Interplay between Ratio Analysis Techniques and Transfer Pricing

Margin-based analysis under transfer pricing involves the use of various profit level indicators or ratios. Thus, understanding of ratio analysis techniques plays an important role in transfer pricing analysis. There are certain ratios which – although very useful – are not frequently used by transfer pricing practitioners, namely the Altman Z-score ratio, the Berry ratio, the operating profit to value added expenses ratio and so on. This article discusses usage and applicability of such uncommon ratios in transfer pricing analysis.

1. Introduction

Ratio analysis is a tool used in financial analysis. A ratio is a statistical yardstick that provides a measure of the relationship between two variables or figures. This relationship can be expressed as a percentage or as a quotient. The ratio analysis technique is used to interpret the financial statements of a company, as well as to compare the risk and return relationships of companies of different sizes operating within the same industry.

An interplay exists between the ratio analysis technique and transfer pricing. For transfer pricing purposes, various methods are prescribed to determine the arm’s length nature of controlled transactions, including the comparable uncontrolled price (CUP) method, resale price method, cost-plus method, transactional net margin method (TNMM) and profit split method. Of these, the resale price method, cost-plus method and TNMM are margin-based methods under which a ratio (known as the profit level indicator) is computed for the tested party. The ratio is then compared with that same ratio computed for the comparable companies. The resale price method involves the use of the gross profit ratio, the cost-plus method requires the computation of the gross profit margin on the direct and indirect cost of production/services, and under the TNMM, the ratio to be computed involves the net operating profit as the numerator, the denominator being, for example, sales, operating expenses, total assets, capital employed or any other appropriate denominator, depending on the nature of the controlled transaction. Thus, it is essential for transfer pricing practitioners to have knowledge and an understanding of ratio analysis techniques, as they are useful in transfer pricing analysis.

The above-mentioned ratios are commonly used in transfer pricing analysis. This article will discuss certain ratios that – although very useful – are not frequently used by transfer pricing practitioners. Authoritative guidance is provided on the use of the following ratios in transfer pricing analysis:

- the Altman Z-score ratio;
- the Berry ratio;
- the OP/VAE ratio; and
- the cash profit ratio.

This article also discusses the significance of ratio analysis in light of the recently introduced three-tier documentation approach under Action 13 of the OECD base erosion and profit shifting (BEPS) initiative. Under Action 13, multinational groups are required to prepare and file a country-by-country report with the tax authorities. That report requires multinational groups to disclose, for example, aggregate tax jurisdiction-wide information relating to the global allocation of revenue (bifurcating between revenue from related and unrelated parties), profit before income tax, income tax paid (on a cash basis), the number of employees, and details of business activities, as well as other information as specified in the format of the country-by-country report. This information can then be interpreted by the tax authorities through the use of ratio analysis techniques, together with information on details of the group’s business activities. The manner in which ratio analysis techniques can be used by tax authorities is discussed further in this article.

2. Altman Z-Score

2.1. General

The Altman Z-score is a credit scoring model developed by Professor Edward I. Altman in 1968. This model is used to predict the probability that a company may go into bankruptcy within the next two years. The Z-score model is a combination of five different financial ratios associated with some weighted factors as follows:

\[ \text{Altman’s Z-Score} = 1.2T_1 + 1.4T_2 + 3.3T_3 + 0.6T_4 + 0.999T_5 \]

where:

- \( T_1 \) = working capital to total assets ratio
- \( T_2 \) = retained earnings to total assets ratio
- \( T_3 \) = earnings before interest and tax to total assets ratio
- \( T_4 \) = market value of equity to total liabilities ratio
- \( T_5 \) = sales to total assets ratio

The components of the Z-score formula can be described in more detail as follows:

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The main intention of the Z-score model is not to predict when a company will become bankrupt, but rather to assess the likelihood of it becoming bankrupt. This helps lenders and external investors take appropriate decisions to reduce their risk.

### Z-score Interpretations

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<tr>
<th>Zone</th>
<th>Interpretation</th>
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<tbody>
<tr>
<td>2.99 and above</td>
<td>Safe zone: Relatively low probability of becoming insolvent within a two-year period</td>
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<tr>
<td>1.81 &lt; Z-score &lt; 2.99</td>
<td>Grey zone: A good chance that the company may go bankrupt within the next two years of operations</td>
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<tr>
<td>Below 1.81</td>
<td>Distressed zone: High probability that the company is headed towards bankruptcy</td>
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The utility of the Z-score model in transfer pricing analysis is as a supplementary analysis to defend a loss-making comparable. An elaboration on this point will explain how this model can be used to defend a loss-making comparable company. Generally, where a margin-based method such as the TNMM is used, the experience has been that tax authorities (specifically in jurisdictions having an aggressive transfer pricing environment) during the course of a transfer pricing audit will exclude comparable companies that have losses in that year as well as in the previous two to three years from the set of comparables selected by the taxpayer. This results in an increase in the average and interquartile range of margins of the comparables set. It is essential to conduct a qualitative analysis to understand the reason for the losses, in order to determine whether the losses are due to normal business conditions or otherwise. If the losses are due to normal business conditions, this qualitative analysis can be supplemented by a Z-score analysis to defend such loss-making comparables from exclusion from the set of comparable companies.

Although the Z-score model can be useful in establishing creditworthiness, as a matter of caution it is essential that this model only be used as a supplementary analysis, as this model was developed in 1968 and, thus, some of the financial ratios used in the model are not relevant to current economic circumstances. Thus, it essential that practitioners not blindly trust the results under this model. The result obtained from the Z-score model can be used as supplementary analysis to the credit rating analysis conducted by means of proprietary credit scoring models licensed by credit rating agencies.

Another use of the Z-score model in transfer pricing analysis is as a supplementary analysis to defend a loss-making comparable company. An elaboration on this point will explain how this model can be used to defend a loss-making comparable company. Generally, where a margin-based method such as the TNMM is used, the experience has been that tax authorities (specifically in jurisdictions having an aggressive transfer pricing environment) during the course of a transfer pricing audit will exclude comparable companies that have losses in that year as well as in the previous two to three years from the set of comparables selected by the taxpayer. This results in an increase in the average and interquartile range of margins of the comparables set. It is essential to conduct a qualitative analysis to understand the reason for the losses, in order to determine whether the losses are due to normal business conditions or otherwise. If the losses are due to normal business conditions, this qualitative analysis can be supplemented by a Z-score analysis to defend such loss-making comparables from exclusion from the set of comparable companies.

Tax authorities typically contend that a company suffering persistent losses (typically losses over three years or in two out of three years, as there is no precise definition of what constitutes persistent losses) may turn out to be a company with negative net worth and that it may go bankrupt. With the help of the Z-score model, one can predict the likelihood of the comparable company becoming bankrupt. If using the Z-score model establishes that the loss-making comparable company may not default or go bankrupt in the next two years, it would be worthwhile for the practitioner to present this analysis to the tax authorities as a supplementary analysis (in addition to the qualitative analysis) to defend such comparable company from being excluded from the set of comparables.
3. Berry Ratio

3.1. Historical background

This ratio is named after Professor Charles Berry, who was engaged as a consultant by the US Internal Revenue Service (IRS) in the E.I. du Pont de Nemours case (the DuPont case), which involved transfer pricing issues. In the DuPont case, Professor Berry used the gross profit to operating expenses ratio as a profit level indicator to measure the profitability of the DuPont US subsidiary in Switzerland which acted as a distributor on behalf of DuPont USA.

Later, in 2010, the revised OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations (OECD Guidelines) added the Berry ratio as one of the profit level indicators under the TNMM. In addition, the concept of the Berry ratio as one of the profit level indicators is also found in the United Nations Practical Manual on Transfer Pricing (UN Manual) which was published in 2013.

3.2. The concept of the Berry ratio and its applicability in transfer pricing

The Berry ratio is defined as the ratio of gross profit to operating expenses (GP/OE). When determining the numerator (i.e. gross profit or GP), interest and any extraneous income are generally not considered, and when determining the denominator (i.e. operating expenses), depreciation and amortization may or may not be included in the operating expenses, depending on the facts of each case. In addition, the cost of goods sold (COGS) is not included in the operating expenses, even though it is booked in the accounts. Accordingly, the denominator (i.e. operating expenses or OE) under the Berry ratio is nothing but value added expenses.

The Berry ratio is a measure of the gross profit return earned by an enterprise on the value added functions performed by such enterprise. Thus, the Berry ratio can be a useful profit level indicator in the case of a limited risk distributor or service provider (such as a procurement service provider taking flash title to goods). To elaborate further, in the case of a limited risk distributor, the principal manufacturer undertakes manufacturing functions, bears relevant risks (such as market risk, inventory risk and technology risk) and owns the tangible and intangible assets for undertaking its business operations. On the other hand, the limited risk distributor takes only flash title to the goods, undertakes marketing functions on behalf of the principal against reimbursement of costs, performs distribution functions and does not bear any significant risks. Thus, the compensation that a limited risk distributor bears relevant risks (such as market risk, inventory risk and technology risk) and owns the tangible and intangible assets for undertaking its business operations. On the other hand, the limited risk distributor takes only flash title to goods, undertakes marketing functions on behalf of the principal against reimbursement of costs, performs distribution functions and does not bear any significant risks. Thus, the compensation that a limited risk distributor earns is for its value added functions/services (typically distribution, marketing, etc.) and not on the value of goods for holding inventory. The limited risk distributor’s value added functions are reflected in its value added expenses, i.e. operating expenses. Thus, in such a case, the Berry ratio can be used as a profit level indicator to measure efficiency of the limited risk distributor.

Similarly, the procurement service provider/entity undertakes a buy and sell function on behalf of its principal entity. In this process, it may take flash title to goods, such that goods purchased pass through its books of accounts along with the sales. But the procurement service provider bears neither risks nor costs associated with the goods. Rather, those risks and costs are borne by the principal entity to which the procurement service provider renders services. In such a case, the procurement service provider does not receive any return on the value of goods sourced or procured. The only return for the procurement service provider is on its value added functions performed, which is reflected in operating expenses. Thus, in this situation, the Berry ratio can also be used as a profit level indicator.

In addition, the OECD Guidelines also illustrate a situation in which the Berry ratio can be applied. According to the Guidelines, the Berry ratio can prove useful for intermediary activities where a taxpayer purchases goods from an associated enterprise and on-sells them to other associated enterprises. In such cases, the resale price method may not be applicable (given the absence of uncontrolled sales), and the cost-plus method (which would provide for a markup on the cost of goods sold) might not be applicable either where the cost of goods sold consists in controlled purchases. By contrast, operating expenses in the case of an intermediary may be reasonably independent from transfer pricing formulation, unless they are materially affected by controlled transaction costs such as head office charges, rental fees, etc.

Thus, the Berry ratio can be used as an appropriate profit level indicator in the case of a low-risk distributor or service provider that does not own or use any valuable intangibles.

The OECD Guidelines provide guidance on the applicability of the Berry ratio. According to the Guidelines, in order for the Berry ratio to be appropriate for testing the remuneration of a controlled transaction, it is necessary that:

- the value of the functions performed in the controlled transaction (taking account of assets used and risks assumed) be proportional to operating expenses;
- the value of the functions performed in the controlled transaction (taking account of assets used and risks assumed) not be materially affected by the value of the products distributed (i.e. not be proportional to sales); and
- the taxpayer not perform, in the controlled transactions, any other significant function (e.g. manufacturing function) that should be remunerated using another method or financial indicator.

The Income Tax Appellate Tribunal (ITAT) in India upheld the use of the Berry ratio as a profit level indicator. In the

1. OECD, Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations (OECD 2010), International Organizations’ Documentation IBFD, at paras. 2.100-2.102.
2. UN, Dept. of Econ. & Soc. Affairs, United Nations Practical Manual on Transfer Pricing for Developing Countries (2013), para. 6.3.7.5.
3. OECD Guidelines, supra n. 1, at para. 2.102.
Mitsubishi Corporation India Pvt. Ltd. case, concerning a taxpayer (i.e. Mitsubishi Corporation India Pvt. Ltd.) that was a trader, the Tribunal upheld the use of the Berry ratio and held that in the case of traders that neither assume any major inventory risk nor commit any significant assets for the same – and particularly because there is no value addition or involvement of unique intangibles in such a case – the Berry ratio should be equally relevant as in the case of a limited risk distributor.

The ruling in the Mitsubishi case was followed by the ITAT in the Marubeni Itochu Steel India Pvt. Ltd. case, in which the concept of the Berry ratio was upheld as an appropriate profit level indicator in the case of a trader.

Recently, the Delhi High Court, in the Sumitomo Corporation India Pvt. Ltd. case, supported the principles of the Berry ratio as a profit level indicator under the TNMM. The case concerned a taxpayer (i.e. Sumitomo Corporation India Pvt. Ltd.) that was an Indian subsidiary of Sumitomo Corporation Japan, which in turn is one of the largest trading companies globally (referred to as sogo shosha in Japan). The taxpayer was involved in both buying and selling products, i.e. in the trading business, and also performed agency functions as an indenting business for both associated enterprises and third parties. From the facts discussed in the ruling, it appears that, for the trading business, the taxpayer operated on a gross profit model on sales, whereas for the indenting business, it operated on a commission model on sales. In the transfer pricing study report, the taxpayer applied the Berry ratio as the profit level indicator under the TNMM to benchmark the profitability of the combined businesses of trading and indenting, as in the view of the taxpayer the functional profiles of both segments were the same.

The tax authorities rejected the use of the Berry ratio, as, among other things, the use of the Berry ratio is not enshrined within the TNMM framework under the Income Tax Act, 1961. The tax authorities proceeded to make a transfer pricing adjustment for the indenting segment by taking the gross profit margin relating to the trading business carried out by the taxpayer with third parties as the arm’s length price for commissions for the indenting business carried out by the taxpayer with its associated enterprises. Aggrieved by the order of the tax authorities, the taxpayer filed an appeal before the ITAT.

On appeal, the ITAT held that, as the taxpayer performed additional functions and accordingly assumed higher risks in its trading business, the functional profiles of the trading and indenting businesses could not be the same for a proper comparison. The ITAT proceeded to apply the commission rate earned by the taxpayer on sales relating to the indenting business carried out by the taxpayer with third parties as the arm’s length rate of commission relating to the indenting business carried out by the taxpayer with its associated enterprise. Aggrieved by the order of the ITAT, the taxpayer appealed before the Delhi High Court.

Taking into consideration the facts of the case, the Delhi High Court explained when the Berry ratio may be used as a profit level indicator. According to the Court, the Berry ratio may be used only in very limited circumstances where operating expenses adequately represent all functions performed and risks undertaken, namely in cases where the price of goods has no relevance to the quantum of profit, and where the profit is mainly dependent on the operating expenses – or, in other words, in cases of limited risk distributors that do not contribute to significant intangibles and also, ideally, do not carry out inventory or debt-related functions, even though they may be taking flash title to the goods as part of the buy/sell activities. In such situations, the distributor should ideally be seeking to merely obtain a reward for the amount of operating expenses incurred by it, without regard to the price of the goods, as the manufacturer of the goods would typically perform the functions and bear the associated risks with regard to the goods and debtors.

Having explained the concept of the Berry ratio as above, the High Court held that the Berry ratio could not be applied to the indenting business of the taxpayer, as the commissions received from the principals (both associated enterprise and third parties) were linked to the value of the goods dealt with by the taxpayer.

3.3. Modified version of the Berry ratio: OP/VAE

As discussed, the Berry ratio is the GP/OE ratio. These operating expenses are nothing but the value added expenses incurred by a limited risk distributor or service provider. A modification to the Berry ratio results in the OP/VAE ratio. The OP/VAE ratio can be derived by deducting 1 from the Berry ratio, as demonstrated below:

\[
\text{Berry ratio} = \frac{\text{GP}}{\text{OE}}
\]

\[
\text{OP/VAE} = \frac{(\text{GP})}{(\text{VAE})} - 1 = \frac{(\text{GP})}{(\text{VAE})} - \frac{(\text{Operating profit})}{(\text{VAE})} - 1
\]

The OP/VAE ratio can be used as a profit level indicator in the case of an enterprise performing intermediary activities, such as an advertising agency function wherein the agent buys and sells advertisement space. For the advertisement agency, however, these are pass-through costs. The agency’s efficiency is in its value added function reflected in its value added expenses. Thus, the OP/VAE ratio can be considered as an appropriate profit level indicator. Another situation where the OP/VAE ratio can be used is in the case of a freight forwarder wherein the freight forwarder incurs third-party costs (e.g. local transportation cost, or carriage charges from airlines or shipping lines) and recovers such costs from the client. These are pass-through costs for the freight forwarder. The freight forwarder’s operational efficiencies are not reflected in such third-party pass-through costs, but are reflected in...
its value added expenses. Thus, in such a case, the OP/VAE ratio can be used as a profit level indicator.

4. Cash Profit Ratio

Application of the TNMM requires the selection of an appropriate profit level indicator. Under the TNMM, the numerator of the profit level indicator should be the “net operating profit.” The denominator may be costs, sales, assets, etc., depending on the nature of the controlled transaction and the facts of the case. However, the net operating margin (such as the net operating profit to sales ratio, or the net operating profit to operating expenses ratio) may not be an appropriate profit level indicator for a tested party in its start-up phase. Typically, companies in the initial few years (two to three years) of operation incur net operating losses or earn a miniscule operating profit at a net level. This is because for start-up operations, depreciation is high because machinery is new, but production may be low due to the initial stages of operations. Thus, the production capacity of new machinery might remain underutilized. On the other hand, this may not be the case with the selected comparable companies, as the comparables could be well-established players in the market with stable business operations. Thus, it may not be appropriate to compare the net operating profit margin of the tested party in its start-up phase with that of established players in the market. Typically, in such a situation, a transfer pricing practitioner may attempt to apply a capacity utilization adjustment.

The capacity utilization adjustment, although technically the right approach, may not be doable unless details of the capacity utilized by the selected comparable companies are available. This is because in many countries, accounting norms and disclosure regulations do not require companies to reveal details of capacity utilized in their financial statements. In such situations, an alternative approach that could be explored by transfer pricing practitioners is to use the cash profit ratio as a profit level indicator for both the tested party and the comparable companies. Typically, under this approach, the practitioner attempts to remove the impact of high depreciation and low capacity utilization in the initial years of operation by using the cash profit ratio. The formula for the cash profit ratio is as follows:

Cash profit ratio = cash profit to sales ratio

or

Cash profit ratio = cash profit to operating cash expenses ratio

where:

\[ \text{cash profit} = \text{net operating profit} + \text{depreciation and amortization expense} + \text{other non-cash expenses} \]

\[ \text{operating cash expense} = \text{operating expenses} + \text{depreciation and amortization expense} + \text{other non-cash expenses} \]

Depreciation and amortization expense and other non-cash expenses (such as provisions for expenses) are added back, as they are non-cash items of expense, although operating expense in nature. Ideally, all non-cash items are added back to compute the cash profit and cash expenses. However, details of non-cash expenses (other than depreciation and amortization) may not be readily available for the comparable companies. Thus, the most practical way to determine cash profit and cash expenses is to add back depreciation and amortization expense to net operating profit and operating expense, respectively.

Although not an accurate measure of profitability, taking the cash profit ratio as a profit level indicator under the TNMM does negate the need for a capacity utilization adjustment.

The OECD Guidelines and UN Manual do not provide any authoritative guidance on the use of the cash profit ratio as a profit level indicator. In India, there are few judicial precedents on the use of the cash profit ratio as a profit level indicator. Indeed, ITATs have divergent views on the use of the cash profit ratio. The cash profit ratio has been accepted as a profitability indicator by some ITATs, notably in the Schefenacker Mattherson Ltd. v. Reuters India Pvt. Ltd., Siemens Healthcare Diagnostics Ltd. and A T & S India Pvt. Ltd. cases. The other hand, ITATs have rejected the use of the cash profit ratio in the Sumi Motherson Innovative Engineering Ltd. and Fiat India Pvt. Ltd. and Toyota Kirloskar Motors Pvt. Ltd. cases.

In the Sumi Motherson Innovative Engineering Ltd. case, the ITAT specifically highlighted the following flaws of the cash profit ratio:

- it is contrary to provisions of the Income Tax Rules. The starting point for computing the arm’s length price under the TNMM is the determination of the net profit margin realized by the tested party from the international transaction with associated enterprises. Under the TNMM, the denominator may vary from case to case (cost, revenue, assets, capital), but the use of the net profit margin as the numerator remains fixed;
- depreciation is an integral part of operating expenses. Depreciation expense is an integral part of business operations in the manufacturing industry, and thus cannot be excluded from operating expenses; and
- the TNMM iron out differences in expense line items. Each and every item of operating expense cannot be separately compared — otherwise, the TNMM would fail. The ITAT observed that, on a new asset, the depreciation charged will be higher and the repair costs lower; however, as the asset ages, the situation will reverse (i.e., depreciation expense will be low and repair costs will be high). Thus, one line

8. IN: ITAT Delhi, 11 June 2009, Schefenacker Mattherson Ltd. v. DCIT, ITA 4459/DEL/07 and 4460/DEL/07, Tax Treaty Case Law IBFD.
item of expense cannot be analysed in isolation, and the overall effect of all expense items culminating in operating profit should be considered in a transfer pricing analysis.

Although there are divergent views of ITATs on the use of the cash profit ratio, this ratio appears to be logical for newly set-up business operations, as details of capacity utilization for comparables may not be available so as to allow application of a capacity utilization adjustment.

5. Importance of Ratio Analysis under BEPS
   Action 13

Action 13 under the OECD/G20 BEPS initiative prescribes three-tiered transfer pricing documentation consisting of a master file, local file and country-by-country report. Action 13 specifies the format for the country-by-country report to be prepared by multinational enterprise (MNE) groups. The country-by-country report requires an MNE group to disclose aggregate tax jurisdiction-wide information relating to the global allocation of revenue (bifurcating between revenue from related and unrelated parties), profit before income tax, income tax paid (on a cash basis), income tax accrued, stated capital, accumulated earnings, the number of employees, tangible assets (other than cash and cash equivalents) and business activities by tax jurisdiction.

The information disclosed in the country-by-country report will be helpful to tax authorities for high-level transfer pricing risk assessment purposes. Tax authorities may use ratio analysis and statistical techniques to identify anomalies and assess the plausible transfer pricing risks. Ratios that may be used by tax authorities include:

- the profit/loss before income tax to revenue ratio. This ratio indicates the profit margin earned by a group across various jurisdictions. This information can be combined with information on the main business activity of each entity in the group. A combination of this information may be used to compare the profit margin that is retained in different countries for the same business activity. For example, a multinational group headquartered in the United States has subsidiaries in Canada, India, Japan, Thailand and the United Kingdom. These subsidiaries are engaged in the distribution of products manufactured by the parent entity in the United States. By computing this ratio, the Indian tax authorities can evaluate what the profit margin is that is earned by the subsidiaries in Canada, Japan, Thailand and the United Kingdom, and compare it with the profit margin earned by the Indian subsidiary for the same distribution activity. If there is wide disparity, the tax authorities may consider this information for transfer pricing risk assessment and may conduct a detailed audit; and
- the profit/loss before income tax to number of employees ratio. This ratio indicates the pre-tax profit/loss per employee. The ratio will be higher where there are few employees in a particular jurisdiction or country and vice versa. The ratio must be analysed in view of information relating to business operations/activities in a particular jurisdiction. In a case where this ratio in a particular tax jurisdiction is disproportionately higher or lower than that required by the nature of the business activities or operations of such jurisdiction, the tax authorities are likely to scrutinize that jurisdiction in much detail to understand the reason for such anomalies.

Apart from the above, there are several other ratios and statistical techniques that can be used by tax authorities to evaluate the information disclosed by an MNE group in its country-by-country report.

6. Conclusion

There is an important interplay between ratio analysis techniques and transfer pricing. Practitioners can consider using some of the less common ratios (as discussed in this article) as a primary or supplementary analysis. In addition, the significance of ratio analysis techniques will increase in light of the requirement to prepare a country-by-country report, whereby tax authorities may use these techniques in order to assess transfer pricing risk.