A Study on the Activity-Based Profitability Analysis (1)

Review of the Traditional Profitability Analysis Method

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Introduction

Corporations report to the stakeholders their business performance during a certain time period and their financial position at a certain point in financial statements, in the form of numerical data. The financial statements reveal many types of information about profitability, risk, growth and others. Although matters of concern are different depending on the type of stakeholder, and therefore various stakeholders utilize these financial statements in multiple analyses, the focus of the primary stakeholders, the equity stakeholders, often coincides with that of the other stakeholders. For this reason, many financial statement analysis methods are developed from the perspective of equity shareholders.

Equity shareholders seek for as much profit as possible from the money they invest in corporations. In other words, what matters most to the equity shareholders is how efficiently their funds are used in making profits. Therefore, one of the most basic financial statement analyses is a "Profitability" analysis, which attempts to measure the degree of attainment of an essential purpose of corporations, profit making.

In this three-part series, profitability analysis methods are discussed. The overall purpose is to propose a new method for analyzing profitability of companies in Japanese business environment. The new profitability analysis method proposed will be helpful for the financial statement users to know the pure profitability. This paper, as a first step, reviews the traditional profitability analysis method by examining the characteristics of profit-to-capital ratios (ROE and ROA) and the relationship between them.

Profitability Analysis

Typical profitability analyses handle profit-to-capital ratios as their analysis subject. The concept of profit-to-capital ratio is to measure how efficiently a firm earns profit with its capital. There are various pairs

of profit and capital depending on the purposes of analyses. It is important that the relationship between the numerator and denominator be consistent in a theory. Table 1-1 shows exemplary pairs of profit and capital.

Table 1-1 Exemplary Pairs of Profit and Capital

[Capital concept]		[Profit concept]
Total assets	--	Operating income + Interest revenues(1)
Management assets	--	Operating income
Assets for financing activities	--	Financing revenue
Assets invested in equity capital	--	Net income

Source: Sakurai (2007), p. 141

Of the profit-to-capital ratios that result from the pairs shown in Table 1-1, Return on Equity (ROE) and Return on Assets (ROA) are the most basic and widely used ones. ROE is a ratio from the perspective of equity shareholders, and ROA is a ratio from that of business entity. In the following, they are explained in detail.

ROE

ROE attempts to measure and express how much profit is generated from equity shareholders' investments. Because there are several income concepts in Japanese income statements such as operating income, recurring income(2) and net income, ROE calculation differs depending on which income concept is adopted. Considering the nature of ROE, it would be best calculated as follows.

$$ROE = \frac{recurring\ profit}{equity\ capital}$$

Since ROE is a profit-to-capital ratio from the perspective of equity shareholders, the denominator is the equity capital that is invested by them. The author considers that the numerator consistent with the equity capital is recurring profit because recurring profit is obtained by, in its calculation process, subtracting interest expenses, which are payments to the borrowed capital that equity shareholders should bear, from operating income.

ROE is in some cases defined as $\frac{net\ income}{equity\ capital}$; however, this calculation does not produce a ratio that reflects profitability appropriate for time-series analysis.

The numerator, net income, incorporates extraordinary profit and loss. Since these items are nonrecurring items, net income incorporating nonrecurring items does not suit for time-series analysis.

ROA

Another basic profit-to-capital ratio is ROA. Capital is configured by equity capital and borrowed capital raised from two different sources, which are capital investors and creditors, respectively. The equity capital is a capital raised from equity shareholders, and is sometimes called the invested capital. The borrowed capital is a capital that is raised from creditors like banks. The equity capital plus the borrowed capital equals a total capital. A firm invests the total capital into assets for business activities.

A firm attempts to utilize the total assets as efficiently as possible to operate a business. In view of that, an important thing for a firm is not identifying the source of fund raising, but maximizing efficiency of total assets management for profit making. Therefore, it is not necessary for a firm to be aware of which assets are financed by the borrowed capital or the equity capital. ROA measures profitability without distinguishing the source of fund raising, but simply in terms of the total assets operated. For this reason, ROA is suitable more as a profit-to-capital ratio from the perspective of a firm.

The pair of the numerator and denominator of ROA is determined based on this nature of ROA. The denominator of ROA is naturally the total assets; on the other hand, there are several candidates for the numerator such as EBIT, operating income, recurring profit, and net income. Among them, EBIT is employed herein as the numerator of ROA because it explains the investment result of total assets.

$$ROA = \frac{EBIT}{total\ asset}$$

The following are the reasons why the other candidates are not suited.

First, operating income is not appropriate because it disregards non-operating revenues(3). The main component of non-operating revenue is interest incomes that are generated from loans and investments. Because loans and investments are parts of total assets, interest incomes from these assets should not be excluded from the numerator of ROA.

Second, recurring profit also is not consistent with the total assets. Recurring profit is obtained by subtracting non-operating expenses from EBIT. The main component of non-operating expenses is interest expenses that are affected by the way of raising funds, which in turn affects recurring profit. As mentioned previously, ROA measures how efficiently a firm earns profit with the total assets. Hence, income concept in ROA should not be affected by the way of raising funds. Accordingly, recurring profit is not suited for the numerator of ROA.

At last, net income is not suited for the numerator of ROA for the same reason as that for recurring profit. Net income is a bottom line in income statements, which incorporates non-operating expenses, extraordinary profit, and loss in its calculation.

In addition, net income is not suited for the financial statements analysis in the perspective that comparison of the corporate among firms and time-series comparison.

Decomposing ROE

Knowing solely ROE or ROA is not sufficiently helpful for the financial statement users to make a sound decision. ROE and ROA can be a useful decision making tool only when the relationship between them is known by using the traditional profitability analysis method of ROE. The traditional profitability analysis method decomposes ROE into three value drivers, and reveals how ROE is affected by factors actually not related to profitability, which in turn helps understand purer profitability.

Because ROE and ROA share several common components, they are not inseparable at all. Here, ROE is decomposed into three components to recognize what factors affect it. This decomposition is called the Du Pont System.

$$ROE = \frac{recurring\ profit}{sales} \times \frac{sales}{total\ assets} \times \frac{total\ assets}{equity\ capital}$$

The first component is a profit ratio of sales. The second component is the so-called asset turnover that reveals the sales revenue per unit of money assets. The last component is the inverse of the so-called equity capital ratio (equity capital/total assets), and is called financial leverage. Financial leverage is more than 1 in the case of a firm that has borrowed capital. In such a case, financial leverage levers ROE up. This is because ROE equals the profit ratio of capital $\left(\frac{recurring\ profit}{sales} \times \frac{sales}{total\ assets} \right)$ multiplied by financial leverage $\left(\frac{total\ assets}{equity\ capital} \right)$.

ROE is also rewritten as[4]:

$$ROE = ROA + \frac{D}{E} \times (ROA - r) \quad \text{(Formula 1)}$$

The r is the interest rate of liabilities. The D represents debt, which means the borrowed capital. The E represents equity, which means the equity capital. The mathematical expression is obtained as follows.

First, the simplest form of ROA is:

$$ROA = \frac{EBIT}{total\ asset}$$

The numerator of ROA is EBIT. EBIT can be expressed as:

$$\begin{aligned} EBIT &= total\ capital \times ROA \\ &= (D + E) \times ROA \end{aligned} \quad \text{(Formula 2)}$$

Interest expense is calculated as:

$$Interest\ expense = D \times r \quad \text{(Formula 3)}$$

Formula 1 can be obtained with Formulas 2 and 3 as follows.

$$\begin{aligned} ROE &= \frac{recurring\ profit}{equity\ capital} \\ &= \frac{EBIT - interest\ expense}{E} \\ &= \frac{ROA \times (D + E) - r \times D}{E} \\ &= \frac{ROA \times E + ROA \times D - r \times D}{E} \\ &= ROA + \frac{D}{E} \times (ROA - r) \end{aligned}$$

This is the most basic formula in the traditional profitability analysis method, which expresses components of ROE. The traditional profitability analysis method is used to know the reason for the gap between ROE and ROA, which is essential for knowing a firm's pure profitability.

Value Drivers of ROE

ROE is expressed by three value drivers, which are ROA, financial leverage and , $(ROA - r)$ which is called SPREAD, as seen in Formula 1. The last two components are collectively referred to as financial leverage effect. The financial leverage effect, $\frac{D}{E} \times (ROA - r)$, determines to what extent ROE is levered up or down.

SPREAD determines which ratio, ROE or ROA, is higher. In the case that SPREAD is positive, which means ROA>*r*, the financial leverage effect is also positive. Thus ROE equals ROA plus positive financial leverage effect. In other words, ROE is levered up over ROA by financial leverage effect.

On the other hand, in the case that SPREAD is negative, which means ROA<*r*, the financial leverage effect is also negative. Thus ROE equals ROA plus negative financial leverage effect. Stated differently, ROE is levered down by financial leverage effect. Negative financial leverage effect lowers ROE because it means that the profitability in business entity is lower than the interest rate of liabilities.

To add to this, financial leverage determines the extent of the financial leverage effect. For example, if the borrowed capital is relatively large for the equity capital, financial leverage becomes high. High financial leverage generates a strong financial leverage effect. This is because this financial leverage effect is obtained by multiplying financial leverage and SPREAD. In contrast, if the borrowed capital is relatively small for the equity capital, financial leverage becomes low. Low financial leverage generates a weak financial leverage effect.

Resolving Contamination of ROE

As seen above, ROE is ROA plus financial leverage effect. This means that ROE incorporates different types of factors relating to operating activities and financing activities. In other words, ROE is "contaminated" or "impure". In this paper, this contamination(5) of ROE is called the "first level contamination". Operating activities relate to the main economic activity, which includes, for example in the case of retail business, buying in and selling goods. On the other hand, financing activities relate to raising funds. Financing activities, unlike operating activities, do not contribute to the profitability directly.

Especially these days, the financial market is unstable, and the environment surrounding business entities changes rapidly. Therefore, ROE that incorporates financing factor can be affected by the financial market even if the profitability of a company is stable actually. For example, it is possible that ROE of a company in the current fiscal year is higher compared with that in the previous fiscal year, even when the pure profitability of a company has not changed. Such a change in ROE may be caused by any financial matter such as change in the way of fund rising or circumstance in the financial market.

For this reason, it is important to break ROE down into three value drivers and recognize whether, for example, high ROE is supported by the profitability of main economic activity, which is operating factor, or levered up by the financing factor. The risk of misleading the financial statement users' decision making can be reduced by the use of identifying influences of both operating factor and financing factor to ROE. The traditional profitability analysis method distinguishes operating factor and financing factor weaving in ROE and helps understand the influence of financing factor on the profitability; in this way, the first level contamination can be solved. Thus, the traditional profitability analysis method is superior to using ROE or ROA alone as a tool for decision making.

Conclusion

Well known profit-to-capital ratios, ROE and ROA, and the traditional profitability analysis method for analyzing ROE were discussed. The fact ROE is affected by financing factor means that it does not show pure profitability. If the financial statement users rely solely on ROE, they may overestimate or underestimate the profitability because they cannot recognize the effect of financing factor. The first level contamination may mislead the financial statement users' decision making. For this reason, the first level contamination needs to be resolved. The traditional profitability analysis method can resolve the first level contamination because it distinguishes operating factor and financing factor of ROE.

Nevertheless, there is still a contamination remaining unresolved in the traditional profitability analysis method. It is called the "second level contamination." The following paper will discuss the "second level contamination", and refined profitability analysis methods which try to resolve the second level contamination will be discussed in detail.

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(1) This income concept is similar to Earning Before Interest and Tax (EBIT). Therefore, it is referred to as EBIT hereunder.

(2) This paper describes the income concept that is disregarded extraordinary profit and loss as recurring income. In sum, recurring income means that net income + non-operating revenues – non-operating expense.

(3) It should be noted here that when it is said in this paper "A" incorporates "B", this means that the concept of "B" is regarded (considered) in calculating "A". On the other hand, when it is said "A" disregards "B", this means that the concept of "B" is ruled out in calculating "A".

(4) The rearrangement of ROE is based on Sakurai (2007). pp. 158-159.

(5) The meaning of "contamination" in this

paper is that operating factor and financing factor are mixed up in the profitability analysis.

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