

Evaluation of the Labour Productivity during the Economic Crisis in Greece: A Financial Accounting Approach at Industrial Listed Firms

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Abstract

This study examines and evaluates the impact of the economic crisis on business obligation for employee benefits and consequently on the labour productivity of industrial listed firms at the Athens Exchange (AE) in Greece. Using accounting data (financial ratios), the labour productivity of a sample of Greek industrial firms, listed on the Athens Stock Exchange, is investigated in order to study how firms administer employee benefits before the outbreak of the sovereign debt crisis (2005-2009) and during the following years of economic crisis in Greece (2010-2014) and if a possible change in policy benefits has affected the labour productivity. For the purpose of the study, a set of financial ratios is employed, in order to measure labour productivity and to compare the performance of the companies for five years before crisis and during the economic crisis (with accounting data analysis from 2005 to 2014). The results revealed that the labour productivity falls significantly during financial crises and consequently the business performance-profitability of the sample companies. The only exception exists in the case of the high capitalization listed companies.

KeyWords: employee benefits, labour productivity, ratios, economic crisis, industry sector, Greece

JEL Classification: J40, M40, M50

Introduction

The global economic crisis has caused a significant reduction of total economic activity. The United States of America has recently experienced a period of economic recession, starting point of which is defined around 2007. Since then, this phenomenon has expanded in many countries around the world (Reinhart & Rogoff, 2009). During the last years companies are trying to survive and increase their profitability in a problematic environment of intense competition, instability and intense economic downturn (Drogalas et al., 2015). In recent years, since 2009, the Greek economy is facing economic recession and its unpleasant consequences. One issue that needs investigation is how the economic crisis affects the ability of employers for employee benefits and how this potential influence increases or reduces labour productivity.

In times of national economic recession, organizations may change their political acting dismissals and hiring fewer new workers or taking other measures to reduce the cost (Campbell, 1997; McKinley et al, 1998). Such measures may be to limit spending on education and employee development and benefits (Williams, 2009), reduction of wages, various allowances and health care costs, as well as the expansion of employment hours without compensation for overtime (Fajarado, 2009; Rowley & Tashiro, 2009). The companies, in order to cope with the modern economic reality, are now directed towards adopting alternative forms of employee benefits, such as support workers, the possibility of more initiatives and the selection decision by a package of non-financial bonus (Blyth, 2008).

There are several reasons that have led in recent years important changes in the calculation of benefits from enterprises (Ledford, 2014). Firms attempt to continuously increase its productivity and reduce labour costs because of the international competition. Also, a strong trend of acquisitions and corporate mergers results the need for harmonization of their systems. The evolution of technology has caused enormous changes in the type and content of jobs, the structure of business and industry and the business models.

Employee benefits are described by the International Accounting Standard - IAS 19, which has the primary objective to prescribe the accounting and to submit information for employee benefits (Caran & Noja, 2015; Caran et al., 2016). According to the IAS 19 *Employee Benefits* (amended 2011), the benefits to the employees are distinguished in 5 categories: a) Short-term benefits to employee (e.g. wages and salaries, annual leave, b) Termination Benefits, c) profit sharing plans, d) Post-employment medical and life insurance benefits, e) Other long-term benefits (e.g. long service leave). From the above it is concluded that IAS 19 is a standard of particular relevance. Its importance is enhanced by the fact that companies in the last years before the outbreak of the economic crisis has placed particular emphasis on the part of the benefits to their employees in an effort to improve working conditions and labour productivity (e.g. collective employee insurance, private plans pension, etc.).

One research gap which exists and which is trying to investigate the specific study, is the consequences of the economic crisis on the benefits provided to employees. This deterioration of the economic

situation of companies is a phenomenon that takes place in recent years in Greece, but also in many other countries. However, there are very few researchers that have been involved with the investigation from a financial accounting perspective of the change of benefits which are offered to employees, these years of recession.

Furthermore, the survival of companies depends largely on the performance and the effectiveness of their employees. It is therefore important for a company to understand what motivates employees in order to design an appropriate employee benefits system. The structure of that system have to encourage efficient employees remain in the company, to increase their commitment to the company and thereby maximized their productivity. This research investigates the impact of the economic crisis on business obligation for employee benefits and consequently on the labour productivity of industrial listed companies at the Athens Exchange (AE) in Greece. Using accounting data (financial ratios), the labour productivity of a sample of Greek industrial companies, listed on the Athens Stock Exchange, is investigated in order to study how firms administer employee benefits before the outbreak of the sovereign debt crisis (2005-2009) and during the following years of economic crisis in Greece (2010-2014) and if there is a possible change these years at the labour productivity.

The structure of the paper is as follows: next section analyzes the literature review, the following the research design of this study (sample and data, selection of variables-financial ratios, research methodology and hypothesis). The following section presents and analyzes the results, and the last section concludes the paper.

Literature review

In general, many past studies on various forms of employee's benefits and labour productivity, that employed accounting data or ratios, were conducted during the last three decades and concluded on ambiguous results:

Azfar & Danninger (2001) find that when employees participate in profit sharing plans are less likely than non-participants to disconnect from their work, while they receive training more frequently and for longer durations. Using salary growth as a proxy for productivity growth, they also find that profit sharing improves labour productivity.

Chelius & Smith (1991) argue that those employees whose compensation is partly in the form of profit sharing are less sensitive to layoff during recessions with negative rate of product demand than those employees paid a fixed and time-based salary.

Kraft (1991) finds that profit sharing reduces the number of dismissals made by companies, by increasing productivity. He argues that profit sharing can reduce the need for dismissals as the need to dismiss employees in recessions is less severe with downward flexible payments, while the profit sharing enhances effort, and thus, dismissals have to be made less frequently as penalty for inefficient performance.

Weitzman (1985) argues that profit sharing reduces unemployment levels and employment ranges. Profit sharing may encourage employees to work better. According to him, the nonprofit sharing companies would control

their employment levels when demand decreases, profit sharing firms control compensations to their employees.

A specific sector of literature is devoted to studying the importance of financial crisis and how financial crises affect the growth of productivity. Baek et al. (2009), for example, found that total factor productivity (TFP) declined during the crisis in Korea, and then bounced back quickly following the crisis.

Nishimura et al. (2005) found that, during the financial crisis in Japan, the productivity of exiting companies was higher than that of surviving companies, which is the reverse of the other periods due to the natural selection mechanism during an important recession.

Mishel (2012) argues that changes in real wages are the most direct way through which labour productivity influences living standards. Mishel (2012) supports that labour productivity in the United States increased by 80 per cent between 1973 and 2011, while median real hourly wages remained virtually static.

Nayak & Patra (2013), by studying the manufacturing sector of Odisha, argue that wages to employees and labour productivity are positively related. Also, a well made financial and non-financial incentive plan could be perceived positively and likely to increase motivation among the workers and consequently improve their productivity. They support that it is important to formulate good non-financial incentives like rewards, appreciation letters and display names on notice board.

Trpeski & Filipovski (2014) analyze the unemployment and employment rates in the F.Y.R.O.M. in comparison to EU28 average and some selected countries of South-Eastern Europe during the recession, and notice that the developments in this country in this particular period have been in the opposite direction to those in the comparing countries. Labour productivity has been improving, but this has not been followed by a corresponding increase in real wages. They claimed that in the F.Y.R.O.M., there are other peculiar institutional and policy factors that shape the functioning of the labour market in the country.

Cristescu et al. (2014) state that wage is a key factor of economic competitiveness as it also reflects the level of labour productivity. In their study, the Romanian labour productivity had the greatest impact on the wage level rather than the net investment and exports.

Nikulin (2015) finds out how much relative wage changes influence the relative labour productivity and relative unemployment rate changes for the period 2002-2013 for Poland and other 5 new EU members. There was confirmed a strong relation between wage and productivity ratio changes in Poland related to Czech Republic, Estonia and Hungary.

Hughes & Saleheen (2012) found that labour productivity in United Kingdom has been persistently weak since the beginning of the recent financial crisis, especially in the service sector. Before the crisis, the United Kingdom had seen the fastest average rate of productivity growth, but since the crisis this performance has worsened considerably.

Research design

Sample and data

The final research sample consists of twenty-four (24) industrial firms listed in the Athens Exchange (AE) in Greece in order to study how firms administer employee benefits before the outbreak of the sovereign debt crisis (2005-2009) and during the following years of economic crisis in Greece (2010-2014) and if there is a possible change in policy benefits has affected the labour productivity. The study proceeds to an analysis only of listed firms as their financial statements are published and it is easy to find them and evaluate from them firm's economic performance. The industrial listed Greek firms have been tracked from the web site of the AE. The available data of this study (financial ratios) are computed from the financial statements of the firms and the databank of the Library of the University of Macedonia (Greece).

Financial Ratios - quantitative research variables

The ratios chosen for the analysis and evaluation of the above sample, in accordance with the methodologies followed previous scholars, are seven (V1-V7) and are classified at two categories : the ratios of the first category (V1-V5) describe basically the efficiency of labour (labour productivity) of a company, and the ratios of the second category (V6-V7) describe the business performance-profitability of a company. Specifically, the ratios of the present study are:

- Profit per employee is considered the ratio of total net income before tax to the total number of employees. In this study, the ratio is denoted by V1.
- Operating Revenue per employee is considered the ratio of operating income derived solely from sales of the company's products to the total number of employees. In this study, the ratio is denoted by V2.
- Shareholders' funds per employee is considered as the quotient of the total share capital (share capital, reserves, retained earnings, etc.) to the total number of employees. In this study, the ratio is denoted by V3.
- Working capital per employee is considered the ratio of working capital to the total number of employees. In this study, the ratio is denoted by V4.
- Total assets per employee is considered the ratio of total assets of an enterprise (long term assets, tangible and intangible assets, etc.), to the total number of employees. In this study, the ratio is denoted by V5.
- ROE% - Return On Equity is expressed as a percentage and is considered the ratio of net income to the shareholder's equity. In this study, the ratio is denoted by V6.
- ROA% - Return on Assets is displayed as a percentage and is the ratio of net income to total assets. In this study, the ratio is denoted by V7.

Research Methodology and hypotheses

The present study attempts to analyze and evaluate the impact of the economic crisis on business obligation for employee benefits and consequently on the labour productivity and business performance-profitability of industrial listed firms at the ASE (Athens Stock Exchange) in Greece.

For the analysis of the above questions, specifically if a possible change in policy benefits because of the economic crisis has affected the labour productivity and the business performance-profitability, financial ratios are used by their financial statements. The measurement of relative change is an empirical question, which can be explored with hypothesis testing for changes in selected ratios, mentioned in the previous section, by applying throughout the period during the economic crisis (2010-2014) and the period before the economic crisis (2005-2009) for the sample companies. Thus, the forms of the examined hypotheses are the following:

H₁: There is no relative change of the financial ratios of the industrial firms from the economic crisis.

H₂: The performance of the industrial firms is not affected differently by the economic crisis.

In order to proceed in our research, the selected financial ratios for each company of the sample over a five-year period before and during the economic crisis are calculated firstly, and the mean from the sum of each ratio for the years before the economic crisis is compared with the equivalent mean from the years during the economic crisis, respectively¹.

Last, to test this hypothesis and apply the above mentioned methodology, tests comparing the mean of two independent groups of the ratios of the sampled companies are applied (two independent samples mean t-tests (Pazarskis, 2008)).

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where,

n = number of examined ratios

\bar{X}_1 = mean of during-crisis ratios

\bar{X}_2 = mean of before-crisis ratios

s = standard deviation

1 = group of during-crisis ratios

2 = group of before-crisis ratios

Finally, the research results are presented in the next section.

¹ In this study, the mean from the sum of each accounting ratio is computed than the median, as this could lead to more accurate research results (Pazarskis, 2008). This argument is consistent with many other researchers diachronically (Giovanis et al., 2014 and others or in general, in financial accounting:).

Analysis of Results

The activities of the twenty-four (24) industrial listed firms included in the sample, were evaluated on the basis of the seven (7) ratios (V1-V7) and after statistic analysis (two independent samples t-test), the results revealed that over a five-year period before and during the economic crisis five (specifically, profit per employee, operating revenue per employee, working capital per employee, ROE, ROA) out of the seven accounting ratios had a statistically significant change due to the economic crisis and all of them present a deterioration. The rest two ratios (shareholders funds per employee, total assets per employee) did not change significantly. More specifically, in the table below are analyzed the results for each of the seven ratios of the statistic analysis separately for the years during the economic crisis (2010-2014) and the years before the economic crisis (2005-2009). Thus, the hypothesis H_1 is rejected.

Comparing the results of the indicators of this study related to the labour productivity and business profitability with the corresponding results of some other past studies (Baek et al., 2009; etc.), we find that we conclude in the same results. According to the results, the labour productivity falls significantly during financial crises. Wage is a key factor of economic competitiveness as it also reflects the level of labour productivity. In this study, the change in labour productivity was statistically significant and was decreased considerably.

Table 1: During and before the economic crisis ratios with T-test

Ratios	During the economic crisis (2010-2014)	Before the economic crisis (2005-2009)	T-Value	P-Value	95% CI for difference
V1	14,0	38,2	-2,34	0,020**	(-44,6; -3,8)
V2	268	525	-2,77	0,006***	(-440,4; -73,6)
V3	240	280	-0,86	0,392	(-130,7; 51,4)
V4	118	217	-2,41	0,017**	(-179,9; -18,1)
V5	507	634	-1,13	0,258	(-345; 93)
V6	-12,1	5,4	-2,33	0,021**	(-32,45; -2,66)
V7	-1,40	2,77	-3,85	0,000***	(-6,31; -2,04)

Note:***, **, * indicate that the mean change is significantly different from zero at the 0.01, 0.05, and 0.10 probability level, respectively, as measured by two independent sample mean t-tests.

More analytically, the P-value interpretation levels for the above referred case are described below:

p<0.01 strong evidence against Ho (see, ***)
 0.01≤p<0.05 moderate evidence against Ho (see, **)
 0.05≤p<0.10 little evidence against Ho (see, *)
 0.10≤p no real evidence against Ho

Interpretation of results and further evidence

In order to examine if a possible change in policy benefits because of the economic crisis in the industrial listed firms (according to the AE categorization) has any impact at the labour productivity and business performance and profitability with the research examined seven ratios, the study analyzes the data of the sample firms and categorize them in

three groups from this respect:

- 8% (2 firms) are firms of high capitalization (according to the AE categorization),
- 17% (4 firms) are firms of medium and low capitalization (according to the AE categorization),
- 75% (18 firms) are all the other firms (not included in the above categories).

Next, the differences between the means of during and before economic crisis ratios (ratios V01 to V07) are computed as below:

$$\Delta V X_i = \bar{X}_2 - \bar{X}_1$$

where,

$\Delta V X_i$ = difference between the means of during-before crisis ratios

i = examined ratios {V01, V02, ..., V07}

\bar{X}_1 = mean of before-crisis examined ratios

\bar{X}_2 = mean of during-crisis examined ratios

Then, for these data (see, $\Delta V X_i$), after the rejection of the null hypothesis that the data sample has the normal distribution, a non-parametric test is applied, as non-parametric tests imply that there is no assumption of a specific distribution for the data population: the Kruskal-Wallis test.

The Kruskal-Wallis test is a nonparametric test alternative to a one-way ANOVA. The test does not require the data to be normal, but instead uses the rank of the data values rather than the actual data values for the analysis. The general calculation form of the Kruskal-Wallis test statistic is for H:

$$H = \frac{12}{N(N+1)} \sum_{j=1}^k \frac{R_j^2}{n_j} - 3(N+1)$$

where,

n_j = the number of observations in group j

N = the total sample size

\bar{R}_j = the average of the ranks in group j,

\bar{R} = the average of all the ranks.

Last, the results reveal a better performance among the industrial listed firms in the examined sample period for the firms of high capitalization in the four out of seven variables. Thus, the hypothesis H_2 is rejected.

Table 2: Kruskal-Wallis test with labour productivity/capitalization

Ratios	Median			P-Value
	Large cap	Medium-low cap	Others	
$\Delta V1$	85,01	-22,47	-15,68	0,086*
$\Delta V2$	535,10	-109,53	-24,01	0,030**
$\Delta V3$	359,415	1,849	-4,248	0,206

$\Delta V4$	361,630	-82,441	-6,774	0,027**
$\Delta V5$	806,56	-77,08	16,27	0,080*
$\Delta V6$	-1,592	-7,582	-9,368	0,454
$\Delta V7$	-1,644	-3,981	-4,106	0,571

Note: ***, **, * indicate that the mean change is significantly different from zero at the 0.01, 0.05 and 0.10 probability level.

Summary and Conclusions

During the late 2000s a general economic decline was observed in world markets with dramatic effects on the banking system and businesses. The scale and timing of the recession varied from country to country. Most companies in Europe are facing a significant reduction in productivity, reaching its lowest level in the last five years. This also happens in Greece. Many companies will need to manage more effectively the performance of their employees as an important point to increase productivity is to utilize all the data - quantitative and qualitative - for human resources.

The decline in productivity appears to be closely related to the lack of employee commitment, which is mainly due to the effects of the economic crisis. Specifically, wages and benefits are continually reduced and unfavorable market conditions act negatively to the overall psychological state of the employees.

In the present study we analyzed and evaluated the effect of the economic crisis on business obligation for employee benefits and consequently on the labour productivity of listed companies of the industrial sector at the ASE (Athens Stock Exchange) in Greece. The sample consists of 24 companies and research carried out for the five years before (2005-2009) and during (2010-2014) the crisis. For the analysis and evaluation of the above, ratios were used, as extracted from the financial statements of companies.

According the study results, the economic crisis had a great effect on labour productivity of the sampled companies. Several labour productivity ratios present a deterioration. Last, the results reveal among the industrial listed firms a better performance for the firms of high capitalization.

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