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**SIMULTANEOUS DETERMINATION OF
INVENTORIES AND ACCOUNTS
RECEIVABLE**

BY

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SIMULTANEOUS DETERMINATION OF INVENTORIES AND ACCOUNTS RECEIVABLE

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ABSTRACT

The study presents a model based on 3,375 observations from industrial firms in Pakistan, and the Three-Stage Least Square (3SLS) technique has been applied for the estimation. The results indicate that the Economic Order Quantity (EOQ) of inventories is not a constant magnitude; it is a variable closely associated with 'time trend'. While the 'buffer stock' element can be estimated through the constant term of an equation. Receivables from customers show a negative correlation with liquid assets and the cost of production. Receivables are also shown to act as substitute for closing inventories.

I am grateful to unknown referees, who helped me in the reshaping and quality improvement of the paper. Their guidance for this paper will help me in future research also.

SIMULTANEOUS DETERMINATION OF INVENTORIES AND ACCOUNTS RECEIVABLE

I. INTRODUCTION

Working capital management is one of the important areas of financial planning and control. This broad area covers the management and control of Cash and Banking Transactions, Short-term Investments, Receivables from Debtors, Credit Analysis, Inventories and Current Liabilities. Inventories and Accounts Receivables are the two important components of Current Assets. In their work on cost accounting Mats, Curry, Frank and Khan (1982) estimated that inventories, on average, cover one third of the value of total assets in a balance sheet. Similarly, 'Receivables from Customers' are another important element of the Current Assets. Inventories and receivables are illiquid assets and are important for the following reasons:

- (1) They appear in the balance sheet at their historical value, but their realization depends on the present and future business environment and economic conditions.
- (2) They represent a significant share in total assets. Consequently, any change in the magnitude of these assets can affect the profitability and financial viability of a business.
- (3) The volume of sales revenue and profitability are directly correlated with the inventory-level and credit policies of a firm. A soft credit policy with an interest on receivables is considered a cause of higher sales revenue and profit.

Similarly, an optimal size of inventory is required for profit maximization. The Economic Order Quantity and Buffer Stock levels lead to minimum cost and thus to maximum profit.

For these reasons optimal inventory and accounts receivables' policies always have been important element in the financial management of a company, and various analyses recommend different options and tools. Relatively less importance has been given to the conversion of inventories into receivables. In order to help remedy this shortcoming, the present study has the following objectives:

- 1) To identify the determinants of closing inventories, and
- 2) To test the hypothesis of inverse relation between trade debtors and closing inventories.

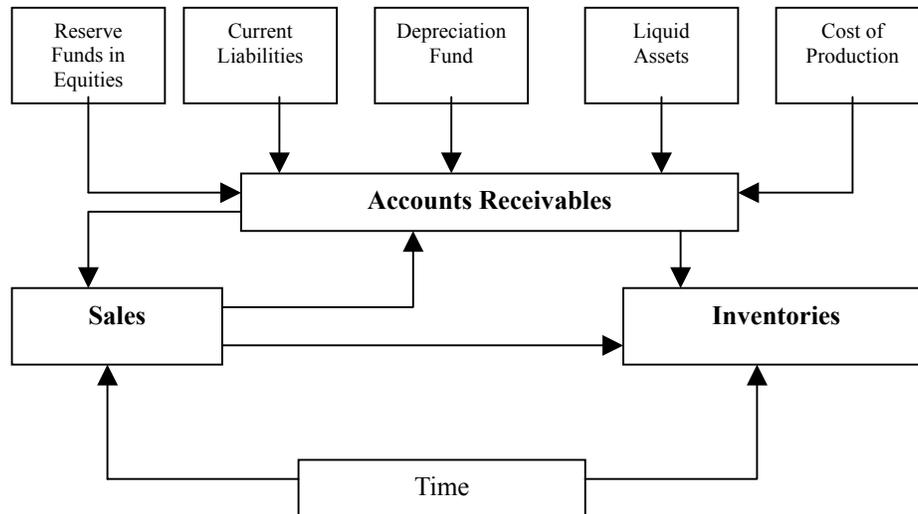
The study is also important from the business cycle's point of view. It is a common observation that a firm faces liquidity problem during recessions and has excess inventories at the beginning of a contractionary period. During the recession, excess inventories lead to other problems, such as a decrease in the market price of the product and a decline in production and employment levels etc. We test the hypothesis that a firm can sell its excess inventories if it can afford to increase its receivables. Although, this will not solve the problem of liquidity it may, however, protect a firm from the risk of price shocks and improve its profitability.

II. THE ACCOUNTING INSIGHTS

We adopt an econometric approach in the study. However, it is useful to recall the main insights of financial accounting on which most of the models in corporate finance tend to rely. The accounting and the economic approaches differ fundamentally in the literature. The accounting studies focus attention on the mechanism of the flow of funds (the origins of the funds and their use). While, in economic theory attention has been paid to the motivation of investors and managers. Economics considers the rationale implied by the application and use of funds. Consequently, studies by economists tend to answer questions that are not usually addressed by the accounting literature.

Various companies have different accounting policies. Particularly in Depreciation Accounting, Inventories Valuation, and Bad Debts Estimates, the policies may differ significantly. The effects of this variability have been minimized in the study by converting corporate accounts into "The Uniform Accounting System ¹". The procedure, which is described in the forthcoming section, is related to the literature on "economic tests". The structure of the complete model proposed in this paper is given in figure: 1. This figure shows the inter dependency and relations between dependent and independent variables. Figure 3 in the next section show the quantification of the relations between those variables.

FIGURE: 1
SIMULTANEOUS DETERMINATION OF INVENTORIES AND ACCOUNTS RECEIVABLES



Under the financial accounting framework, trade credits are classified in the following two categories:

- 1) Accounts Receivable and
- 2) Notes Receivable.

However, we merged both the categories into a single aggregate, due to the constraints on the data available for this study. It is noteworthy that accounts receivable and notes receivable have similar characteristics in financial theory. They are treated differently in connection with financial controls and legal considerations. Similarly, accounts payable and notes payable also have identical financial characteristics.

a) The Objectives of Inventories' Holding:

The traditional analysis of inventory-holding decisions is based on the relation between inventory and sales. Among the objectives of the inventory decision examined in the subject literature, the following stand out: -

1) Buffer stocks for unanticipated expansion in demand:

Textbooks on production management and operation research refer to this objective of inventory holding in discussing the techniques of production planning. Inventory can be maintained to meet incoming orders in case of an unanticipated expansion in demand. This case highlights the cost-benefit trade off in terms of inventory-holding costs versus the cost of foregone sales and goodwill. To optimize this choice, part of the goods produced are held as inventory. This is known as a buffer stock.

2) Inventories for smooth production:

This objective is frequently discussed in the literature on cost accounting. Inventory can be held in order to provide for smoothness in the production process. The optimal stock for this objective is known as Economic Order Quantity (EOQ). The main problem of inventory control is balancing ordering costs (which decline in total as stocks increase) against carrying costs (which increase as stocks increase), in order to calculate the Economic Ordering Quantity (EOQ) which minimize total costs. Ordering costs include clerical costs, stationery, postages, telephone etc; carrying costs include insurance, rent and

interest foregone. The Economic Order Quantity (EOQ) depends on the time required to receive the material after issuance of a purchase order. However, the opportunity cost of interest on investment in the inventories is also an important factor in the inventory holding decision.

3) Inventories as some desired ratio to sales:

This concept is exemplified by the accelerator principle in macroeconomics. An increase in inventory leads the growth in demand. According to this principle the inventory holding of the year will be determined by expected sales in the next year.

4) The speculative factors in inventories:

Another strand of analysis has emphasized the speculative element in the inventory decision. According to this, one of the major objectives of the inventory policy is to capitalize an anticipated price changes. This factor is pertains mainly to industries where product prices experience wide fluctuations. It also pertains to cases of high input price volatility. Inventories of precious metals, coffee, cotton, and tea are the best examples of this. If an industry utilizes imported raw materials, inventory holdings will also depend on speculative factors with respect to exchange rates. Similarly, the speculative factor also applies in the export-oriented industries. A leading hypothesis in this connection concerns the importance of spot and forward exchange rates, transport costs, and the preponderance of domestic over foreign sales by affiliated companies. The

importance of exchange rates suggests that the speculative role often attributed to inventories may have a significant international dimension (Stern: 1993)

The importance of this dimension is bolstered by the finding (Stern: 1993), that the effect of ‘just-in-time’ inventory policies, which have driven US inventory-sales ratio to historically low levels, is not in evidence in the year-to-year inventory-sales ratio of the foreign affiliates of US parent firms during the 1982-87 span.

(b) The Determinants of Receivables:

Receivables are another important part of the current assets. The individual size and the total magnitude of receivables depends the nature and volume of the business. There are, however, some common factors, which determine the value of receivables in a company’s balance sheet. In the accounting literature, sales and credit policy are emphasized as the major determinants of accounts receivable.

III. THE DATA AND RESEARCH METHOD

The study is based on three behavioral equations. Closing inventories (CLSTOCK), accounts receivable (DEBTRS) and sales revenue (SALES) are the dependent variables of the equations. The equations are estimated by a Three-Stage Least Square (3SLS) estimation technique.

The model is estimated from the pooled data of the annual audited accounts of 225 companies listed on the Karachi Stock Exchange. The accounts cover the

period of 1980 to 1994, giving us 3,375 observations (225 companies and 15 years). The data for the model have been extracted from the annual reports of the listed companies. We applied the standard definitions of accounting variables as mentioned by the State bank of Pakistan in the 'Balance Sheet Analysis' (State Bank of Pakistan: 1995-96, 19990-91, 1986-87, 1982-83).

All the data are in million of Pakistani rupees. 'D6' and 'D7' are dummy variables. 'Time' is a trend variable, taking 1980 as one and so on. The description and abbreviated names of the variables are listed in table: 2. The justification for their inclusion is discussed below:

FIGURE: 2
THE DESCRIPTION OF THE VARIABLES

SR. NO.	VARIABLE	DESCRIPTION
1	CLSTOCK	The Value of inventories at the closing date.
2	CSTPRD	Cost of production
3	CURLIBL	Current liabilities.
4	D6	Dummy variable equal to one if a company belongs to the cement industry
5	D7	Dummy variable equal to one if a company belongs to the fuel and energy sector
6	DEBTRS	Accounts receivable including Bills/ Notes receivables and Pre-paid expenses.
7	DEPRCT	Annual Depreciation on Fixed Assets
8	LASST	Balance of Petty Cash plus Bank Accounts (Liquid Assets)
9	SALES	Net Sales Revenue
10	SURPLUS	Outstanding balance of Retained Earnings (Surplus and Reserves Funds)
11	TIME	Time (trend) variable equal to one for 1980.

A) Inventories:

The specification of closing inventories (CLSTOCK) is not a simple task. Traditional studies in cost accounting suggest that Economic Order Quantity (EOQ), and Buffer Stock levels are the most appropriate considerations in inventory-holding decision. These considerations are based on the sales volume of

a product. We therefore, hypothesized that sales' volume (SALES) is one of the major factors of closing inventories (CLSTOCK). A higher amount of sales (SALES) implies a higher volume of closing inventories (CLSTOCK). It is also hypothesized that receivable from debtors (DBTRS) is a substitute for closing inventories (CLSTOCK). In the presence of a higher amount of receivables (DBTRS) the volume of closing inventories (CLSTOCK) would thus be lower.

The time trend (TIME) is also an important factor in determining closing inventories (CLSTOCK). 'Time trend' indicates the growth in the magnitude of inventories (CLSTOCK), over the years. We assumed that 'time' is a proxy of the improvement in managerial skills, storage facilities, and change in the Economic Order Quantity (EOQ) levels. The other determinants like ABC cost distribution method ² and inventory control levels ³ have been ignored and it is assumed that their effects would be captured by the explanatory variables 'Time' and 'Sales'

We establish a cause and effect relation and assume that the Economic Order Quantity (EOQ) is not a fixed parameter, but a variable instead. The future magnitude of inventories is independent of their historical volume.

B) Receivables:

We hypothesize that reserves and surplus funds (SURPLUS), short-term liabilities (CURLIBL), liquid assets (LASST) and sales revenue (SALES) bear a direct relation to the receivables from debtors (DBTRS). All of these lead to an

improvement in the liquidity position of a firm and a good liquidity position leads to a soft credit policy. Mian and Smith (1992) also include sales revenue (SALES) in their equation explaining receivables from debtors (DBTRS), as a proxy for the market power of any given firm. It also stands to reason that higher cost of production (CSTPRD) and depreciation expenditures (DEPRCT) are a cause of lower sales on credit.

We have seen that trade debt (DEBTRS) depend upon the sales volume and credit policy of a firm. So far as sales revenues (SALES) are concerned, we test their relation with receivables (DEBTRS) and find sales to be a significant explanatory variable. We also hypothesize that trade credit policy is directly related to the cost of production (CSTPRD) and to the pattern of corporate financing. We observe that externally generated employed capital - long-term debt and paid-up capital – do not have a significant correlation with receivables (DBTRS), while, the cumulative balance of retained earnings (SURPLUS), as well as current liabilities (CURLIBL), have a significant positive relation with the accounts receivable. We hypothesize that liquid assets (LASST) bear a negative relation to account receivable (DBTRS). This hypothesis is confirmed by the results of our study.

Mian and Smith (1992) have analyzed the various attitudes towards trade credit. They identify sales revenue (market power), tax advantages, scale economies (production volume) and organizational set up as the factors determining accounts receivable. They suggest that there are several non-mutually exclusive incentives

for a firm to extend trade credit to its customers, rather than requiring cash sales. Trade credit is more likely to be extended if the additional earnings on a credit sale as compared to cash on delivery (COD) are higher than the cost of borrowing. In the present study we assume that the producer would prefer to sale on cash basis in the presence of higher cost of production (CSTPRD).

C) Sales as an Endogenous Variable:

The factors determining sales revenue are complicated, varied, and sales are subject to fluctuations. Therefore, a detailed estimation of sales revenue (SALES) is not here attempted. However, since we are mainly concerned with the credit policies of a firm, and in order to simplify the model, we assume that sales revenues (SALES) are largely explained by the 'time trend' (TIME). Hence, for simplification of the model it is assumed that 'time' is a proxy for all the relevant explanatory variables of demand i.e., population, season, income, and demand patterns etc.

An additional hypothesis is that an increase in the credit volume (DBTRS) leads to an increase in the sales revenue of a company.

The regression results of the model are reported in figure: 3, while, the basic features of the simultaneity in short-term credit policy model are illustrated in figure: 1. Our pilot analysis using OLS is confirmed by the 3SLS results. These results show that our estimated parameters are robust. In addition, our model is mathematically complete and identified.

IV: THE RESULTS AND THEIR IMPLICATIONS

a) Accounts Receivables (DBTRS) :

Our estimates suggest that on average, five percent of sales revenues are attributable to accounts receivable. This confirms the hypothesized direct relation between sales and a credit facility. The results are also consistent with the findings of the Mian and Smith (1992) study. Higher depreciation expenditure (DEPRCT) and cost of production (CSTPRD) foster a tendency to avoid sales on credit. In case of the higher cost of production, a producer will prefer to sell on a cash basis. Liquid assets are also found to substitute for receivables, while financing through internal equities ⁴ and short-term liabilities (CURLIBL) lead to the expansion of accounts / notes receivable (DBTRS). Any increase in current liabilities will lead to the enhancement of accounts receivables. This implies that firms want to maintain a constant current ratio (or working capital).

b) Closing Inventories (CLSTOCK) :

The specification of this equation has some interesting implications. We will discuss those implications in the next section. It is interesting that 29 percent of additional sales will ultimately come out of inventories. Sales on credit have earlier been confirmed as a substitute for closing inventories in the historical analysis of the corporate sector in Pakistan. The 'time trend' also avers itself as a most important variable in determining the level of inventories, because of its magnitude. 'Time' indicates the addition in the value of inventories (CLSTOCK) over the years. It has been mentioned earlier that the 'time trend' is used as a proxy of learning-effects, of the improvement in the storage facilities and of the pattern

of economic order quantity (EOQ). The other important implications are discussed as follows:

A) Accounts Receivables as a Substitute of Inventories

We conclude that accounts receivable (DEBTRS) are a substitute for closing inventories (CLSTOCK). This is reflected by the highly significant beta attached to accounts receivable in the first equation. Closing inventories will be less for those products, which are sold on credit. It is obvious that sales volume affects the size of inventories. If products are perishable or proper storage facilities are not available, the producer will prefer to sell the products at the earlier possible time. In this case, he will expand his credit facility. A 100 percent increase in credit sales will be a cause of 98 percent decrease in inventories.

FIGURE: 3
ESTIMATED RESULTS
(THREE STAGE LEAST SQUARE --- 3SLS)

NC	DEPENDEN VARIABLE	INDEPENDEN VARIABLE	COEFFICIENT	T- STATISTIC	R- SQUARI	F- STATISTIC
1.	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		
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.	SALES	CONSTANT	- 10.179	- 0.20	0.3181	193.55
		TIME	48.727	4.54		
		DEBTRS	0.705	8.21		
		D6	487.455	2.57		
		D7	2952.941	23.39		

B) Is the Economic Order Quantity a constant?

There are many factors that can change the volume of inventories and the Economic Order Quantity (EOQ). The extent of material usage, the acquisition cost of material, the managerial and storage cost of inventories and the opportunity cost of investment in inventories are included in those factors. All of these factors are exogenous, and we assume that they have a strong relation with time. With the passage of time, the inventory management skills are improved; storage facilities are enhanced and material acquisition cost increases. As a result, volume of inventories will also increase. We have mentioned that 'time trend' is a proxy for all such variables. The constant term in the inventories' equation denotes the level of the buffer stock. This level is always maintained in store by a company. We find that the monetary value of the average buffer stock in the sample of joint stock companies in Pakistan is Rs.50.42 million.

'Time trend' is shown to be an important determinant of inventories. The magnitude of its parameter shows that inventories are increasing by Rs.3.43 million per annum on average in Pakistan. This relation is explained in figure: 4.

C) The Effects of Sales on Inventories and Receivables

The growth of inventories and accounts receivable depends on sales revenue. Inventories are shown to increase by 29 percent of the incremental sales revenue. The result supports the accountant's hypothesis of the significance of inventory-to-sales ratio. Similarly, the accounts receivable will also increase as sales grow. The incremental receivables will be 5 percent of the incremental sales revenue.

D) Internally Generated Capital (CURLIBL and SURPLUS) and Accounts

Receivables

Internally generated capital also proves to be a significant determinant of accounts receivables (DEBTRS). Accounts receivable (DBTRS) increase significantly with the growth of the outstanding balance of retained earnings (SURPLUS). The same is shown for current liabilities (CURLIBL). The volume of accounts receivable will increase by 27 percent of the increment in current liabilities (CURLIBL) and reserves and surplus funds (SURPLUS).

E) Liquid Assets and Accounts Receivables

A negative relation between accounts receivable (DBTRS) and liquid assets (LASST) has been found. Accounts receivables will decrease by 42 percent of the additional liquid assets. We conclude that a firm will not adopt a soft credit policy if it has a good liquidity position. It is a common observation that companies in the utility sector (Energy, Fuel, and Communication industries) have good liquidity position because of the inelastic demand for their products. They thus don't need to have recourse to a soft credit policy in order to enhance their sales.

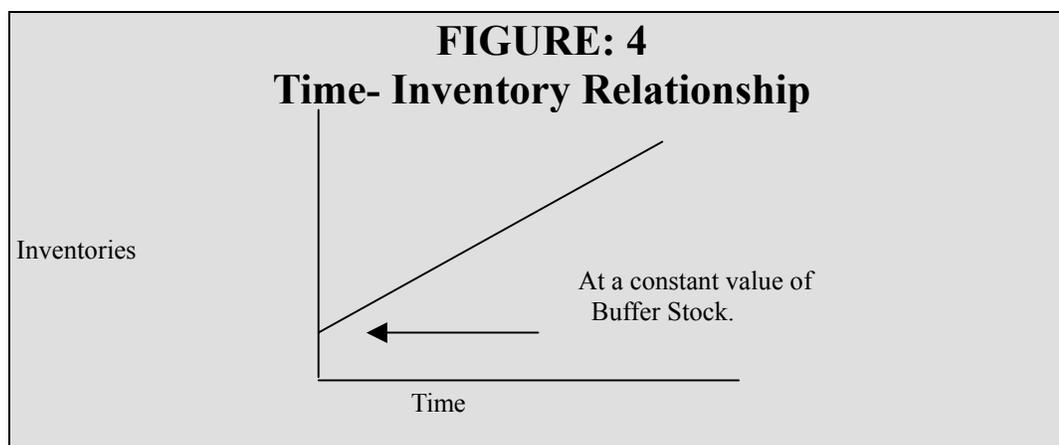
F) How Do Cost of Capital and Cost of Production Affect Inventories?

We used the 'annual depreciation expenditures (DEPRCT)' as a proxy for the cost of capital. It is shown that cost of capital has a negative relation with the soft credit policy. We conclude that a firm will avoid selling on credit if it experiences a high cost of capital. The higher the cost of capital, the lower the accounts receivable. This is a typical condition in the heavy mechanical and engineering

equipment industries. Similarly, the cost of production can also influence credit policy. The higher the cost of production, the lower the amount of receivables.

G) Sales Growth and Credit Policy

If a firm softens its credit policy, some existing customers will prefer to avail themselves of the newer policy. It means that they will no longer buy the product on a cash basis; they will shift to credit transaction. So, the growth in sales revenue will be less than the growth in receivables. A 100 percent addition in credit sales will result in a 70 percent addition to total sales revenue.



V. POLICY RECOMMENDATIONS

- 1) It is an interesting and important conclusion that a soft credit policy will not improve the solvency position of a firm. A 100 percent addition to credit sales will cause a 98 percent reduction in the inventory volume. In other words, current assets will increase by 2 percent only. However, a soft credit policy

will cause an improvement in sales revenue (and possibly in net profit), but not in working capital.

- 2) It has also been observed that growth in sales and inventories has a strong correlation with the 'time trend'. The 'time trend' is a proxy of complicated, varied and complex explanatory variables.
- 3) The following two variables may be classified as 'Anti soft credit policy factors':
 - i) Liquid Assets (LASST): If a firm has a large amount of liquid assets, the receivables will be lower. This means either that revenues are transformed into cash at an early date or else the firm sells its product on a cash basis only. This may occur when demand for the good is inelastic.
 - ii) Higher costs of production and higher cost of capital are the other causes of a lower balance of receivables. If costs of production or depreciation expenditures are higher, firms will reduce credit sales.
- 4) If a firm can generate a sufficient amount of reserve funds through retained earnings or if it can obtain short-term credit facilities, the receivables will be higher. This is implied by the second equation. An important finding is that a firm typically tries to maintain its working capital (or current ratio). To maintain the current ratio, if the denominator of the ratio (current liabilities) is changed the firm will have to change its numerator (current assets). The firm will therefore adopt a more stringent credit policy.

FOOTNOTES

1. 'The Uniform Accounting System' is a method of the transformation of corporate accounts into uniform accounting policies. A firm can opt any policy for depreciation accounting like 'Straight Line Method', 'Diminishing Balance Method', 'Sum of Digit Method' etc. Similarly, in accounting for inventories, firm can adopt 'Firs-in-first-out (FIFO)', 'Last-in-first-out (LIFO)' or 'Weighted Average' method. The methods of accounting are varied from company to company. International Accounting Standards (IAS) or corporate laws or taxation authorities do not restrict the companies to choose a particular method of accounting. However, for research purposes, accounts should be prepared on uniform basis. The State Bank of Pakistan publishes the accounts of listed companies in a uniform standard accounting. (State Bank of Pakistan: Balance Sheet Analysis).
2. 'ABC Method' is a famous term in Cost Accounting. It indicates the distribution of material into three categories:(1) High Cost Material, (2) Medium Cost Material, and (3) Low Cost Material. The objective of this distribution is to control over expenditure and smoothness in the inventory holding process.
3. Inventory control levels are applied in the production management to analyze the budgeted expenditure and capacity utilization. Maximum level of inventory indicates the required inventory at 100 percent utilization of plant capacity. Practical level indicates the required material at maximum possible level of production keeping in view the human element and overheads' requirements. Normal level indicates the inventory volume in normal working conditions.
4. 'Internal Equity' is a synonym of the 'reserve and surplus funds'. Cumulative Retained Earnings are appeared in the credit side of a balance sheet under the title of 'Reserves and Surplus'. In fact, 'Retained Earnings' are the retention of profit for re-investment. However, those internal equities may also be generated through overvaluation or appreciation in the value of assets on debit side.

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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 Textile
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	Saif 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 Mills
16	United Sugar
PUBLIC SECTOR	
17	Thal Industries Corporation

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

