## OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

## DISCLAIMER



## FAIR USE POLICY



## CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

D01792

United Nations Industrial Development Organization

ID

Distr.
LIMITED
ID/WG.85/3
22 October 1970
ORIGINAL: ENGLISH

Training Workshop in Industrial
Banking Techniques

Vienna, 2 - 28 November 1970

# USES OF RATIO ANALYSIS FOR TERM-FINANCING INSTITUTIONS 1/

1/ This material has been prepared as a background paper for this workshop by UNIDO Consultant, Dr. B. Prasad, of the Industrial Development Bank of India. The aim is to present factual information regarding ratio analysis as a basis for discussion of this subject by participants. The views and opinions expressed in this paper are based on this consultant's original paper and do not necessarily refect the views of the Secretariat of UNIDO. This document has been reproduced without formal editing.

id.70-5975

SSFIOC

Contents

## USES OF RATIO ANALYSIS FOR TERM-FINANCING INSTITUTIONS

### Introduction

Term financing institutions have to apply certain minimum standards in assessing the credit-worthiness of borrowers. This is necessary because they normally lend at low fixed interest rates and also on account of the need for them to keep their capital and income free from risk. On the basis of the financial statements (Profit and Loss account, Balance Sheet and Cash-Flow Statements) supplied, the financing institution has to satisfy itself about the solvency of the borrowing concern over the years - three, five and perhaps even ten or twenty years which may be the period of the loan - and its ability to meet obligations as and when they arise. Financial statements over a period of years depict the trends or patterns in financial structure and inter-relationships between financial facts. The judgement of the overall financial position of a concern would depend much upon an assessment of the structure of its capital position, its earning capacity and profitability in relation to its sales and capital invested. Ratio analysis is regarded as an essential part of the equipment of the financial analysis. Primarily, by these ratios, the assessment of the concern's creditworthiness is made and a limit is set to its borrowing capacity. The study of financial pattern usually provides the basis for projection regarding the future and enables one to study the inter-relationship between certain items as compared to certain other items, with a view to ascertaining weaknesses in the financial structure. From the nature of business of a term-lending institution, the following ratio analyses would seem important:

1. Ratio analysis of financial structure;
2. Ratio analysis to determine solvency;

3. Ratio analysis of profitability.

These are studied in some detail below:

1. Ratio Analysis of Financial Structure

Over a period of years, it is the borrowing concern's own profit-earning capacity which will stand it in good stead, but from the lender's point of view a concern which is profit-earning to-day may lose its strength over the years if it sustains a long series of losses. On the other hand, a company which is in a bad financial condition to-day could become sound if a substantial portion of the profits of successful years are properly reinvested. Also, overall return on capital will generally prove a concern's efficiency, but it may not be necessarily so. The lending institution has to analyse trends, compare results and discern changing patterns and study ratios to determine more precisely the efficiency in different sectors of the business and for different classes of capital. The higher the proportion of fixed interest capital to equity capital, the greater are the chances of high rates of return on the equity capital if the business is successful and, conversely, of low return if the business faces difficult trading conditions. For purposes of analysis of financial structure, the following ratios could be studied with advantage:

a) Debt-Equity Ratio;

b) Coverage Ratios;

c) Other Relationships.

a) Debt-Equity Ratio

From a lender's point of view, the financial structure of a project should reveal a satisfactory balance of owned funds, i.e., equity, and "borrowed" funds, i.e., debt. Equity consists of the entire share capital,* premium on issue of shares, free

---

* Redeemable preference shares with more than twelve years to run are classed under equity.

reserves and surplus, provision for contingencies, development rebate, etc. Debt includes all debt and debentures maturing within more than one year and redeemable preference shares which become due for payment within less than twelve years. The larger the amount of debt in the financial structure, the greater will be the risk involved because provision has to be made both for the payment of interest and the amortisation of principal. If the owners of the business have substantial amount of personal stake in the form of investment in equity, this will reduce burden of payment of interest or borrowed capital and will generally be of advantage to the business. The debt-equity ratio, which describes the relative amount of creditor-and owner supplied funds, can be computed by dividing debt by equity, expressed as a percentage. There is no rigid rule as to the relationship between these items although a debt-equity ratio of 1:1 is generally considered desirable in the case of industrial concerns. If the debt-equity ratio is 1:1, it will mean that margin for debt is roughly 50 per cent, presuming that current liabilities do not exceed current assets. Individual lenders may, however, prescribe higher margin and advance loans against charge of assets of higher values. Depending on the state of the economy and fluctuation in prices, the degree of risk which the lenders are prepared to undertake will vary and along with it the maximum desirable debt-equity ratio. The debt-equity ratio will also suggest the extent of a concern's borrowing capacity. If the ratio is high it will indicate chances for the company to face bankruptcy if there is over-run since it would not be in a position to give sufficient cover to lenders for raising loans. Also, there will be danger of encouraging some undesirable speculative practices on the part of the management. Lending institutions would naturally like to avoid such future eventualities in the case of their loanee

companies. If the project is considered risky because of uncertainty of the market, the lending institution may consider it necessary to have a more favourable ratio. Similarly, where the concern is well managed and caters to the needs of a favourable market, a high proportion of loan funds may not be considered risky.

(b) Coverage Ratios

Coverage ratio, also called the Debt service Coverage Ratio, provides a measure of the ability of a company to pay the interest due on its entire longterm debt and also serves the purpose of determining the period of repayment of instalments thereof. The purpose of the ratio is to indicate the number of times the source of payments exceeds the amount to be paid. Coverage ratio should preferably be stated as profit, before interest and income-tax, to interest. This is because profits before taxes and interest form the sources of funds for interest payments as interest is an expense which can be deducted in computing income-tax payments. However, where it concerns a business which has overseas subsidiaries, which retain profits abroad on which further taxes would be due when remitted to the parent company, it would be necessary to estimate this future tax and deduct it from income to determine the true cover. If the ratio is calculated on net-tax basis, an after-tax coverage ratio of 4 would mean a before-tax ratio of 6, provided we assume income-tax rates at 50%. Also, a ratio of 5:1 of profits to loan interest would mean that profits could fall by 80 per cent and still be adequate to meet the total loan interest. Although there is no general agreement as to the appropriate size of this ratio, most authorities recommend 6 before-taxes ( and 3 after-taxes) as the minimum coverage ratio for industrial concerns.

A considerably larger proportion of debt capital can be raised for a business with very secure and stable earnings and with highly marketable assets. But wherever the additional borrowing is associated with any particular risk, e.g., where there may be doubt as regards the ability of the firm to continue to meet all its

repayments and interest, any further debt capital cannot be obtained almost on any terms. This is because of two factors: (i) higher interest rates offered increase the risk of liquidation and (ii) strong institutional influences mitigating against such debt issues.

(c) Other Relationships

From the view-point of term-lending institutions, it may be worthwhile to study certain other ratios regarding financial structure, but their utility will differ from case to case and industry to industry. Study of the following relationship will be particularly helpful :

(i) tangible fixed assets to tangible net worth;

(ii) current liabilities to tangible net worth;

(iii) total liabilities to tangible net worth;

(iv) net worth to total assets;

(v) inventory to working capital.

It may be pointed out that none of the above relationship possesses great significance in itself. The relationship as shown by each must be examined over time and compared to industry standards. We shall explain these relationships briefly.

(i) Tangible Fixed Assets to Tangible Net Worth* :

The higher this ratio is, the less the protection for creditors. Should the ratio exceed 1 : 1, it will mean that

---

* Tangible Net Worth = Paid-up Capital and surplus less intangible assets.

creditors' obligations finance a part of the fixed and all other assets. An unduly high ratio signifies greater dependence on outside finance for funds. While this may be alright for utilities, it should be taken as a sign of weakness for most industrial concerns, indicating a need for additional equity capital.

(ii) Current Liabilities to Tangible Net Worth:

The ratio is computed by dividing tangible net worth into current liabilities. It expresses the relationship of short-term borrowed capital to permanent contributed capital. The ratio shows the measure of the degree of protection available to short-term creditors provided by the owners.

(iii) Total Liabilities to Tangible Net Worth

This ratio measures the relationship between total borrowed and contributed capital, since it includes all liabilities of the borrower. Normally, in industrial concerns, this ratio should not exceed 100% . Generally, the smaller the ratio, the higher is the interest of the shareholders as compared with that of the creditors and the sounder the financial structure. In cases where the ratio exceeds 100% limit, creditors will have contributed more than the owners, and the higher the percentage the lower the protection for creditors. Where the owners' contribution is quite small, a sudden business slump might wipe out completely the owners' capital and inflict heavy losses to creditors.

(iv) Net Worth to Total Assets

Generally speaking, the higher the ratio of the net worth to total assets the stronger the financial position of the borrower, since the greater portion of the borrower's resources will have been obtained from contributed capital. A low ratio signifies a decrease in the amount of shareholders' funds in relation

to the amount of debt, indicating greater dependence on creditors for working funds.

(v) Inventory to working capital

Inventory forms the major part of working capital. Heavy or excessive inventories are to be avoided by all means. Constant attention to this is of utmost importance in the continuous successful operation of any industrial enterprise. A heavy or excessive inventory is a drag upon the business concern and results in heavy losses due to obsolescence, changes in fashion, and constant price fluctuation.

The relationship between the inventory and the net working capital is between one variable, the inventory, and the other item working capital which changes modernately from year to year, so that there is a relatively fixed basis for comparison which will be significant. As a rule, the ratio of inventory to working capital should not exceed 75%. So long as inventory is less than the working capital, any decline in inventory values would mean a small percentage of reduction in working capital. A lower ratio indicates a stronger working capital position.

2. Ratio Analysis to Determine Solvency

The next important aspect to be considered is the ability of the borrowing concern to pay its current liabilities on maturity to maintain solvency. The lending institution has to keep this in mind in selecting credit risks to avoid losses on account of bad debts. The analysis of solvency is usually referred to as the current position of the firm which is really the relationship between current assets and current liabilities. Current assets include all assets which are in liquid form or which can be converted into cash within a year - stocks of raw materials, stores, work-in-progress and finished goods, book debts and other

receivables, prepaid expenses, cash and investments, which can be readily converted into cash. Current liabilities cover all short-term obligations which have to be met within one year. Careful analysis of (a) Current Ratio and (b) Quick Assets Ratio would enable the financing institution to judge whether the proposal is sound.

(a) Current Ratio

This ratio is computed by dividing current liabilities into current assets and shows by how many times the means of payment exceed the payments that have to be made. Its purpose is to indicate whether the concern can pay off the current liability as they mature and whether it can withstand sudden reverses by the strength of its liquid position.

A current ratio of 2:1, i.e., if current assets are at least twice as great as current liabilities, is considered generally satisfactory; but a lower ratio of 1.5:1 may also be acceptable. In accepting a ratio lower than 2:1, the prevailing conditions in the money market and the practice as regards the measure of reliance on short-term borrowing in the particular industry have to be taken into account. Standard ratio could be prepared for individual industries by credit agencies and trade associations for comparative purposes. The current ratio will naturally vary from industry to industry and perhaps from year to year in the same industry. It should also be borne in mind that this ratio only throws light on the quantitative aspect and does not give any indication as to the qualitative contents of the current assets and liabilities. The adequacy of the ratio has to be considered in the light of the composition and quality of the current assets and liabilities that form its part. Thus, if

current assets contain large amounts of slow-moving stocks of raw materials, work-in-progress, finished products and debts as against current liabilities which require immediate attention, even a high current ratio may not be satisfactory.

(b) The Quick Assets Ratio

This ratio, also known as the 'acid test' is computed by dividing the quick assets by current liabilities. Quick assets include cash in hand at bank, bills receivable, sundry debtors and marketable securities representing cash temporarily invested. This ratio provides a test of what would happen if all current creditors pressed for immediate payment. Evidently, a ratio of 1:1 would seem desirable because it would indicate that all such claims could be met without difficulty.

3. Ratio Analysis of Profitability

Profits can be either 'operating or 'non-operating'. Operating profits are derived from carrying on the business proper, while non-operating profits are in the nature of wind-falls and result from various non-operating activities, usually related to financing or the sale of assets. In analysing profitability ratios, we are mainly concerned with the operating profits.

(a) Operating Profit Ratios

Operating profits are the sum which remains when the cost of the goods sold and all operating expenses have been deducted from net sales (but before any adjustments are made for non-operating incomes and expenses or income taxes). Thus, operating profit will equal net-profit after taking into account all items of expenditure including depreciation, interest and management remuneration, but before provision for taxation and development rebates. Closely related to the concept of operating

profits is that of operating assets which includes only those assets which are employed in operating the business. The concept of operating assets excludes all investment assets since they are sources of funds which do not relate to operations. Assets like marketable securities, which are held for income purposes, and intangible assets like patents earning royalities are also excluded from operating assets. We shall discuss below the important operating ratios in some detail:

(i) Operating Profits to Sales

The formula for computing this ratio is:

Operating Profits / Net Sales* Normal operating profit ratios vary widely from industry to industry. It is, therefore, desirable to compare the operating profit-to-sales figure for a single firm with the same ratio in other firms or with typical figures for the industry as a whole. This ratio provides a yard-stick of the efficiency of production and a measure of margin on axle price. A low operating profit ratio generally reflects an unfavourable condition. It may be due to high cost of production following over-expansion or over-investment in plant capacity, failure to develop sales, etc.

An increase or decrease in the operating profit ratio as compared with the previous year may indicate a higher or lower cost without any change in the sale price, or a decrease in both the cost and sale price with the same amount of operating profit maintained as before.

(ii) Operating Profit to Operating Assets

The formula for calculating this ratio is:

Operating Profit / Operating Assets . This ratio will reveal whether the operations

---

* Net sales = Total production less allowances for rejections and carry over of stocks.

of the enterprise are economically successful. A favourable ratio will help a company to show a satisfactory return on capital and will put it into a strong competitive position - such a company will be able to finance its developments out of retained earnings and to build up its reserves.

Since capital can be invested profitably in other businesses, inter-industry comparisons are possible. Apart from differences in risk, the yield in all businesses should tend to be approximately the same. Any marked difference would indicate unusually favourable or adverse conditions.

This ratio is different from Operating Profit to Net Sales, since besides showing the relationship between profit and sales it also shows the turnover of operating assets. Turnover of operating assets means the number of times in any one year the values represented by the operating assets are converted into cash through the sale of goods and services. Thus, if sales are three times the operating assets, then operating assets will be supposed to have turned over three times during the course of the year. The operating profit to operating assets ratio, in fact, can also be computed by the formula:

$$\frac{\text{Sales}}{\text{Operating Assets}} \times \frac{\text{Operating Profit}}{\text{Sales}} = \frac{\text{Operating Profit}}{\text{Operating Assets}}$$

In actual life, profit to sales ratio varies very widely from industry to industry, while the profits-to-assets ratio remains more or less stable. In some businesses, a return to 20 per cent on assets can be earned by making only 1 per cent on sales and turning assets over twenty times per year. The same result can be achieved by making 20 per cent on sales and turning operating assets only once. This will be so since, in the first instance, sales are twenty times as high as operating assets, while in the second case the two are equal.

(iii) Operating Profit to Net Worth

This ratio shows the return from operations in relation to owner's investment. In computing this ratio also, two factors are at work: (i) operating profit to sales and (ii) the turnover of the net-worth. The turnover of net-worth is the number of times the equity represented by net-worth is turned into cash each year in the sales process. It is computed by dividing net-worth into sales. This ratio can therefore be also expressed by the formula:

$$\frac{\text{Operating Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Net-worth}} = \frac{\text{Operating Profit}}{\text{Net-worth}}$$

This ratio is of great importance to the financing institution because it provides the measure of dividends and capital gains on the investment of equity share holders. A higher ratio is indicative of better prospects for attracting new capital.

(iv) Operating Profit to Total Capitalisation

The operating profit to total capitalisation ratio is expressed as a percentage of operating profit (before taxes) with interest on long and medium term debt added back to total capital employed. For this purpose, total capital employed is taken as equity plus debt, both referred to earlier in the note under debt-equity ratio. Since the ratio seeks to measure the earning power of both 'owned' and 'borrowed' capital, it is necessary to add back to profits the interest paid on borrowed capital to present the correct picture. A higher ratio is a sign of brighter prospects for attracting new capital.

(b) Net Profit Ratios

Having outlined the importance of operating profit ratios, a few words regarding net profit ratios also seem necessary. Net profit ratios are different from operating ratios because net

profits are taken after making provision for taxation, development rebate and dividend due for the year on cumulative preference share capital. The net profit ratios assume importance since they show total net performance, i.e., after taking into account taxes as well as the important factors 'operating' and 'non-operating'. The important net-profit ratios are:

(i) $\frac{\text{Net Profit}}{\text{Sales}}$

(ii) $\frac{\text{Net Profit}}{\text{Total Assets}}$

(iii) $\frac{\text{Net Profit}}{\text{Net Worth}}$

(iv) $\frac{\text{Net Profit}}{\text{Ordinary Share Captial}}$

These ratios can be interpreted directly along the lines of operating profit ratios.

4. The Interpretation of Ratios

After the relevant ratios have been computed, the important task of interpretation remains. The effect of one or two important ratios can well be obscured by several other figures which are neither significant or relevant. These are four different ways to interpret ratios and we shall discuss them below in some detail.

(i) In some cases, individual ratios by themselves are regarded as significant. For instance, if current ratio falls significantly below 1, it may threaten the solvency of the concern and should be treated as a cause for concern. Similarly, if profits to net worth exceed .5 (50 per cent) it should be regarded as a sign of better strength. Also, when debt exceeds net worth by 5 to 1, it should be interpreted as a definite sign of financial weakness. These are examples of some popular rules of the thumb and their limitation should be known. Normally, it is difficult to arrive

at meaningful conclusion when individual ratios are studied in isolation. Individual ratios at best are only approximation and unless interpreted with caution will lead to wrong conclusions. For purposes of financial analysis from the view-point of term-lending institution, individual ratios are of little use. Usually several ratios have to be studied in combination to arrive at meaningful conclusions.

(ii) The second method of interpretation will involve examining of a group of related ratios. For instance, a current ratio of 2 can be of greater significance if it is supplemented by ratios showing the proportions of various types of current assets included in the total and the quickness with which the inventory is sold. Similarly, a profit-on-sales ratio becomes more meaningful when supplemented by a ratio showing the number of times the equity (owners' investment) is turned over in sales each year.

(iii) The third approach to the interpretation of ratios involves comparison over time. Here, the same ratio, or a group of them, is studied for a number of years and any significant trends are brought to light. For example, it is worthwhile knowing whether the current ratio, which is still within the margin which can be taken as safe, has been declining. A term-financing institution would want to investigate the situation with great care even though immediate insolvency is not threatened. Similarly, a rising trend in the profit to net worth ratio would be looked at quite favourably. Also, it will be easy to judge current performance on the basis of the standard set, taking into account the results achieved in the past. For example, if a firm has been making an average of about 10 per cent profit on sales, its current performance of earning only 4 per cent would be looked upon with disfavour.

(iv) Finally, performance of a particular firm can be compared with other firms in the same industry. This will be necessary in order to determine both the firm's relative position and the degree of conformity of its trend to the trends in the industry. Also, different firms in the same industry have to face certain common financial problems. These comparisons can be facilitated by the use of tables summarising the ratios of the firms in the same industry. Such tables are frequently prepared by trade associations or financial or credit-rating groups.

5. Limitations of Ratio Analysis

Ratio analysis, in order to be useful, should be employed in conjunction with other techniques, such as quantitative evaluation of specific items, cash flow analysis and projection and a study of the flow of funds.

Ratio analysis necessarily proceeds on the assumption that the financial statements correctly represent the true financial status of the business. Sometimes, however, this may not be the case. Before we can use ratio analysis, we must be sure that the statements from which these ratios are computed represent a typical and upto-date picture.

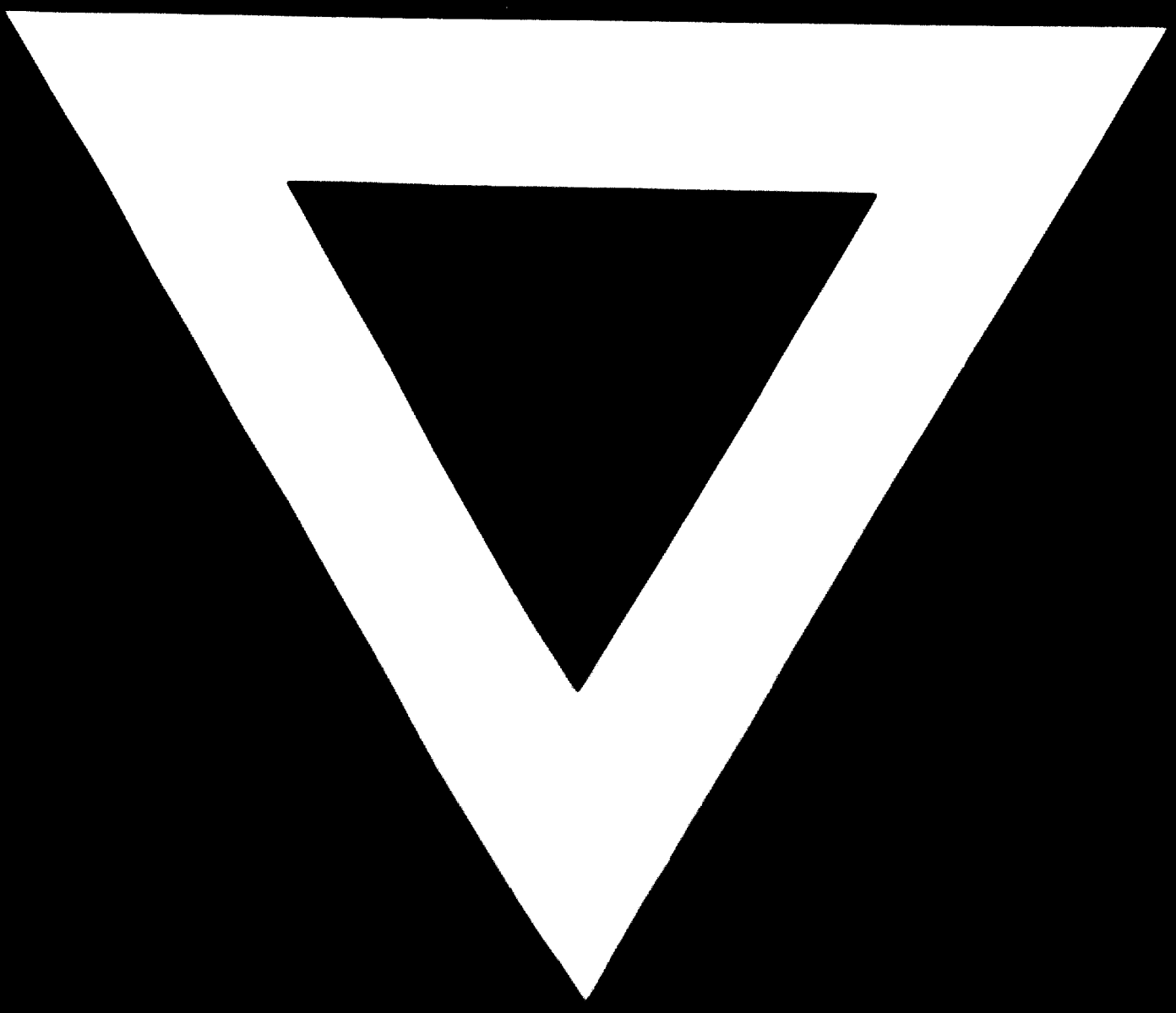
Also, in making inter-firm or intra-firm comparisons, it is necessary to ensure that the items to be compared are determined on a consistant basis, both as to definition and method of valuation. This can be usually achieved by adopting uniform costing and accounting practices. Differing costing and accounting practices will make comparison difficult and the comparative results will be of little value.

6. Application of Ratio Analysis in term Financing Institutions for Appraising the cases

Coming to the importance of ratio study in term financing institutions for appraising projects, it may be stated that many of these institutions are still in the initial phase of building up a proper organisation and machinery for the financial, economic and technical appraisal of projects. The experience of other term-lending institutions in this field is largely drawn upon.

While using the debt-equity ratio, it is considered as important that the borrower should have a proper balance between paid-up equity capital and debts. Consequently, it is not considered prudent to have a debt-equity ratio of more than 2:1. Similarly, operating profit-sales ratio, operating profit-total capitalisation ratio and net profit-ordinary share capital ratio indicate the profitability of the project and its future viability. Since the project is evaluated on the basis of estimated cash flow, production, sales, etc., it is worth following a cautious approach in the appraisal of various projects. A strict adherence to the norms of financial ratios would avoid the channelling of assistance to uneconomic units.

From the foregoing paras, it is clear that the project for assistance has to be appraised from the point of view of financial viability and economic feasibility. Financial viability can be assessed keeping in mind the various ratios examined in this note. In a way, it would be profitable for term financing institutions to sue all the ratios in as much as each ratio is as important as the other. However, some of the ratios given in this paper may not be practicable in the case of new companies/borrowers as the required information for computing the same may not be available. The ratios which it may not be possible to calculate precisely in the case of new companies/borrowers may be cited as: current liabilities-tangible net worth ratio, inventory-working capital ratio, current ratio and quick assets ratio.



7. 10. 71