Net Earnings and Labor Productivity Indexes

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Abstract

The main purpose of this research is to recognize the relationship between Net Earnings and labor productivity indexes on the basis of financial statements yearly published by the North Industrial Wood Firm. The type of this research method is applied for the purpose and it is a case study for the procedure, so choosing an economical unit named the North Industrial Wood Firm as a population evaluates and recognizes the relationships between independent variables and dependent variables. In this research, the dependent variable is Net Earnings and independent variables are labor productivity indexes. In this research, for data analysis, descriptive statistics (the mean and standard deviation) and inferential statistics (correlation test) were used. Also by using the survey of documents and degrees of the North Industrial Wood Firm in a period of 11 years (1995- 2006), necessary information was put into special tables and then analyzed statistically. Findings of the research showed that there is a meaningful correlation at the level of %5 between labor productivity indexes and Net Earnings.

Keywords

Net Earnings, Labor productivity, Financial Information, Economical Unit, Index

I. Introduction

Productivity is somehow a know language and researches, articles, books, seminar and various conferences in different industries that is attracts to itself, meanwhile it is not know. In a brief study of the process in different countries, particularly in far Asian countries we notice that the main basis of fast economical development is the productivity. Several activities are there that large industries can not do them because of economical or technical reasons. Small industries do them. Small and middle industries do an important part in economical progress and industrial development of a country. Productivity always relates an output to one or some bases (factors) that are used in production. One concept 'Unique', 'Super' or 'Fixed' in productivity measurement does-not exist [1].

According to productivity definition, if the factors of output production are used (man power, capital, raw materials, field) best, surely productivity will enhance. Among these production factors, labor is one of the most important entrance sources. Therefore productivity is the most important factor of success in an organization and even it is called the productivity in several organizations generally. Labor and capital are considered as two helping factors and in fact two basic factors of production. Therefore, as easily we talk about the labor productivity, we can talk about capital productivity as well. In fact, the capital productivity is the most important measuring ratio of productivity after the labor productivity and it is a pretty suitable information for making decisions of management. Total productivity is a ratio totally that considers the common and the same time effect of all bases such as labor, material, mechanical tools, capital, energy and so on in relation to the rate and value of production [2].

Three different aspects of evaluation of a firm's function are:
1.   Stock Market Returns
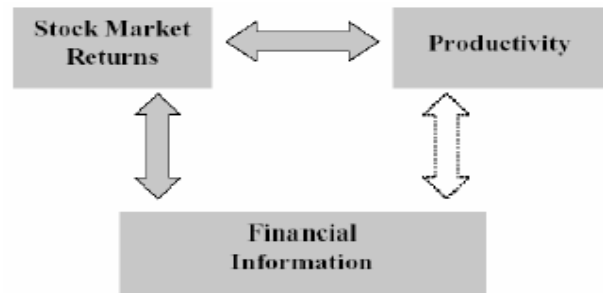2.   Productivity Measures

3.   Financial Information

Fig.1: Different Aspects of Evaluation of a Firm's Function

According to a capitalist, productivity is the concept of "Capital Return". Therefore, profit is considered as an output. Productivity is mainly the guarantee profit at a high level for a firm whereas a low productivity leads to reduction of profit relation (level). Generally, decrease in profitability, productivity or price covering leads to reduction of profit. Productivity decrease is the sign of more analytical necessity and improving actions. The profit of a firm also depends on productivity to a great extent for a long time. In the following equation, the relationship between profitability and productivity is shown:

Profitability = Physical Productivity Process × Price Covering

So a firm has to emphasize on two cases of productivity and price improvement(recovery) to get much profit as possible as it's shown in Fig. 2 [13].
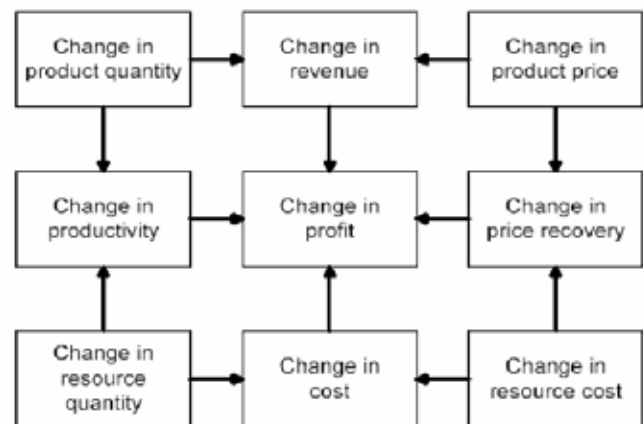

Fig. 2: Strategy for Profitability

The final goal of every productive or industrial activity is more profitability that involves the correct use of sources and facilities (productive factors) and cost reduction and in other words productivity increase. Profitability or getting advantage means the relation of profit with used capital.

The main purpose of this research is to recognize the relationship between Net Earnings and labor productivity indexes on the basis of financial statements yearly published by the North Industrial Wood Firm.

II. Materials and Method

The method of study is functional in aspect of purpose and it is a case study in aspect of method, that with election of an

economical unit named the north industrial wood company as a society the relation between dependent and independent variables is evaluated. In this study, the dependent variable, Net Earnings and independent variables are labor productivity indexes (labor productivity, total output to labor power and each training hour individual).

In this study, two following methods were used for collecting information:

1- Library study, to collect resources and to know about the researches done in this field, is one of the most important methods of gathering information in scientific study.

2- Field study, in which the present documents and evidences of the firm, the statistics and information center(the computer center) of the firm with reference to them, the necessary information was collected for analyzing hypothesizes.

The computer software used in calculating the indexes related to the researching subject (issue) and estimating the relevant regressions are Excel 2007 and SPSS. All used variables in aspect of statistics, contains (includes) the normal distribution with average and standard deviation indicated in the '"Table 1". According to Kolmogorov- Smirnov Test, there isn't any adequate reason for rejecting the hypothesis of being normal of the data:

H0: Data are normal
H1: Data are not normal

While Sig <0/05 is, H0 hypothesis (being normal of data) is rejected. Otherwise there's not any adequate reason for rejecting H0 hypothesis. In the above table, in all cases Sig is larger than 0/05.

Sig Test of the typical correlation by t test student is done while in this test, data are normal and ρ is the parameter of correlation coefficient and r is a typical correlation coefficient that is taken from the relation:

$$r = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\left[\sum_{i=1}^{n}(X_i - \bar{X})^2\right] \times \left[\sum_{i=1}^{n}(Y_i - \bar{Y})^2\right]}}$$

that is an estimation from ρ so in the hypothesis.

$$\begin{cases} H_0 : \rho = 0 \\ H_1 : \rho \neq 0 \end{cases} \Rightarrow \left| t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} \sim t_{(n,\gamma)} \Rightarrow \right.$$

$$(if \ t_f > t \ \Rightarrow \text{Re} \ ject \ H_0)$$

H0 is rejected that Sig <0/05 is while there would be a meaningful correlation between two variables at the level of 0/05. Also by the multi- correlation coefficient R (which is) taken from regressive models (with SPSS software), the notice to the following category is of a high important:

If R >0/70 in this multi correlation is strong (the more it's nearer to number one, the stronger correlation it shows) and if 0/20< R <0/70 in this multi correlation is weak and if R<0/20 multi correlation isn't there. So if we want to get a regressive model in concern with different styles of regressive modeling in the field of economics measuring, will use the method of Stepwise (the compound model of back ward and forward) in order to get the best regressive model.

In the method, the variables which contain a more suitable correlation with the dependent variable has more chance to enter the model, otherwise they get out of the model. In this way, regressive variables are shown in "Table 2".

The main Hypothesis in this research is:

There is a meaningful relationship between labor productivity indexes and Net Earnings.

Secondary hypothesizes in this study are as follows:

1-1) There is a meaningful relationship between labor productivity and Net Earnings.

1-2) There is a meaningful relationship between total output to labor and Net Earnings.

1-3) There is a meaningful relationship between training hours of each individual and Net Earnings.

III. Discussion

Production is a process of combining various material inputs and immaterial inputs (plans, know-how) in order to make something for consumption (the output). The methods of combining the inputs of production in the process of making output are called technology. Technology can be depicted mathematically by the production function which describes the relation between input and output. The production function can be used as a measure of relative performance when comparing technologies. The production function is a simple description of the mechanism of economic growth. Economic growth is defined as any production increase of a business or nation (whatever you are measuring). It is usually expressed as an annual growth percentage depicting growth of the company output (per entity) or the national product (per nation). Real economic growth (as opposed to inflation) consists of two components. These components are an increase in production input and an increase in productivity.

There are several important profit measures in common use. Note that the words earnings, profit and income are used as substitutes in some of these terms (also depending on US or UK usage), thus inflating the number of profit measures. Gross profit equals sales revenue minus cost of goods sold (COGS), thus removing only the part of expenses that can be traced directly to the production or purchase of the goods. Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) equals sales revenue minus cost of goods sold and all expenses except for interest, amortization, depreciation and taxes. It measures the cash earnings that can be used to pay interest and repay the principal. Since interest is paid before income tax is calculated, the debt holder can ignore taxes. Operating profit or Earnings Before Interest and Taxes (EBIT) equals sales revenue minus cost of goods sold and all expenses except for interest and taxes. This is the surplus generated by operations. It is also known as Operating Profit Before Interest and Taxes (OPBIT) or simply Profit Before Interest and Taxes (PBIT) [4]. Earnings Before Tax (EBT) or Net Profit Before Tax equals sales revenue minus cost of goods sold and all expenses except for taxes. It is also known as pre-tax book income (PTBI), net operating income before taxes or simply pre-tax Income. Earnings After Tax or Net Profit After Tax equals sales revenue after deducting all expenses, including taxes (unless some distinction about the treatment of extraordinary expenses is made). In the US, the term Net Income is commonly used. Income before extraordinary expenses represents the same but before adjusting for extraordinary items. Earnings After Tax (or Net Profit After Tax) minus payable dividends becomes Retained Earnings. To accountants, Economic Profit, or EP, is a single-period metric to determine the value created by a company in one period - usually a year. It is Earnings After Tax less the Equity Charge, a risk-weighted cost of capital. This is almost identical

to the economists' definition of economic profit. There are analysts who see benefit in making adjustments to economic profit such as eliminating the effect of amortized goodwill or capitalizing expenditure on brand advertising to show its value over multiple accounting periods. The underlying concept was first introduced by Schmalenbach, but the commercial application of the concept of adjusted economic profit was by Stern Stewart & Co. which has trade-marked their adjusted economic profit as Economic Value Added (EVA). Economists define also the following types of profit:

• Abnormal profit (or Supernormal profit)
• Subnormal profit
• Monopoly profit (or Super profit)

Optimum Profit is a theoretical measure and denotes the "right" level of profit a business can achieve. In business, this Fig. takes account of marketing strategy, market position, and other methods of increasing returns above the competitive rate. Accounting profits should include economic profits, which are also called economic rents. For instance, a monopoly can have very high economic profits, and those profits might include a rent on some natural resource that firm owns, whereby that resource cannot be easily duplicated by other firms [14].

Net income is the residual income of a firm after adding total revenue and gains and subtracting all expenses and losses for the reporting period. Net income can be distributed among holders of common stock as a dividend or held by the firm as an addition to retained earnings. As profit and earnings are used synonymously for income (also depending on UK and US usage), net earnings and net profit are commonly found as synonyms for net income. Often, the term income is substituted for net income, yet this is not preferred due to the possible ambiguity. Net income is informally called the bottom line because it is typically found on the last line of a company's income statement (a related term is top line, meaning revenue, which forms the first line of the account statement). The items deducted will typically include tax expense, financing expense (interest expense), and minority interest. Likewise, preferred stock dividends will be subtracted too, though they are not an expense. For a merchandising company, subtracted costs may be the cost of goods sold, sales discounts, and sales returns and allowances. For a product company advertising, manufacturing, and design and development costs are included.

Today, productivity is considered as a thoughtful status and an intellectual meaning of working. The initial concepts are simple. The problem in the productivity discussion is the lack of a definite and certain procedure (method) for productivity. Of necessities for making intellectual of productivity is to present definitions on productivity and its evaluation indexes. Productivity is the relation between products or produced services and used resources in production. Productivity is a real concept that is a relation degree between a physical output and a physical input. Productivity is an evaluation of an institute's distribution and production process; for instances, one's goods quality and produced services and used resources or else [3]. Productivity involves effectiveness and efficiency and also a total of results and products with(at) the highest level of function.

Robbins defines productivity like this; "the quantity or proportion of products or the main services are presented by organization." [11]. Kawan Lie defines productivity as, "the measurable relation between the proportion of products and the proportion of used factors(resources) needed for making the product." [6]. Increase in productivity also can affect the society in a wide way with producing earnings improvement and life standards growth. The

real meaning of productivity is this: more production with the same attempt of manpower. Productivity increase is a key for competition in domestic, national and international levels [10]. Peter Druker writes anywhere, "the explosion of productivity has been the most important social event during the last hundred years, that is unique during history." Druker, with referring to South Korea (1955) points out that a week and underdeveloped country has developed during twenty years by paying attention to productivity issue and constant and intelligent attempt until it has become a developed country [5]. As shown in "Table 3", many definitions of productivity that are indicated by experts and researchers in this field, confirm the reality that despite of vast studies and (vast) surveys done in this field, there's still no agreement on the productivity concept and about basic concepts [13]. Johnson and banker (1994) by using the airline industry process as their experimental function, got a result that there is an extreme positive correlation between profitability and productivity.

Sjogren, Marton, Holmen(2002) in the process of research of airline industry got result that there is a direct and positive correlation between stock market returns and productivity indexes and there is a negative correlation between productivity indexes and operational expenses. Kitaeva(2002) in a research called, "relationship between productivity measures and financial information in the airline industry" studied 35 airlines in 25 countries in a period of 1991 to 1999. He also received a result that there is a negative correlation between operating expenses and efficiency measures [7]. To measure productivity in industrial units, with studied done, among numerous indexes related with productivity in industries, the most effective and important ones in economical and financial function of elected industrial units and the concepts of these indexes and how to measure them and their analysis are described in "Tables 3". The more the independent equations are, the clearer of the institute's situation is indicated. Productivity is a measure of the efficiency of production. Productivity is a ratio of what is produced to what is required to produce it. Usually this ratio is in the form of an average, expressing the total output divided by the total input. Productivity is a measure of output from a production process, per unit of input. At the national level, productivity growth raises living standards because more real income improves people's ability to purchase goods and services, enjoy leisure, improve housing and education and contribute to social and environmental programs. Productivity growth is important to the firm because it means that the firm can meet its (perhaps growing) obligations to customers, suppliers, workers, shareholders, and governments (taxes and regulation), and still remain competitive or even improve its competitiveness in the market place.

IV. Conclusion

Labor productivity is a measurement of economic growth of a country. Labor productivity measures the amount of goods and services produced by one hour of labor. More specifically, labor productivity measures the amount of real GDP produced by an hour of labor. Growing labor productivity depends on three main factors: investment and saving in physical capital, new technology and human capital.

By referring to "Table 4", in hypotheses 1-1 and 1-2 because of being lower than 5% Sig, there is a meaningful correlation between net earnings and labor productivity and also there is a meaningful correlation between net earnings and total output to labor power, but there's no meaningful correlation between

net earnings and each training hour individual, in hypothesis 1-3, (Sig= 0/153 >0/05).

In the survey of the above table, R is 0/982 (R=0/982) that it indicates a very strong correlation. It means that the main hypothesis is confirmed in general. Also this hypothesis's regressive model is:

$$Y = -1498055241.667 + 190.576 X_1 - 21.522 X_2$$

With notice to the importance of the study subject and considering the gained results from this study, the following suggestions are presented:

1. It is suggested that the higher and middle degree managers of the north industrial wood company build a unit to survey and control the productivity indexes, by which they make better decisions.
2. Notice to the study's results showed that among labor productivity indexes, "labor productivity ratio" has the most relation with "operating profit" with a typical correlation coefficient 0/988 and the most relation with "net earnings" with a typical correlation coefficient 0/966. So these firm managers should pay more attention to the labor productivity ratio.
3. Notice to the study's results showed that among capital productivity indexes, the capital productivity ratio has the most relation with "operating profit" with a typical correlation coefficient 0/936 and the most relation with "net earnings" with a typical correlation coefficient 0/955. So those firm managers should pay more attention to the capital productivity ratio.
4. With notice to the case that through researches haven't been done so far, it's suggested that this study should be evaluated with methods and various instruments and in different situation and organization.
5. It's advised that the subject of the study should be used in the private firms accepted by Tehran Stock Exchange.

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Table 1 : Kolmogorov- Smirnov Test

Range	Variable	Number	Mean	Standard Deviation	Sig
1	Capital Productivity	11	1/3291	0/33348	0/104
2	Total Output To Fixed Assets	11	3/8836	1/06144	0/634
3	Capital Intensity	11	82078708/3636	17450222/45562	0/749
4	Total Output To Operating Capital	11	1/0536	0/09135	0/999
5	Operating Capital Circulation	11	1/0509	0/09428	1/000
6	Fixed Assets Circulation	11	3/8709	1/05518	0/682
7	Total capital Circulation	11	1/0136	0/08903	0/956
8	Operating Profit	11	15994348369/0909	5561801395/86713	0/601

Table 2: Regressive Variables

Range	Dependent Variable	Conventional Form	Range	Type of Index	Independent Variable	Conventional variable
1	Operating Profit	Y	1	Capital Productivity Indexes	Capital Productivity	X_{11}
			2		Total Output To Fixed Assets	X_{12}
			3		Total Output To Fixed Assets	X_{13}
			4		Capital Intensity	X_{14}
			5		Total Output To Capital Operating	X_{15}
			6		Fixed Assets Circulation	X_{16}
			7		Total Assets Circulation	X_{17}

Table 3: Capital Productivity Indexes

Range	Relation	unit
1	Capital productivity(CP) $= \dfrac{\text{Added Value}}{\text{Fixed Assets}}$	Net number
2	Total Output To Fixed Assets $= \dfrac{\text{Total Output}}{\text{Fixed Assets}}$	Net number
3	Capital Intensity(CI) $= \dfrac{\text{Fixed Assets}}{\text{Labor Number}}$	Rial per one
4	Total Output To Operating Capital $= \dfrac{\text{Total Output}}{\text{Operating Capital}}$	Net number
5	Operating Capital Circulation $= \dfrac{\text{Net Sales Value}}{\text{Operating Capital}}$	Net number
6	Fixed Assets Circulation $= \dfrac{\text{Net Sales Value}}{\text{Fixed Assets}}$	Net number
7	Total Assets Circulation $= \dfrac{\text{Net Sales Value}}{\text{Total Assets}}$	Net number

Table 4: Results of Hypothesizes

Hypothesis	Relevant variables		Typical correlation coefficient r	SIG
	Variable 1	Variable 2		
1-1	Capital Productivity	operating profit	0/936	0/000
1-2	Output to fixed assets	operating profit	0/919	0/000
1-3	Capital intensity	operating profit	0/780	0/005
1-4	Output to operating capital	operating profit	- 0/092	0/788
1-5	Operating capital circulation	operating profit	- 0/121	0/722
1-6	Fixed assets circulation	operating profit	0/915	0/000
1-7	Total assets circulation	operating profit	- 0/055	0/873
Multi correlation coefficient between capital productivity indexes and operating profit			R= 0/997	