REVIEW ARTICLE

Analysis of efficiency indicators

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Abstract

There are several variations of efficiency definitions and of course ratios concerned with efficiency. A better understanding of the notion of efficiency is critical to dissolve ambiguity about it. Many confuse efficiency with other supposedly synonymous notions such as profitability, successfulness, competitiveness, liquidity or productivity. This ambiguity originates not only in subjective reasons, but the lack of hierarchical order among certain ideas. The primary driver in our research is, to systematize efficiency in general, and formulate a new categorical approach of the efficiency in corporate level.

Key words: efficiency, corporate level, new categories.

Introduction

There are several definition can be found in different sources which reflected on that sometimes we speak about the same formula in different way or vice versa, we speak about different items based on the same definition. Let we show some examples:

Efficiency: Producing a desired results with a minimum of effort, expense or waste. (Webster's New World Dictionary, 1995) Efficiency: State or quality of being efficient **(**Hornby, 1989). Efficiency: Getting any given results with the smallest possible inputs, or getting the maximum possible output from given resources. (A Dictionary of Economics, 2002) Efficiency: Technical efficiency: a measure of the ability of manufacturer to produce the maximum output of acceptable quality with the minimum of inputs. Economic efficiency: a measure of the ability of an organization to produce and distribute its product at the lowest possible cost. (A Dictionary of Economics, 2002) Productivity: A measure of the output of an organization or economy per unit of input (labour, raw materials, capital etc.) (A Dictionary of Economics, 2002) It is sure, that the field of efficiency is not clear. Why this miserable situation? If we look around in the business textbooks about the efficiency we can find several ratios belongs to that big category. Efficiency ratios has five goups like: liquidity, leverage, activity, profitability and growth. (David, 2007). Within the categories we recognize logical correlations hovewer sometimes if the ratio is bigger than we consider that is better, somtimes there are total opposite of our meaning. That is why the primary driver of our article, to systematize efficiency in general, and formulate a new categorical approach of the efficiency in corporate level.

Material and methods

Concerning with international textbooks we collect different efficiency definitions and efficiency ratios. Analyzing approaches we made three main categories. Using internationally accepted efficiency ratios in corporate level a new grouping method were initiated. Reorganizing former classification we have made a new formula for grouping efficiency ratios and definition. Our suggestion is that it will be extremely useful to add to

the former categories four new elements reflected to the origin of the efficiency calculation. Finally analyzing efficiency ratios we strongly recommended for the decision makers: only one efficiency ratio is not enough for making judgment about a firm efficiency.

Results and discussions

The definition of the efficiency in worldwide is not the same as we have discussed in the introduction part of this article. However dictionaries and textbooks approaches very often are different in national level governments are fixed the basic definitions. We can see an example in Hungary: The interpretation of efficiency, on the basis of the Government Regulation 217/1998 (XII.30.) amended by the governmental regulation of 280/2003 (XII.31.) is the following: products, services and other output produced in the course of a given activity and the correlations of resources used for their production. Another interpretation claims that an economic activity is efficient, if it is successful in respect of a set objective. Objectives (output) may include outputs, gross production value, net production value, added value, revenue and the growth of profit. The resources (input) of economic activities may subsume: the use of living labour, assets and land in economic terms, efficiency is the expression of the successfulness of management. It can be measured by collating input and output. More poignantly, efficiency is the random combination quotient of output and input!

Efficiency indicators can be subsumed into three main groups on corporate level:

I. Based on derived data:
   - "Physical" efficiency
   - Economic efficiency

II. Based on relations or origins (Input/Output):
   - Productivity
   - Intensity
   - Endowment
   - Output-proportionality

III. Based on input types:
   - Average efficiency
   - Additional efficiency
   - Marginal efficiency

I. Basically, there are two main categories of efficiency on the grounds of derived data. The first is the large group of "physical" efficiency and the second is economic one. We use the term of "physical" efficiency if in input-output relations both input and output are measures expressed in physical dimension. In the SI system: mass (e.g. kg), distance (e.g. m), area (e.g. m²), capacity (e.g. Kw) etc. If any of the elements (input-output) are expressed in money value, economic or business efficiency is mentioned. Its measurement unit reflects the economic notion by including money value (e.g. €/kg, €/ m², or their reciprocals. The mostly used indicator groups can be calculated on the grounds of relations. The first group of indicators (I) is too general, the third (III) is in-plant one (field register, log of animal feed, etc.) Relation-based classification is used when the existence and measurability of several input-output relations are discussed on corporate level.

A realistic reflection of relations suggests that a certain input in the resource need of a company is the part of another input, therefore efficiency indicators can also be generated from input/input relations. This correlation can be found on the output side as well. A

certain corporate output is the part of another output; consequently, output/output relations can generate efficiency indicators.

In the two basic category of efficiency (economic, "physical") four groups of indicators are included (II). These are the following:

- Indicators of endowment, which are the quotients of input/input,
- Indicators of Intensity, which are the quotients of input/output results,
- Indicators of productivity, which are the quotients of output/input,
- Output-proportionality indicators, which are the quotients of output/output values.

Table 1: Type of economic efficiency indicators

Ratio	How calculated	What it measures	New Category
	I. Liquidty		
Current	$\frac{Current\ assets}{Current\ liabilities}$	A firm can (not) meet its short term obligations	Endowment
Quick	$\frac{Current\ assets - inventory}{Current\ liabilities}$	A firm can (not) meet its short term obligations without relying upon the sale of its inventories	Endowment
	II. Leverage		
Dept to total assets	$\frac{Total\ dept}{Total\ assets}$	The % of total funds that are provided by creditors	Endowment
Dept to equity	$\frac{Total\ dept}{Total\ stockholder's\ equity}$	The % of total funds provided by creditors versus by owners	Endowment
Long term dept to equity	$\frac{Long\ term\ dept}{Total\ stockholder's\ equity}$	A balance between dept and equity in a firm's long term capital structure	Endowment
Times interest earned	$\frac{Profit\ before\ interest\ and\ taxes}{Total\ interest\ charges}$	The extent to which earnings can decline without the firm becoming Unable to meet its annual interest costs	Productivity
	III. Activity		
Inventory turnover	$\frac{Sales}{Inventory\ of\ finished\ goods}$	Whether a firm holds excessive stocks of inventories	Output-proportionally
Fixed assets turnover	$\frac{Sales}{Fixed\ assets}$	Sales productivity and plant and equipment utilization	Productivity
Total assets turnover	$\frac{Sales}{Total\ assets}$	Sales productivity on total assets	Productivity
Account receivable turnover	$\frac{Annual\ credit\ sales}{Account\ recevable}$	The average length of time it takes a firm to collect credit sales (%)	Output-proportionally
Average collection period	$\frac{Account\ recevable}{Total\ credit\ sales\ /\ 365\ days}$	The average length of time it takes a firm to collect credit sales (days)	Output-proportionally
	IV. Profitability		
Gross profit margin	$\frac{Sales\ minus\ cost\ of\ good\ sold}{Sales}$	A total margin available to cover operating expenses and yield a profit	Output-proportionally
Operating profit margin	$\frac{Earnings\ before\ interest\ and\ tax}{Sales}$	Profitability exclude I&T	Output-proportionally

Net profit margin	$\frac{Net\ income}{Sales}$	After tax profits of sales	Output-proportionally
Return on total assets (ROA)	$\frac{Net\ income}{Total\ assets}$	After tax profits of assets (Return on investment)	Productivity
Price earning	$\frac{Market\ price\ per\ share}{Earning\ per\ share}$	Attractiveness of firm on equity market	Output-proportionally

Finally, we can calculate several *V. Growth ratios* as well. For example sales ratio represents annual % growth in total sales, or dividends per share represent annual % growth in dividend per share. All of growth ratios belong to the output-proportionally category.

Several authors in the past decades tried to interpret the notion of efficiency as it is in correlation with several areas, phenomena and representations of life. Earlier, basically the system of central planning and distribution, ignoring the relations of reality, input-field-output, the negation of the potential of decreasing outputs, the insufficient knowledge of western technical literature and other sources etc. played a key role; whereas after the transformation of regime the potentials of money-making, market development, the disorders of liberalization and deregulation and the constant character of transforming, transitional conditions pushed profitability in the background.

Efficiency – as a notion – is generally the comparison of certain output category and certain input category. It leads to conclude that efficiency is a relative category, and the calculation of a single formula or its result is not enough to declare whether a corporation or a farm is efficient or not. Accordingly, the general formula of efficiency can be given as follows: Efficiency = Output/Input, or Efficiency = Input/Output, or Efficiency = Output/Output, or Efficiency = Input/Input. In most cases, efficiency is discussed exclusively as the measurable, quantifiable result of activities, however, the authors elucidate efficiency can be examined in terms of national economy, society, regions, corporations and in-corporation units as well. Consequently, efficiency can not only be discussed in general, but in concrete partial terms as well.

Conclusions

Efficiency always expresses the relationship between an output and an input category. Different level efficiency indicators are used for estimating the efficiency of an activity (partial, complex, social, corporate, regional and macroeconomic). Corporate efficiency expresses the efficiency of the given corporation or plant through supply, requirement, productivity and output-relatedness indicators.

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