768	467867	57099	5302	46452	15949
EX-POST SIMULATIONS										
1,995	16	104,081	466,191	100,433	451845	514,654	62,809	5832	51097	17,544
1,996	17	100,433	512,810	110,195	497029	566,119	69,090	6415	56206	19,298
1997	18	110,195	564,091	120,828	546,732	622,731	75,999	7057	61828	21,228
EX-ANTE SIMULATIONS										
1998	19	120,828	620,500	132,417	601,405	685,004	83,599	7763	68010	23,351
1999	20	132,417	682,550	145,060	661,546	753,504	91,959	8539	74811	25,686
2000	21	145,060	750,805	158,860	727,701	828,855	101,154	9393	82293	28,255

APPROPRIATION OF PROFIT AND LOSS
(CONSOLIDATED STATEMENT)

(RS. / MILLION)

YEAR	Net Profit Before Tax	Direct Taxes	Net Profit After Tax	Cash Dividend	Bonus Shares	Retained Earnings
1980	2339	937	1402	805	159	597
1981	2879	1164	1715	942	173	773
1982	3221	1321	1900	1050	286	850
1983	3376	1198	2178	1134	252	1044
1984	3333	1413	1920	1230	459	690
1985	4137	1520	2617	1586	291	1031
1986	5197	1457	3740	1824	545	1916
1987	4882	1592	3290	1948	735	1342
1988	7117	2245	4872	2312	592	2560
1989	8441	2562	5879	2892	640	2987
1990	9832	3148	6684	2967	825	3717
1991	9838	3348	6490	2980	661	3510
1992	11438	4212	7226	4756	1202	2470
1993	14444	5467	8977	4805	1208	4172
1994	15949	5713	10236	5385	2282	4851
EX-POST SIMULATIONS						
1995	17,544	6284	11,260	7,666	0	3,594
1996	19,298	6913	12,386	8,027	0	4,359
1997	21,228	7,604	13,624	8,425	0	5,199
EX-ANTE SIMULATIONS						
1998	23,351	8,364	14,987	8,863	0	6,124
1999	25,686	9,201	16,485	9,344	0	7,141
2000	28,255	10,121	18,134	9,873	0	8,260

LIQUIDITY AND FINANCIAL POSITION OF THE FIRM
(CONSOLIDATED ACCOUNTS)

(RS. / MILLION)

YEAR	Shares Held by the Board (MILLION)	Market Capital-ization	Net Current Assets	Cash Flow	Depreciation	Accumulated Depreciation	Average Rate of Deprecia-tion	Average Rate of (Direct) Tax	Debt to Sales Ratio
1980	709	6710	-1344	100	1651	11132	9.4	40.06	6.58
1981	762	6708	-20	-37	1864	12822	7.83	40.44	6.54
1982	854	9380	1725	423	2501	15254	9.63	41.02	6.79
1983	917	13326	1962	1089	3320	17570	11.15	35.5	6.22
1984	1065	19647	1650	73	3324	22902	9.17	42.38	6.15
1985	1217	21953	1079	1255	4026	25856	9.31	36.75	6.42
1986	1309	24422	2295	739	4765	29294	9.55	28.03	7.02
1987	1440	31617	3078	-397	5522	32713	9.77	32.61	7.13
1988	1636	38151	2009	1743	5895	38449	9.65	31.54	6.51
1989	1918	43935	2893	2982	7143	51911	10.05	30.35	6.71
1990	2440	48626	4415	5170	8794	57606	8.95	32.02	7.11
1991	2877	68439	4212	4631	10577	68275	9.85	34.03	7.18
1992	4316	218357	4885	1155	13630	77276	9.75	36.82	6.45
1993	4815	214429	480	6262	16226	104041	9.7	37.84	7
1994	6379	404578	-1588	8429	18171	111687	9.5	35.82	6.9
EX-POST SIMULATIONS									
1995	6,379	253,043	24,133	2,764	37,248	154137	10.58	35.82	9.68
1996	6,379	370,465	37,860	3,131	40,972	195110	10.58	35.82	9.73
1997	6,379	407,512	42,614	3,444	45,070	240179.8	10.58	35.82	9.79
EX-ANTE SIMULATIONS									
1998	6,379	448,263	48,019	3,788	49,577	289756.4	10.58	35.82	9.86
1999	6,379	493,089	54,142	4,167	54,534	344290.7	10.58	35.82	9.94
2000	6,379	542,398	61,052	4,583	59,988	404278.5	10.58	35.82	10.03

APPENDIX

LIST OF COMPANIES

(1) TEXTILE GROUP

Serial Number	Company
	PRIVATE SECTOR
1	Adamjee Industries.
2	Ahmed Spinning Mills.
3	Ali Asghar Textile Mills.
4	Allawasaya Textile & Finishing .
5	Annoor Textile.
6	Anwar Textile.
7	Ayesha Textile.
8	Babri Cotton
9	Bahawalpur Textile.
10	Burewala Textile.
11	Central Cotton.
12	Chaudhry Textile
13	Chenab Textile
14	Colony Sarhad
15	Colony Thal
16	Crescent Textile
17	D.M. Textile
18	Dawood Cotton
19	Dewan Textile
20	Dost Muhammad Cotton
21	Elahi Cotton
22	Elite Textile
23	Fateh Textile
24	Fazal Cloth
25	Fazal Textile
26	F.P. Textile
27	Ghafur Textile
28	Globe Textile
29	(OE) Globe Textile
30	Gul Ahmed Textile
31	Gulistan Textile
32	Hafiz Textile
33	Hamraz Industries
34	Hussein Industries
35	Indus Dyeing & Manufacturing
36	Island Textile
37	Jubilee Spinning & Weaving
38	Junaid Cotton
39	Karim Cotton
40	Khalid Textile
41	Khyber Textile
42	Kohat Textile
43	Kohinoor Industries

44	Kohinoor Spinning
45	Kohinoor Textile
46	Kotri Textile
47	M.F.M.Y. Industries
48	Mahmood Textile
49	Modern Textile
50	Muhammad Farooq
51	Mushtaq Textile
52	Nafees Cotton
53	Nakshbandi Aindustries
54	Naveed Tex
55	Nishat Mills
56	Noon Textile
57	Olympia Spinning & Weaving
58	Quetta Textile
59	Rasihid Textile
60	Sadiqabad Textile
61	Sally Textile
62	Sapphire Textile
63	Service Industries
64	Shafiq Textile
65	Shahyar Textile
66	Shaheen Cotton
67	Shams Textile
68	Sind Fine Texitle
69	Star Textile
70	Sunshine Cotton
71	Universal Textile
72	Usman Textile
73	Yousuf Textile
74	Zaman Textile
75	Bengal Fibre
76	Colony Woollen
77	Dilon Ltd
78	Karim Silk
79	Lawrencepur Wollen & Textile
80	Liberty Mills
81	Moonlite (Pak)
82	Nilom Nylon
83	Noor Silk
84	Polypropylene Products
85	United Carpets
86	Valika Art Fabrics
87	Valika Woollen
	PUBLIC SECTOR
88	Harnai Woollen
89	Ravi Rayon

(2) CHEMICAL AND PHARMACEUTICAL GROUP

Serial Number	Company
	PRIVATE SECTOR
1	Abbott Laboratories
2	Bawany Oxygen
3	Berger Paints
4	Chemicals Ltd
5	Cyanamid (Pak) Ltd
6	Dawood Hercules Chemicals
7	Exxon Chemicals Pakistan
8	Ferozsons Laboratories
9	Glaxo Laboratories
10	Hoechst (Pak) Ltd.
11	I.C.I. (Pak) Ltd
12	P.Leiner & Sons Chemicals & Feeds
13	Pakistan Gum & Chemical
14	Pakistan Industrial Gases
15	Pakistan Oxygen
16	Reckitt & Colman
17	Sandoz Pakistan
18	Wellcome Pakistan
	PUBLIC SECTOR
19	Pakistan P.V.C.Ltd.
20	Sind Alkalies.

(3) ENGINEERING GROUP

Serial Number	Company
	PRIVATE SECTOR
1	Allwin Engineering Industries
2	Aslo Electrical Industries
3	Atlas Autos
4	Climax Engineering
5	Johnson & Philips
6	K.S.B.Pumps
7	Nowshera Engineering
8	Pakistan Cables
9	Philips Electrical Industries
10	Punjab Lamp Eorks
11	R.C.D.Ball Bearings
12	Regnis Pakistan
13	Saif Nadeem Kawasaki
14	Saifee Development Corporation
15	Shaigon Electrical & Engineering
16	Siemens Engineering (pak)
	PUBLIC SECTOR
17	Bela Engineers
18	Karachi Pipe
19	Mack Trucks of Pakistan
20	Metropolitan Steel Corporation
21	Millat Tractors
22	National Motors
23	Pakistan Engineering
24	Quality Steel

(4) SUGAR AND ALLIED GROUP

Serial Number	Company
	PRIVATE SECTOR
1	Al-Noor Sugar
2	Bawany Sugar
3	Charsadda Sugar
4	Crescent Sugar
5	Facto Sugar
6	Frontier Sugar
7	Habib Arkady
8	Husein Sugar
9	Kohinoor Sugar
10	Mehran Sugar
11	Mirpurkhas Sugar
12	Noon Sugar
13	Premier Sugar
14	Shahtaj Sugar
15	Shakarganj Mils
16	United Sugar
	PUBLIC SECTOR
17	Thal Industries Corportation

(5) PAPER BOARD AND ALLIED GROUP

Serial Number	Company
	PRIVATE SECTOR
1	Adamjee Paper & Board
2	Baluchistan Partical Board
3	Chilya Corrugated Board
4	Crescent Board
5	Orient Straw Board & Paper
6	Packages Limited (Pvt)
7	Pakistan Paper Corporation
8	Pakistan Paper Products
9	Pakistan Paper Sack Corporation
	PUBLIC SECTOR
10	Security Papers

(6) CEMENT GROUP

Serial Number	Company
	PRIVATE SECTOR
1	Asbestos Cement Industries
	PUBLIC SECTOR
2	Gharibwal Cement
3	Javedan Cement
4	Mustehkham Cement Industries
5	Zeal Pak Cement Factory

(7) FUEL AND ENERGY GROUP

Serial Number	Company
	PRIVATE SECTOR
1	Atlas Battery
2	Burshan (Pak) Ltd
3	Haroon Oil Ltd
4	Pakistan Burmah Shell
5	Pakistan Refinery
	PUBLIC SECTOR
6	Attock Refinery
7	Karachi Electric Supply Corp
8	National Refinery
9	Pakistan Oil Fields
10	Pakistan State Oil
11	Sui Gas Transmission Co
12	Sui Northern Gas Pipelines

(8) THE 'MISCELLANEOUS GROUP'.

Serial Number	Company
	PRIVATE SECTOR
1	Amin Fabrics
2	Crescent Jute Production
3	Indus Jute
4	Latif Jute
5	Mehran Jute
6	Pakistan Jute & Synthetics
7	Thal Jute
8	Exteaction Pakistan
9	Lever Brothers Pakistan
10	Arpak International
11	Bari Rice
12	Bata Pakistan
13	U.D.L Industries
14	Benz Industries
15	Brooke Bond Pakistan
16	Dadabhoy Padube
17	General Tyer & Rubber
18	Haji Dossa
19	Hashimi Can Company
20	Hilal Flour & General
21	Karachi Can Companyt
22	Lipton Pakistan
23	Milk Pak
24	Noon Pakistan
25	Pakistan Fisheries
26	Pakistan House International
27	Pakistan Services
28	Prince Glass
29	Security Safe Deposit Co
30	Service Industries (Shoes)
31	Shabbir Tiles & Ceramics
32	Spencers & Co. Pakiistan
33	Syed Match Co.
34	Taj Mahal Hotels
35	Trans-Pak Corporation
36	Treet Corporation
37	Universal Leather & Footwear Industries
	PRIVATE SECTOR
38	Associated Industries
39	Burma Oil Mills
40	Fazal Vegetable Ghee
41	Kakakhel Industries
42	Kohinoor Oil
43	Maqbool Company
44	Maorafco Industreis

45	Sh.Fazal Rehman & Sons
46	Suraj Ghee Industries
47	Universal Oil Vegetable Ghee
48	Wazir Ali Industries