

## RATIO ANALYSIS: APPLICATIONS, LIMITATIONS AND DANGERS – A PERSPECTIVE

Over the last few years a great number of students, prospective entrants to the industry, and practitioners have undertaken all or part of the various investment related topics covered by the Institute's education course. It has been decided in future therefore to devote a section of the journal to subjects of direct relevance to students and those practitioners who might be rusty on the fundamentals. This article by Barry B. Davis (Lecturer in Business Finance, University of Queensland), attempts to place Ratio Analysis in perspective and examines a number of problems associated with the application of the technique.

Information about a business organisation, its activities, profitability, financial condition and investment potential can come from a number of different sources. Foremost amongst these are the firm's financial reports,<sup>1</sup> and therefore it is not surprising to find that traditionally financial statement analysis has played an important role in providing specialised information to particular decision makers. As will be seen later, the principal analytical tool employed by financial statement analysts is the ratio, and as a result ratio analysis has become synonymous with financial statement analysis.

The purpose of this paper is to introduce readers to the nature of ratio analysis, its associated problems and the role which the technique plays in providing information to various types of decision makers. The objective here is to give readers some insight into the fundamental drawbacks confronting practising financial analysts and to expose them to some of the more important pitfalls associated with an uncritical application of what is a substantially imperfect decision tool. As to whether ratio analysis is a useful decision technique is not an issue which fruitfully lends itself to a priori debate. Its usefulness can only be assessed in terms of its success in analysing (predicting) real-world situations. However, at this stage, readers are forewarned that, despite its inherent limitations, ratio analysis does prove to be a useful analytical technique in certain circumstances.

In order to obtain a fuller appreciation of the problems associated with the analysis and interpretation of financial statements, the discussion commences with a brief review of the evolution of the ratio technique.

### **An Historical Review<sup>2</sup>**

Perhaps one of the most damning criticisms of modern ratio analysis is its lack of an underlying

explanatory and testable theory. Since the technique has no real structural framework, it is difficult to justify the calculation of certain ratios, their interpretation, and the determination of comparative standards on logical or a priori grounds. To a student of ratio analysis, this lack of theoretical underpinning imparts an air of something less than confidence in the technique and pedagogically makes its communication difficult.

The theoretical void of ratio analysis is a consequence of the fragmented, haphazard and ad hoc development of the technique. Ratio analysis in its modern format originated around the turn of the 20th century with the development by New York bankers of the now famous current ratio. This device was employed by the bankers as an indicator of debt bearing capacity in the evaluation of the credit worthiness of clients. In time, this ratio was followed by a proliferation of other ratios each designed to provide information about a particular aspect of a subject firm's activity. With the acceptance of the ratio as an evaluative tool came the necessity for establishing standards of comparison for interpretative purposes. Absolute ratios told little. They needed to be rated as favourable or unfavourable. Such a rating cannot occur without the establishment of a standard – a cutoff criterion which distinguishes favourable from unfavourable, and herein lies one of the most critical aspects of the technique. Since there is no theoretical basis for determining an optimal level for a particular ratio, the yardstick chosen must of necessity be arbitrary. As a consequence, a number of rules of thumb emerged under the implicit guise of precise cutoffs. The most famous of these is the 2 to 1 standard for the current ratio.<sup>3</sup> The appreciation of the necessity for standards of comparison subsequently precipitated both inter-firm (cross-sectional) and intra-firm (intertemporal) analyses.

The asserted usefulness or validity of a particular ratio or group of ratios and their stan-

dards of comparison lay not in logical derivation confirmed by empirical testing but in the authority and status of the author propagating the ratios. As a consequence the views which tended to predominate were those of the more verbose and well known authors.<sup>4</sup> In fact, prior to the mid 1960's little empirical work was done in the area and the very early studies which did appear were unreliable.<sup>5</sup> Most of the literature concentrated on technical aspects of ratio calculation (**how** to do it) and little effort was devoted to the evaluation of the usefulness of the ratios and the development of an integrated explanatory theory (**why** it was done).

Although further advancements such as the development of industry averages, the grouping and refinement of ratios, the identification and appreciation of ratio interrelationships (decomposition analysis) and the establishment of ratios incorporating non financial-statement data<sup>6</sup> did take place, until very recently the state of the art underwent little change of consequence, although the authoritative influence of the pioneers had waned substantially so that there exists today a widely accepted almost self-righteous ratio core. Emphasis has now switched from the prior concentration on how ratios are to be calculated to an empirical evaluation of the usefulness of selected ratios and the technique is general. From the results of these studies it is hoped that much of the arbitrary, indefensible, assertive character of ratio analysis will vanish and in its place will develop a reasonably substantive positive theory.<sup>7</sup>

However, in its present state ratio analysis lacks theoretical rigor and as a consequence the interpretation of ratios dictated by the technique is much more of an art than a science. Successful application of the technique relies upon analyst attributes such as perception, skill, experience and judgement. To a student of the subject answers to an enquiry about ratio calculation, the determination of an appropriate comparative standard and the interpretation of particular results etc., of the type "in my opinion" or "from my experience" imbue him with something less than confidence in the utility and solidarity of the technique. "Opinion" and "experience" are not good surrogates for logic and empirical evidence. Nevertheless, the technique still proliferates and consequently a closer examination seems warranted.

### **The Ratio Analysts**

There are two major groups of individuals interested in the financial reports of a business organisation. These groups may be identified as:

- (a) interests internal to the firm — principally management, but also including employees; and
- (b) interests external to the firm — principally owners (shareholders) and creditors (debenture and note holders, trade creditors, banks and other financial institutions), but also including the government, unions and trade associations, customers, and the public in general.

Of these two groups, there is little doubt that management (the internal analyst) is in a much stronger position to analyse and interpret the results of operations than shareholders or creditors (the external analyst) because of the availability of additional data to supplement the information contained in the published financial reports. This data encompasses not only the consequences of past decisions but also includes information on the future strategies (policies) of the firm; that is, budgetary data.

Planning, control and decision tools widely employed within business organisations which provide data for analytical and interpretative purposes include: cash and capital budgets; inventory and credit control models; capital structure and dividend policy models; cost-volume-profit, pricing and production control models; standards and variance analysis; control charts; etc. In general, then, the internal analyst is most well informed on all aspects of the company's operations, and has available to him a very large amount of data which is not contained in the firm's published financial statements. Given this data, there are a number of sophisticated techniques which he can employ for information, evaluative, analytical and interpretative purposes. It would therefore seem highly unlikely that a manager (internal analyst) would rely on ratio analysis to any great extent,<sup>8</sup> although some financial writers still believe this to be the case.<sup>9</sup>

On the other hand, the external analyst relies very heavily on the firm's published financial reports for they often constitute his principal source of information on the past (and perhaps implied) future performance of the firm. Two classes of external analysts may be distinguished: (1) security analysts, and (2) credit analysts.

Security analysts perform firm analyses with the purpose of evaluating the investment potential of a firm's securities either with the view of investing in the securities of the firm themselves or supplying investment advice to clients who may be existing or potential investors. Such analysts are commonly identified as fundamental security analysts, and their objective in analysing the financial reports of a firm (and other data sources) is to extract information which will enable them, via some valuation technique, to determine the value of a security vis-a-vis its current market price.

Their analysis is therefore oriented towards the prospects of investing in the securities of the firm.

Credit analysts, however, undertake their firm analyses in order to determine whether they will advance funds directly to the firm. Trading banks, finance companies, insurance companies and merchant banks all employ analysts of this type. It is frequently stated that their main interest lies in assessing the firm's financial condition; that is, its ability to service and repay any additional debt which the firm may undertake. Whilst this may be partially correct, astute financiers recognise that a firm's ability to service its obligations is inextricably linked with its profitability. Security analysts and credit analysts therefore share a common interest.

The ensuing discussion is biased towards the position of the external analyst working with the published financial statements, although most of the points made may also be applicable to any internal ratio analysts. All comments apply equally to both credit and security analysts.

#### The Nature and Function of Ratio Analysis

Both credit analysts and security analysts are interested in evaluating the investment potential of the firm – the credit analyst for direct advancement of funds to the firm and the security analyst for acquisition or sale of securities in the market place. Both types of analyst are therefore interested in assessing, amongst other things, the expected return from their existing or potential investment and the risk associated with earning that return.<sup>10</sup> Alternatively, they may be interested in evaluating the success of a prior investment decision. It is towards the attainment of these ends that ratio analysis is employed as an analytical and interpretative tool. Its function is therefore to provide information to assist the analyst's investment decision or performance evaluation.

In general, then, the extent and depth of financial statement analysis is determined by user requirements. For example, the security analyst in evaluating a prior investment's performance is interested in determining the actual return obtained in the market place – dividend yield plus capital gain. He can then compare this return with the return which he expected to earn when he made the investment decision. Any difference between the two figures and the reasons for such a difference are his main concern. Identification of the cause of the variance thus enables him to make better, more well-informed decisions in the future. It is most probable that the firm's profitability and financial condition (and clearly the market's assessment of these) would explain a significant proportion of such a variance.<sup>11</sup> On the other hand an analyst

about to make a decision as to whether to invest in a firm is interested in its **future** performance. Only to the extent that its past results provide indications of or clues to future performance (risk and expected return), is the analysis of the firm's profitability, financial condition and valuation by the market of interest to the analyst.

Ratio analysis is the principal analytical tool employed by analysts in an attempt to explain such variances and provide clues to the future. The technique involves the calculation of a number of ratios – indicators which attempt to express the relationships which exist between key financial variables which appear principally in the published financial statements. The values for individual ratios are then compared with an appropriate standard to ascertain whether they are satisfactory or otherwise. Three main types of comparisons are widely employed:

- (1) cross-sectional – (a) intra-industry – the subject firm is compared with other firms in the same industry. The industry average for each ratio is the standard employed. In the United States, statistics of this type are freely available. In Australia, their publicity is uncommon thus requiring many additional and costly calculations by individual analysts. (b) inter-industry – the subject firm is compared with other firms in different industries, and the results of other firms or the averages of other industries are the standards employed. This approach is fraught with difficulty since the differing risk structures of industries make unadjusted raw results difficult to compare.
- (2) intertemporal – intra-firm – the subject firm's ratios are compared across time for the identification of trends or other relationships.
- (3) arbitrary standards – ratios of the subject firm are rated against "traditional" standards. These standards, which have evolved with the development of the technique through time, are arbitrary rules of thumb. Application of these standards requires caution.<sup>12</sup>

The final step in the process involves the interpretation of the results obtained. Since the technique lacks a formal theoretical framework, a comparison of ratios and appropriate standards produces no conclusive answers.<sup>13</sup> The technique is not deterministic only suggestive, indicating areas for further closer analysis. No formal guides are possible here and the analyst must rely heavily on his intuition, experience and skill.

In addition to the conceptual problems of the technique, there are some further limitations which must be understood by an analyst if the tool is to be

gainfully employed. The more important of these will now be considered.

### Limitations of Ratio Analysis

Firstly, to a large extent, the external analyst relies fairly heavily on the firm's published financial statements for much of his information. Consequently, the information which he obtains from his ratio analysis is constrained by the quantity and accuracy (quality) of the data contained in the published reports. In short, his analysis inherits all the shortcomings and defects contained therein. Some specific problems include (1) inadequate disclosure and (2) lack of comparability.

- (1) Inadequate disclosure — (a) Very few companies publish Funds Statements in Australia and therefore valuable information which cannot be obtained from the other reports on the cash flow position of the firm is unavailable. The relationship between the firm's profitability, its cash flow and its financial condition (liquidity) is most important to an external analyst's investment decision. (b) It is also common practice in Australia to commence the Profit and Loss Statement with a "net profit before tax" figure thus denying the external analyst (and many other interested parties too, for that matter) much valuable information about sales, cost of sales and the various operating expenditures. (c) Many Australian companies are diversified, or at least have more than one major line of business activity, yet the figures reported in the published accounts are consolidated. Consequently, it becomes difficult if not impossible for the external analyst to assess the risk and return contribution which one enterprise segment makes to the consolidated enterprise figures. Product or segment reporting in addition to the consolidated figures is clearly necessary before any informed judgement can be made. The combination of (b) and (c) is even more insidious.
- (2) Lack of comparability — since accounting reports are prepared under a fairly loose set of procedural rules commonly referred to as Generally Accepted Accounting Principles (GAAP's), inter-firm comparability is greatly impaired, even within the same industry. In accounting for a particular item, Generally Accepted Accounting Principles permit firms to select from a range of accounting techniques that particular method which best suits their needs. Since GAAP's encompass many items such as fixed asset valuation, intangible asset valuation, inventory valuation, depreciation,

revenue and expense recognition, capital maintenance and price level changes, the number of permutations and combinations signifying the number of reports which could validly be prepared within the ambit of GAAP's, is enormous. Consequently, in many cases, inter-industry and intra-industry comparisons are not possible.

In an attempt to alleviate this problem (to some extent at least), a number of authors suggest that the analyst makes adjustments to the reported figures prior to his ratio calculations in order that the accounting data might more accurately depict the real economic condition of the firm.<sup>14</sup> Not only do these adjustments make the analysis of the subject firm more realistic, but if they are also performed on other firms as well, intra-industry analysis is enhanced. The following adjustments are those usually considered to be the most important and are the ones most frequently attempted where feasible by practising analysts:

1. Nonrecurring or extraordinary or nonoperating items are eliminated from a single period analysis,<sup>15</sup> although they are usually preserved in a long-term analysis. These include:
  - (a) the payment of back taxes and tax refunds,
  - (b) results of litigation and other claims relating to prior years,
  - (c) profits or losses from the sale of fixed assets,
  - (d) profits, losses or adjustments to market value of investments, for a non-investment company,
  - (e) writeoffs or recoveries of foreign assets,
  - (f) proceeds of life insurance policies collected (on key personnel).
2. Conservatism (liberalism) may be eliminated. This arises through:
  - (a) undervaluation (overvaluation) of inventories,
  - (b) undervaluation (overvaluation) of book debts through excessive (inadequate) provisions for doubtful debts,
  - (c) undervaluation (overvaluation) of fixed assets through excessive (inadequate) provisions for depreciation,
  - (d) overstatement (understatement) of taxation.
3. Where companies have changed an accounting technique, a restatement is made on a common basis to permit intertemporal comparison. Such changes are usually found with depreciation,

fixed asset and inventory valuation.

4. The accounting treatment of some items may be changed:
  - (a) lease premiums shown in a footnote may be capitalised,
  - (b) expenditures of a capital nature, although written off against current income, may be capitalised. These include research and development costs, certain advertising costs, costs of promotion and training, etc.,
  - (c) intangible assets valued nominally may be revalued to a more realistic figure,
  - (d) certain contingent liabilities may be expensed,
  - (e) bank overdraft, frequently shown as a current liability to reflect the legal on-demand nature of the obligation, may be reclassified as a long-term liability to reflect the real economic nature of the debt; that is, neither the firm nor the bank expects it to be paid off until a distant future date.
  
5. Questionable accounting practices may be corrected. This usually involves the reclassification of an offending item. For example, it has been known for companies to create an Asset Replacement Reserve of a not insignificant amount (which they record as a current liability) by charging the entire amount of the reserve against a single period's profit as an operating expense. The net effect is to drastically understate the current period's net profit figure and overstate the firm's current liabilities, thus creating the false impression of poor profitability and financial condition. In fact, the creation of such a reserve has no effect on the profitability or the financial condition of the firm since no fund (cash) flows are involved. Conventional accounting would recognize this by classifying the reserve as a part of shareholders funds and the charge as an appropriation of profit. Thus the net effect is to alter the composition of the Shareholders Funds section of a Balance Sheet whilst leaving the aggregate amount unaffected. Periodic profit is also unaffected. Two adjustments are therefore necessary if the economic condition of the firm is not to be misrepresented.

It should be clear that in actual fact many of these adjustments, particularly those in the second category, will be impossible to make due to a lack of sufficient information. When it is not possible to quantify the adjustment, the analyst treats it as a qualitative factor in his overall evaluation. The highly subjective and very unscientific nature of

ratio analysis becomes even further apparent at this stage.

**Secondly**, financial statements reflect past performances and events. If the objective of the analysis is to evaluate past performance then, notwithstanding other limitations, ratio analysis can be of use to the analyst. But if, as is often the case, the objective of the exercise is to evaluate future investment potential (security or credit analysis), evaluation of past events is relevant only to the extent that it provides guides or clues to the future. And whether in fact it does (that is, whether ratios have predictability) is an empirical issue, and not one open to a priori debate.

**Thirdly**, ratios are not ends in themselves although this point is most frequently overlooked by the novice analyst.<sup>16</sup> The calculation of the ratios relative to their interpretation is trivial. Ratios raise the important question "why?" For example, if they indicate declining firm profitability the analyst needs to know why it is that profitability declined. Once he answers this question then he is in a sounder position to determine whether the condition will continue in the future and how it will affect his investment decision. Thus ratios do not give yes/no, black/white – type answers. They are attention directing and not problem solving. Hence it is necessary to look behind the ratios. It is the interpretation of the ratios which is most important.

**Fourthly**, to a large extent, the final interpretation of the ratios depends upon such nebulous virtues as experience, skill, intuition, and insight.

These, together with the prerequisite of logic, explicitly account for the technique's artistic rather than its scientific nature. It is probably this point, coupled with the fact that the technique as a whole is devoid of any well-developed testable theory, which has contributed the most to the steady demise of the technique in recent years in the eyes of academics and practitioners alike.

Notwithstanding these limitations, ratio analysis continues to be a popular analytical technique. In the extreme, ratios may constitute the only basis of assessment for an analyst. Therefore, if the technique is to be utilised successfully, those employing it should at least be exposed to some of the serious dangers which are associated with its uncritical application.

### Dangers in Ratio Analysis

Perhaps the greatest inherent danger in the ratio analysis process is for the analyst to become complacent with the apparent precision of the

calculations. After all, ratios are numbers, as are the standards of comparison, and frequently the numbers produced by the process give the inept analyst the erroneous appearance of being mathematically precise. This apparent precision tends to imply that the ratios are accurate representations of the real economic conditions of the firm. However, the number calculated only reflects the logic of the ratio construction and the quality of the input data. Consequently, the number produced is far from clear-cut or deterministic. As was explained above, it is the interpretation of the ratios which is most important.

A second common problem stems from the first and revolves around the comparison of ratios with their appropriate standard. In most instances where absolute standards are employed, the quantum of the standard is purely arbitrary. In essence, the seemingly precise standard is no more than a rule of thumb — its quantum can not be defended on a priori grounds. But this does not necessarily make them useless. The danger arises from the mechanical, indiscriminant application of the standard. The purpose of the standard is not to establish an absolute inviolable figure, but to establish a guideline — an indicator which may signal that all is not as well as it might be, rather than all is unequivocally good or bad. An example using the familiar current ratio will illustrate the point.

The cutoff or standard commonly employed with this ratio is 2 to 1.<sup>17</sup> However, this does not mean that a ratio of 1.9 to 1 is unsatisfactory whilst a ratio of 2.1 to 1 is satisfactory. Many firms operate most successfully over lengthy periods of time with low current ratios — in the 1 to 1 vicinity. The nature of the business might require only nominal investment in current assets and/or the ratio might reflect excellent cash (current asset) management. But other firms whose business activity demands a fairly high investment in cash and other current assets might operate continuously with a ratio around 4 to 1. What the guideline does attempt to impart to an analyst is that ratios of 10 to 1 seem unusually high, perhaps reflecting poor working capital management or lack of profitable investment opportunities, whilst ratios of 1 to 10 seem unusually low, perhaps indicating severe liquidity problems, poor budgeting etc. Consequently an uncritical or mechanical application of an arbitrary guideline can result in the misevaluation of a firm.

Once again, the ratio provides the signal but not the answer. The interpretation of the signal is important for which the analyst must go behind the ratio for cause. **The primary function of ratio analysis is not in determining what is right or wrong,**

**but is in identifying aspects of firm activity which do not seem just right and consequently indicating areas for further study and synthesis.**

Another aspect which is necessary to understand is that no particular ratio or group of ratios is sacrosanct. If an analyst wishes to examine a particular trait (say the subject firm's capital structure), there are a whole host of different ratios which have evolved in the literature from which he may draw for his study. Some may be useful to him, some may not. Some may be better than others in analysing a certain aspect of firm behaviour. But it is not possible to say that in the analysis of the firm's capital structure there are (say) three ratios, and only three, to use. Consequently it is not uncommon to find different analysts using different ratios to evaluate a certain aspect of enterprise activity, although it is clear from the literature that an analyst's kit of tools includes a well accepted ratio core.

Concomitant with this point, it should also be appreciated that it is possible to find a number of ratios which at first glance appear unrelated but which, after some reflection, are found to actually measure the same attribute but from a different aspect. Consider the capital structure example. A firm's capital structure comprises the amounts or proportions of debt and equity which the firm employs to finance its assets (investments). The accounting equation which represents this relationship is

$$A = P + L$$

The equation has three components: assets, A; equity capital, P; and liabilities, L. A ratio has two components — a numerator and a denominator. Thus from the equation it is possible to identify six ratios. But since the equation is an equality, these six ratios must be able to measure the same attribute, and that is the amount of debt (or leverage or gearing) which is employed in the capital structure of the firm. The six ratios are produced below and most are quite familiar. The ratio finally selected is largely a matter of personal choice.

$$(ia) \quad \frac{A}{P} = \frac{\text{assets}}{\text{shareholders funds}} \\ = \text{capitalisation ratio}$$

$$(ib) \quad \frac{P}{A} = \frac{\text{shareholders funds}}{\text{assets}} \\ = \text{ownership ratio}$$

$$(ia) \quad \frac{L}{P} = \frac{\text{liabilities}}{\text{shareholders funds}} \\ = \text{debt/equity ratio}$$

$$(iib) \quad \frac{P}{L} = \frac{\text{shareholders funds}}{\text{liabilities}} \\ = \text{equity/debt ratio}$$

$$(iia) \quad \frac{L}{A} = \frac{\text{liabilities}}{\text{assets}} \\ = \text{debt/asset ratio}$$

$$(iiib) \quad \frac{A}{L} = \frac{\text{assets}}{\text{liabilities}} \\ = \text{asset cover}$$

The final point concerns ratio relationships. Since each ratio has two components, it is most likely that it will be related in some functional way to other ratios which also incorporate one of its component parts. Thus, for example,

$$\frac{\text{net profit}}{\text{sales}} \times \frac{\text{sales}}{\text{assets}} = \frac{\text{net profit}}{\text{assets}}$$

or profit margin x asset turnover = return on assets.

In analysing the profitability performance of a firm it is not sufficient to look at the return on asset ratio alone. The analyst needs to go to the return components to attempt to determine the reasons for the outcome.<sup>18</sup> Thus a firm which earns a return on assets of 10% which is comparable with the return earned by the firm in previous periods need not be in a sound position. It may well be that the firm is in a declining industry with a resultant low asset turnover, but the average return has been attained by increased managerial efficiency, with the resultant high profit margin. However, there is a limit to managerial efficiency and therefore it is unreasonable to expect profit margins to continue to rise. Therefore, because of the chronic nature of

the industry it is reasonable to expect asset turnover to continue to fall with the net effect of a future declining return on assets. Consideration of ratio interrelationships aids substantially in the synthesis of firm performance for they tend to direct the analyst towards a consideration of the reasons underlying the condition of the subject firm.<sup>19</sup> Superficial analyses tend to be mischievous and misleading. Identification of causal factors is critical.

### Summary

This paper has attempted to discuss the most important fundamental aspects of ratio analysis, the principal analytical tool used in the synthesis of financial statements. It was seen that the development of ratio analysis has been largely ad hoc with the major emphasis in the literature being placed upon how to calculate particular ratios rather than upon why these ratios should be employed. Little work has been done to integrate the present fairly widely accepted core of ratios into a logical testable theory. In only very recent years has any real attempt been made to test the usefulness of particular ratios and ratio groups.

Notwithstanding a lack of formal structure, ratio analysis is widely employed in practice by both security analysts and credit analysts, and consequently it is necessary to expose the student analyst to the limitations and dangers inherent in the traditional application of the technique. The most prominent limitation of the technique stems from its input data; namely the inadequate disclosure and very loose GAAP's resulting in the failure of the financial statements to accurately reflect the real economic condition of the firm. It was also emphasised that the calculation of the ratios plays a minor role in the analysis of financial statements relative to the interpretation of the ratios. In this latter aspect it is necessary for the analyst not to succumb to the apparent precision of the numbers with which he deals, and not to mechanically apply the standards of comparison. The identification of ratio relationships aids the interpretative process substantially but in the end the analysis depends upon the nebulous and non-communicable qualities of skill, experience, intuition and insight etc., thus inspiring something less than confidence in the technique.

## FOOTNOTES

1. Other information sources include: company announcements; interviews with management; the news media and in particular, the financial press; industry, trade and technical journals; economic and statistical reports of government departments; research reports from stockbrokers, management consultants, professional bodies (such as the Analysts Society) and universities; etc.
2. Readers interested in a deeper examination of this topic are referred to the excellent work of Horrigan (3).
3. Discussed later.
4. For example, see Foulke (1) and Helfert (2).
5. These are discussed by Horrigan (3).
6. Principally market data.
7. The first modern attempt along these lines is by Lev (5). However, it is clear that the issue remains far from resolved.
8. Ratios relying upon market data are an exception. Also it is worth noting that ratio analysis still remains popular in the measurement of divisional performance, although superior methods of analysis are available.
9. For example, see Weston and Brigham (6).
10. Marketability is often another important consideration.
11. This is a tongue-in-cheek assertion reflecting what is traditionally believed to be the case. As it turns out, firm specific factors seem to account for only a small proportion of share price movement (circa 20%). The predominant influences are macro economic factors such as taxes, interest rate changes, etc. (circa 50%), and industry factors such as restrictive trade practices, barriers to entry etc. (circa 30%). See King (4) and Yeung (8) for the U.S. and Australian evidence respectively.
12. This point is discussed later.
13. Because the technique is devoid of any theoretical framework it is extremely difficult to explicitly relate the effects of a change in the level of any one particular ratio or group of ratios to a change in the value of a firm or its returns to investors. This certainly raises suspicions as to the likelihood of the technique supplying many clues as to the risk and expected return from an investment.
14. See for example, Williams and Findlay (7).
15. External analyses are usually made with annual data, since quarterly and half-yearly reports frequently do not contain sufficient data for a full comparative analysis. This, of course, does not detract from the valuable information role which these reports play.
16. Often the calculation process is quite laborious and contains many tedious computations. The completion of this step may therefore come as a relief to the student analyst momentarily leaving him with the erroneous belief that the exercise is at an end.
17. As mentioned earlier, this is the first standard developed within the technique and originated with New York bankers at the turn of the century.
18. This has become known in the literature as decomposition analysis.
19. Problems associated with specific ratios will be discussed in subsequent papers.

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