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REGIONAL HIGHER INSTITUTES AND THEIR CONTRIBUTION TO THE LOCAL ECONOMIC DEVELOPMENT: A CASE STUDY OF GREEK PUBLIC TERTIARY EDUCATION INSTITUTES

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Abstract

Nowadays there is a growth of interest in measuring the impacts of Higher Education Institutes (HEIs) on regional economies. HEIs potentially contribute to regional economic development through their spending and knowledge functions. In this line the goal of the present study is to estimate the effects of Greek public HEIs in regional economic growth and, specifically, in terms of Gross Domestic Product per region (prefecture).

Generally, we examine the essential role of HEI as territorial actors and we investigate whether HEIs generate regional economic development outcomes that would otherwise not occur. From our results, we support that the HEIs presence was positive and statistically significant with the local growth and this entails that the local economies benefit from the presence of HEIs.

JEL classification: R10, R11

Keywords: regional higher institutes, greek public tertiary institutes, local economic development, spending impacts, knowledge effects

1. Introduction

Both at academic and national policy level, Higher Education Institutes (HEIs) are involved in heated debate about their role in entrepreneurship enhancement and local economic growth. Theories that encourage the involvement of HEIs in the region perceive a significant correlation between their contribution and industrial growth in the region. Moreover, it is an undeniable fact that the processes and the patterns are crucial for the regional economic

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growth. Along these lines, there is a wide spectrum of theories which attempt to understand the mechanisms through which local economic growth is created. For instance, Plummer & Taylor (2001) provide a review of previous research in order to investigate the nature of local mechanisms that promote economic development. For this reason, they registered six theoretical models: the growth–pole and growth centers model, the product-cycle model, the flexible–production model, the learning–region model, the competitive advantage model and the enterprise–segmentation model. In addition, they used eight different dimensions which are currently thought to be likely to enhance local economic development. Plummer and Taylor found that knowledge creation and access to information is central to four of the models, which do not include the flexible–production model and the enterprise–segmentation theories. Yet, HEIs have the qualities and ability to create and disseminate knowledge for economic development and, in addition, they are the largest knowledge based institutions in the local region Hagen (2002).

As regards the general attributes and functions of contemporary tertiary education institutes, Goldstein et al. (1995) present the following eight different operational functions of HEIs that lead to economic development impacts: a. creation of knowledge, b. human capital creation, c. transfer of existing know-how, d. technological innovation, e. capital investment, f. regional leadership, g. influence on regional milieu, and h. knowledge infrastructure production. Thus, it is essential to understand the direct casual link between HEIs and local economic development, since new powerful socio–economic forces prompt HEIs to engage in local economic growth and their knowledge to be relevant in terms of local employment and product (Charles 2003; Lazzareti and Tavoletti 2005).

Breznits (2011), based on a case study of the University of Cambridge, supports that the most important factors for regional economic growth are entrepreneurship and innovation, whilst the impact on regional economies depends on the resources, policies, and organization of HEIs, as well as on the industry’s response to the knowledge and innovation generated.

In conclusion, supposing that tertiary education institutes are key players in the local development, the main question concerns the possible effects of their operation on the local economic activity. This question is connected to the fact that for any significant public investment, the public demands to know the return on their investment, the magnitude and distribution of their impacts as well as the effectiveness in achieving desired objectives Bessete (2003).

The fundamental purpose of this paper is to estimate the influences of Greek HEIs in regional economic well–being. To this end, we examine the extent, to

which HEIs-related variables correlate with regional macroeconomic aggregates, and we investigate through the use of regression models, whether the presence of HEIs is statistically significant in terms of gross domestic product per region.

This paper is structured as follows: The next section lays out the existing theories, as well as background information and a brief literature review. The third section presents the methodology and the data resources. The fourth section discusses the results whereas the final section consists of preliminary conclusions and suggestions for additional research.

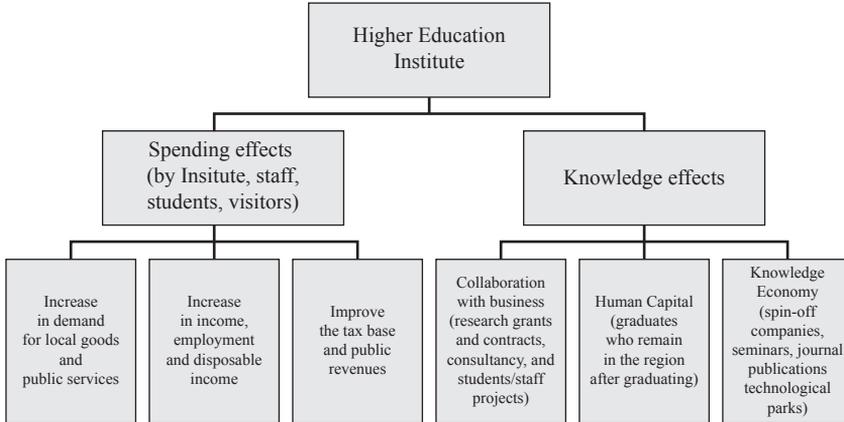
2. Theoretical Framework

The increasing interest in regional and local economic development has had important impacts on the study of economic development, as there are numerous research activities which investigate the major role of HEIs. Generally, the relationship between HEIs and their regions can be divided into spending impacts and knowledge effects (see Figure 1).

Spending impacts refer to effects on operation, consumption and capital expenditures by HEIs to the local economy, either directly or indirectly. The direct effects refer to the initial injection of income into the local economy, such as expenditure by staff, students and other operational expenditure, whilst indirect effects arise from multiplier consequences, related to the 'regional income and employment multiplier'. Both the direct and the indirect effects trigger increase in demand for local goods and services.

Knowledge effects refer to the benefits of their activities such as the production of highly educated graduates and the production and dissemination of knowledge and technology. Furthermore, an important channel for the transfer of academic knowledge into the economy is teaching and training of students, which increase the qualification of the labor force Fritsch and Slavtche (2007). Generally, technology and knowledge may be transferred from the HEIs through different channels. First, through research grants and contracts, mostly with larger firms. Second, through consultancy, i.e. advising of firms on the basis of existing information. Third, through the movement of personnel, staff and students carrying with them both formal and tacit knowledge. Fourth, through spin-off companies, through which a body of knowledge in a HEI is transferred to the private sector by the wholesale transfer of an organization and its staff and, finally, by academic journal publications and industrial-technological parks. (Felsenstein 1996; Newlands 2003; Cox and Taylor, 2006).

The ability of HEIs to transfer their technology to industry depends on

Figure 1: Spending and knowledge effects of HEIs.

external and internal factors. According to Breznitz (2011) the external factors are: a. the legislation framework, such as the Bayh-Dole Act in the USA and specific state legislations, whereas in the UK companies can claim corporation tax relief on research and development, and b. the relationships between non-firm institutions and organizations at national and regional levels. On the other hand, the intra-institute factors are: a. the entrepreneurial culture, relating to the innovation and commercialization, b. the University's policy relating to intellectual property rights, division of royalties, and equity policy, and c. the organization of the technology transfer operation within the HEI in terms of quality and amount of personnel, their business experience, as well as the office's past success in commercializing technology.

In order to achieve their goals, HEIs ought to transform 'a traditional university' into an 'entrepreneurial university', the most vital element being the entrepreneurial culture. This entails that an atmosphere of entrepreneurship and innovation should permeate every layer of the organization Lazzarotti and Tavoletti (2006). Yet, this revolutionary move depends on technology transfer and the development of spin-off firms.

From the above, one could say that the idea of HEIs relates directly to the idea of society and economy, as is argued by Rodrigues: "[...] the knowledge-driven society, the knowledge-based economy or the learning economy, became the epithets of the new idea of society" (2011, p. 181).

As a consequence, the contemporary approach for the role of HEIs has focused on their 'third role', collaborating with industry and commercializing

technology, along with teaching and research Breznits (2011), whereas the geographical proximity and research quality of HEIs shapes decisions by firms to collaborate with them, and this because, in general, firms prefer to engage in collaborative arrangements with first-tier HEIs, as these HEIs are likely to offer the most valuable resources and capabilities Laursen et al.(2011).

As regards the way to discern the effects of HEIs, there are numerous approaches and methods in order to measure the economic impact. For example, Martin (1998) refers to two practical methods. First, the static approach, which is based on spending sources and HEIs operational expenditures. Second, the dynamic approach, which contains various indirect relationships by which HEIs contribute to dynamic changes in the regional economy, such as the personal networks of academic and industrial researchers, or the spin-off firms, whilst fresh graduates may be important channels for disseminating the latest knowledge from lab to the local high technology industry Varga (2000).

Additionally, the impact of HEIs can be divided into backward and forward linkages (Felsenstein 1996; Cox and Taylor 2006). The former includes three different types of effects: i) in the private sector the presence of HEIs increases the demand for local goods and services, ii) in household income, since it triggers increase in expenditure on local goods and services by staff and students, and iii) in the public sector services such as the demand for services and the expansion of a tax base. The later supports the link between HEIs and regional business, since: i) HEIs work in close collaboration with local and regional businesses, offering a range of business support activities such as consultancy and teaching company schemes, ii) new graduates remain in the region after graduating and this entails that the skills of human capital and work forces are improved, and iii) there are positive effects in knowledge economy including research links and collaboration, as well as knowledge and technology transfer. This transfer is established, for instance, through science parks which are designed to foster the creation and growth of R&D-intensive firms, provide an environment that enables large companies to develop relationships with small, high-tech companies, and promote formal regional links between firms and HEIs. For example, Siegel et al (2003) mention that all UK science parks are located on or near HEIs. Also, they found that firms located on HEI science parks have slightly higher research productivity than observationally equivalent firms not located on HEI science parks.

All in all, one could say that HEIs generate much positive output in the fields of economic, social, human and cultural capital of a region. The idea of HEIs as important contributors to regional societies is undeniable, since they

make local areas more attractive for highly skilled human capital Labrianidis (2010).

3. Previous Research

We shall begin the literature review with static approach studies which estimate the direct and indirect impacts of HEIs spending, investment and employment in a region, mostly, through regional input-output modeling, Keynesian multipliers and economic forecasting model. For example, Bonner (1968) estimated the effects of the University of Colorado on the local economy using input-output analysis. He found that each dollar of increased spending by the University eventually stimulated total community production of 1.37 dollar (multiplier effect 1.37) and the impact on local employment translates into almost 4,000 new employees. A few years later, Brownring (1973) analyzed the regional impact of the University of Stirling. He estimated an income multiplier of 1.24-1.54 and an employment multiplier of 1.59-2.14. Two decades later, Bleaney et al. (1992) used Keynesian local multiplier in order to estimate the economic impact of Nottingham University and calculated a disposable income multiplier of 1.56, which was lower than Lewis's (1988) in a study of the impact of Wolverhampton Polytechnic on its local economy. There, the disposable income multiplier was calculated at 1.70. Moreover, Harris (1995) analysis of the University of Portsmouth revealed an employment multiplier between 1.5-1.79 and an output multiplier between 1.24-1.73, whereas more recently, Glasson (2003) calculated an output multiplier between 0.70-1.12 for Sunderland University. Econometric models have been used by Felsenstein (1996). More specifically, he used the input-output relationship to estimate that Northwestern University contributed more than 10,000 jobs (an employment multiplier of 1.55) and half billion dollars in output to the Chicago region in 1993. But Felsenstein went further, removing the presence of HEI from the model simulating the adjustments in regional population and employment that would occur over time in the counterfactual situation.

Until comparatively recently, most studies of the role of HEIs in regional economy were concerned with spending impacts. But, as noted earlier, there is a wide range of indirect relationships by which HEIs contribute to dynamic changes in the regional economy. These, as mentioned above, are forward linkages, including technology development and transfer to local companies.

In this framework, Rodrigues (2011) mentioned that technology transfer is being integrated as a third mission of HEIs, adding to teaching and research. Responding to the pressures of a rapidly changing globalized society, HEIs are

changing as they are increasingly engaged in processes of knowledge transfer that provide the input needed to foster and sustain high levels of innovation-driven competitiveness. A contemporary approach of second academic revolution is a fact and follows the first revolution, which dates back to the nineteenth century and was associated with the full integration of research into the academic mission realm.

First of all, it is essential to mention that Jaffe (1989) introduced the basis for most current econometric research in the area of knowledge and information creation, through the following knowledge production-function equation:

$$\log(P) = \alpha_0 + \alpha_i \log(RD_i) + \alpha_u \log(RD_u) + \varepsilon, (1)$$

where P is the measure of innovation, such as patents or new product introductions, RD_i is industry research and development expenditure and RD_u is HEI research and development expenditure.

Jaffe found significant effects of HEIs research on corporate patents, particularly in certain technology reliant fields such as pharmaceutical, optics, electronics, and nuclear engineering. These effects are geographically mediated by location-proximity to HEI research matters to corporate patents. He supported that HEI research appears to have an indirect effect on local innovation by industrial research and development spending.

Many researchers subsequently modified the model (1). For example, Bania et al. (1992) searched for the local characteristics increasing the probability of new firm openings. The analysis was based on 25 large metropolitan areas in the U.S.A., and it focused on two high-technology industries: Electrical and Electronic Equipment and Instruments (and related products). In conclusion, they found that the HEIs research contribution was positive and statistically significant for the Electrical and Electronic Equipment industry, but for the Instruments, the research impact was insignificant.

Moreover, Acs et al. (1994) via knowledge-production model found that HEI research and development has a greater impact on small firms than on large firms. Furthermore, Varga, (2000) provided formal evidence of a positive effect of agglomeration on local academic knowledge transfers. After controlling for agglomeration effects on technology transfers among high technology companies, he found that concentration of high technology employment is the most important agglomeration factor promoting knowledge transfers from HEI.

The essential role of HEI as territorial actors have been investigated by Smith (2003), who compared British and French knowledge generation

systems at tertiary level, exploring the role of HEIs in Grenoble (France) and Oxfordshire (U.K.). Firstly, he identified the structural differences within national innovation systems. The fundamental differences were: the level of public funding, the sources of funding, the rules on intellectual property ownership, and the systems of regional governance. For instance, the government funding in Britain is lower than in France, the UK has fewer number of scientists than France, but the most important difference is the fact that the UK has a far more developed strategy for the exploitation of science and for promoting enterprise in HEIs than France. In this framework, the possibilities for academic entrepreneurship in France are fewer than in the UK. In conclusion, Smith found that the degree of autonomy allowed individual knowledge institutions to adopt a territorially active role and that this is a critical factor in the nature of engagement with local economy. The greater autonomy of UK universities is reflected in Oxford University's particularly good entrepreneurial activities, and in its even more successful encouragement of academics to establish companies. In Grenoble, the institutional entrepreneurship is the dominant form of spin-off. There, academics have only recently been 'encouraged' to become entrepreneurial. Moreover, the greater restrictions on researchers have led to brain-drain, rather than to scientists staying local and earning a 'dual' income (salaries and entrepreneurial income).

Goldstein and Renault (2004) investigated whether HEIs generate regional economic development outcomes that would otherwise not occur, and which HEI activities are most responsible for any net regional economic growth. They used the quasi-experimental approach to explain variation in change in average earnings per job across 312 metropolitan statistical areas in the USA in the periods 1969-1986 and 1986-1998. The passing of the Bayh-Dole Act (1986) gave HEIs an even larger incentive to engage in entrepreneurial activities by giving them intellectual property rights on patentable inventions, originally stemming from federal government-sponsored research. Goldstein and Renault conducted two different types of analysis. The first was a set of difference-of-means tests between regions with and without 'top 50' research universities (first countrywide and then stratified by a number of control variables such as region size, location and type of industry structure). They found that the hypothesis by which research HEIs contribute significantly to regional economic development, was not supported by the data, throughout the full study period. However, research HEIs did contribute strongly in the second period. Between 1969-86, the presence or the absence of a top 50 research university did not affect the gain in average earning per worker, while it proved a significant factor in the 1986-98 period. The explanation is that economic

development activities were generally absent from universities pre-1986 and quite prevalent in the later period. In addition, the latter period encompasses a more knowledge-based economy. In addition, they support that the human capital creation and milieu functions of the HEI are important contributors to regional economic development. Overall, the results provide additional support to the view that HEIs' research and technology development activities generate significant knowledge spillovers that are captured within the regional environment, and result in enhanced regional economic development.

The importance of HEIs in determining regional economic development was examined by Goldstein and Druker (2006). The fundamental purpose of this study was to estimate the effects of HEIs on regional economic well-being. The unit of analysis is the metropolitan statistical area (MSA) and the study population consists of 313 MSAs. The study methodology combines characteristics of cross-sectional and quasi-experimental design, while the measure of regional economic development was based on the average annual per non-farm worker. They used four university-related variables to investigate different university functions that affect regional economic development. These were the total amount of research expenditures, the total number of degrees awarded, the ratio of graduate science to total degrees, and the number of patents. There are numerous other factors that may influence the extent to which HEI activities translate to regional economic outcomes, such as regional industry indexes (regional earnings in manufacturing, earnings in business services) and entrepreneurial indexes (regional earnings generated by sole proprietorships). In conclusion, they supported that the HEI activities of research, teaching, and technology development help to raise regional average earnings and that knowledge and other spillovers across regional boundaries are influential as well. This serves as at least a partial validation of state and local policies designed to improve economic circumstances by creating or bolstering the economic development function as well as the more traditional research and human capital creation activities of regional HEIs. The effects of HEIs within the region were found to be particularly important in small- and medium-sized MSAs, i.e. those containing fewer than 200,000 non-farm jobs. The behavior of average earnings in larger regions is more dependent on non-institute factors such as business services and starting employment level. Presumably, the fact that universities constitute a much smaller proportion of total innovative activity in the larger MSAs means that they are a less crucial ingredient in regional economic advancement.

Generally, the presence of public research organizations such as HEIs is assumed to have a large impact on regional innovation due to localized

knowledge spillovers resulting from their research. As a result, many countries have implemented regional innovation policies based on the presence of institutes in a region Fritsch (2007). He analyzed the relative importance of geography and networks for academic knowledge spillovers for seven science-based technologies (agriculture and food chemistry, biotechnology, organic fine chemistry, optics, information technology, semiconductors and telecommunications) in the Netherlands at the level of NUTS3 regions. Innovation at the regional level was measured by the average of the number of patents applied for by firms at the European Patent Office between 1999-2001. The goal of this study was to empirically analyze the possible presence of knowledge spillovers stemming from HEI-industry research collaboration over longer distances, while controlling for the presence of localized spillovers. This was done by the estimation of pooled cross-sectional version of a knowledge production function for seven science-based technologies in the Netherlands. The results of this study suggested that academic knowledge spillovers occur through both geographically localized mechanisms and collaborative research over longer distances. In line with the arguments set out in the theoretical section, these findings imply the presence of knowledge spillovers from HEI R&D at multiple spatial scales. Knowledge spillovers resulting from research collaboration occur over longer geographical distances, since geographical proximity is less important in the establishment of collaborative research networks in science-based industries. The presence of knowledge spillover mechanisms (as spin-off dynamics), along with labor mobility and geographical proximity play a significant role. In a nutshell, Fritsch supported that the assumption of policymakers that a university can be regarded as a booster for regional development is at least incomplete. Although regions seem to benefit from the presence of a university, this is not a necessity, since knowledge spillovers occur over longer distances as well.

More recently, Shrolec (2010), using micro-data from the third Community Innovation Survey in the Czech Republic for the period 1999-2001, tested the hypothesis that regional framework conditions determine the innovative performance of firms and that this effect differs for different kinds of firms and is quantitatively assessed. The results indicate that the quality of the regional innovation system directly influences the likelihood of a firm to innovate and that this effect decreases with the size of the firm. Also, broader social characteristics of a region are relevant explanatory factors of innovation. He found that a firm's characteristics are important for innovation, but geography matters a lot, too. The size, age, and ownership of firms influence their odds to innovation, thus firms benefit from being in a region conducive to localized

learning. Small firms seem to benefit more from being located in a strong innovation system than large firms.

The effects of geographical proximity and tertiary education institutes quality on Institute-industry collaboration in the UK were examined by Laursen et al. (2011). Using econometric methods they confirmed that firms prefer to engage in collaborative arrangements with first-tier universities, as these universities are likely to offer the most valuable resources and capabilities. Proximity to these institutes therefore increases the potential for collaboration by reducing the costs of interaction and by supporting the formation of trust through social proximity. However, firms with high levels of absorptive capacity are able to expand their number of potential partners, going beyond the geographically proximate area, because they are more able to search for and coordinate interaction with distant partners. Moreover, the findings from this study suggest that the first choice for firms is to collaborate with a local, top-tier university, in the absence of a high-quality university nearby, the second-best choice being collaboration with a non-local HEI. That is, if required to make a choice, firms appear to favor quality over geographical proximity.

4. Methodology and Data Sources

HEIs are often significant economic units in terms of income and product. They contribute, as mentioned above, both directly and indirectly. In this framework, the goal of the present study is to estimate the effects of Greek public HEIs* in regional economic growth and, specifically, in terms of Gross Domestic Product (GDP).

To this end, this paper has two main objectives. Firstly, it seeks possible linear associations between Greek regional HEIs-related variables and regional macroeconomic aggregates. The second main objective is to estimate the statistical significance of the contribution of Greek HEIs-related variables on regional economic development, by adapting a regression equation. In order to assess the linear associations between regional HEIs and regional accounts, we use the bivariate correlations method. This procedure calculates Pearson's correlation coefficient with the significant levels of variables. The importance of HEIs activities in economic development outcomes at the regional level will be examined through a regression model, using the Least-Squares Method (LSM).

As regards the data, the unit of analysis in the study is the Nomenclature of

* Greek HEIs include Universities and Technological Educational Institutes (TEIs).

Territorial Units for Statistics* (NUTS)-III departments. The sample consists of 35 geographical parts (prefectures) of continental Greece (see Note 1), where HEIs are present, except for Attiki and Thessaloniki, being outliers due to their size. The data refer to 2007 and are based on publications of the Hellenic Statistical Authority (HSA).

The measure of regional economic development is Gross Domestic Product (GDP) per prefecture, as dependent variable, while the measure for the presence of each HEI is the number of students. At regional level, the GDP is a macroeconomic aggregate which plays an important role for the implementation of regional policies. The other regional accounts include unemployment, the newly built properties and the Gross Value Added in the following sectors: agriculture, manufacturing, trade, hotels and restaurants, education, construction, real estate, and population. Table 1 presents descriptive measures for all the variables used in this analysis.

All the above is connected to the fact that for any significant public investment, the public demands to know the return of the investment, the magnitude and distribution of their impacts as well as the effectiveness in achieving desired objectives. This is important for the Greek case, as there is evidence that regional HEIs have a limited contribution to the development of their region. Lambrianidis (2010) supported that Greek HEIs are not so effective in achieving their goals. This is mostly due to the fact that the local economy is limited and, as a result, students, academic staff and their families spend an important percent of their expenditures outside the local market. In addition, academic staff and students stay in the area for few days per year (academic mobility phenomenon). As a result, they spend a considerable amount of their money outside the local economy. This makes it important to investigate the link between the local market and the presence of HEIs.

5. Empirical Results

As mentioned above, Table 1 reports descriptive measures for all variables examined. Table 2, presents the linear correlations for all variables and

* Hellenic Statistical Authority: The Nomenclature of Territorial Units for Statistics (NUTS) provides a homogeneous and unified breakdown of the economic territory of the European Union. The NUTS nomenclature is the territorial classification used for the compilation of regional macroeconomic accounts. The classification is: NUTS-I is a great geographical area, region (NUTS-II) and department (NUTS-III).

Table 1: Variable Descriptive Measures

Variable	Description	Index	Mean	Standard Deviation
GDPD	Gross Domestic Product per department	million €	1.943	1.150
NOST	Number of Students	Number	3.200	4.258
UNEMPL	Unemployment	%	9,9	3,3
NBPR	Newly built properties (surface)	m ²		
GVAAGR	Gross Value Added (GVA) - Agriculture/Hunting	million €	150,39	106
GVAMAN	GVA Manufacturing	million €	262,57	343
GVATRA	GVA Trade	million €	208,94	127
GVAHTRE	GVA Hotels and restaurants	million €	93,47	60
GVAEDUC	GVA Education	million €	151,33	83
GVACONS	GVA Constructions	million €	119,21	74
GVAREAL	GVA Real Estate, Renting and business activities	million €	212,48	139

Source: Hellenic Statistical Authority

responds to the first objective. The HEIs related variables are the number of students and the ratio of population for each department.

There is a high positive correlation ($p < 0.01$) between the mean of the number of students and the GDP in each prefecture, the newly built properties and the outputs (GVA) of several economic sectors such as real estate, renting and business activities, trade (wholesale and retail), hotels and restaurants, and education.

So, the fact that there are direct correlations between regional HEIs-related variables and regional macroeconomic aggregates means that the local economies benefit from the presence of HEIs. Generally, HEIs affect economic development outcomes. Using this method, we basically estimate the impacts of expenditure by students among the sectors of economic activity, in each prefecture of continental Greece.

The statistical importance of the presence of a HEI in the local market was

Table 2: Correlations

	GDP	NOST	UNEMPL	NBPR	GVA REAL	GVA CONS	GVA AGR	GVA MAN	GVA TRA	GVA HOTR
NOST	,698**									
UNEMPL	-,323	-,168								
NBPR	,819**	,564**	-,390*							
GVA REAL	,918**	,822**	-,342*	,775**						
GVA CONS	,660**	,125	-,461**	,641**	,512**					
GVA AGR	,599**	,282	-,240	,370*	,546**	,394*				
GVA MAN	,716**	,236	-,182	,595**	,459**	,654**	,329			
GVA TRA	,913**	,738**	-,369*	,793**	,960**	,546**	,613**	,453**		
GVA HOTR	,839**	,647**	-,446**	,773**	,884**	,619**	,331	,485**	,878**	
GVA EDU	,889**	,831**	-,291	,767**	,935**	,373*	,571**	,419*	,929**	,815**

Notes: ** $p < 0.01$, * $p < 0.05$

examined through fitting the most suitable multiple regression models. The sum of GDP (dependent variable) from our sample is 68.021 millions €, while the mean for each department is 1.943 millions €. The model was estimated using Least Squares Method explaining 91% of the variance of the dependent variable. This implies that the variables are good predictors of the dependent variable. Moreover, it is essential to mention that the model satisfies the necessary conditions for the residuals and the multicollinearity (see Table 3 & Figure 2).

The number of graduates (NOST) and, essentially, their expenditures is a statistically significant parameter in the model, whereas other significant factors are the newly built properties (NBPR), the value in the agricultural sector (GVAAGR) and the value in the manufacturing sector (GVAMAN).

If we go further, removing the presence of HEI from the model, then the new model explains 81.3% of the variance of the dependent variable. Thus, the change in the coefficient of determination that is produced by adding or deleting an independent variable (number of students) is calculated at 9.7%. So,

6. Conclusions and Suggestions for Further Research

Theories that encourage the involvement of HEIs in a region perceive a significant correlation between the level of the contribution of HEIs and industrial growth in the region. This piece of research, by using a statistical theory, examined the major role of HEIs in regional and local economic development. Based on previous research, we could support that HEIs are often significant economic units in terms of income and product. In this framework, the goal of this study was to estimate the effects of Greek public HEIs in regional economic growth in terms of GDP.

The effects of the presence of HEIs in the local economy are found to be important as if there is statistical significant correlations mostly between the number of students and other regional macroeconomics accounts such as the gross domestic product, the real estate (renting and business activities), the trade (wholesale and retail), hotels and restaurants, and education.

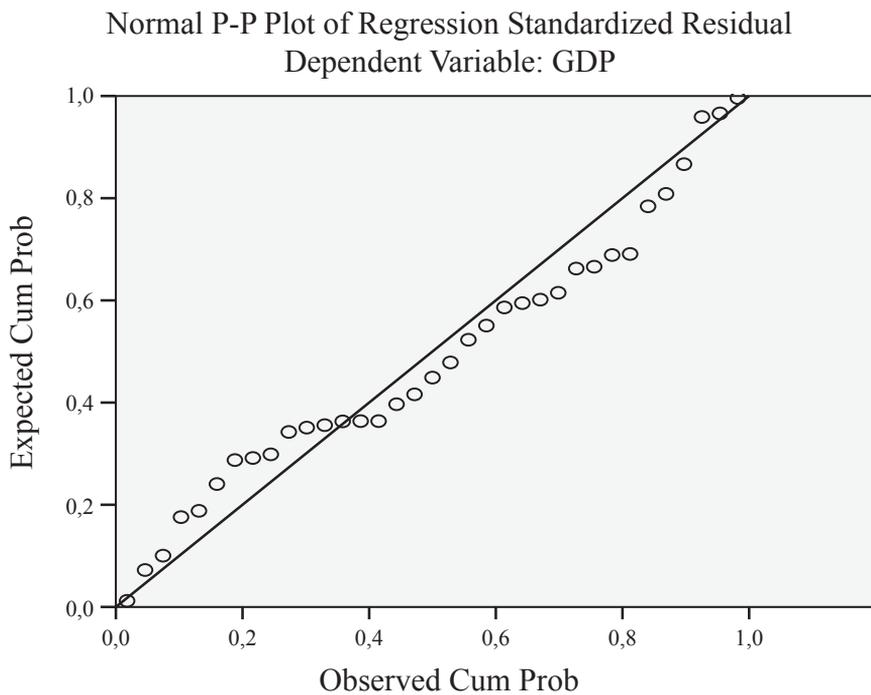
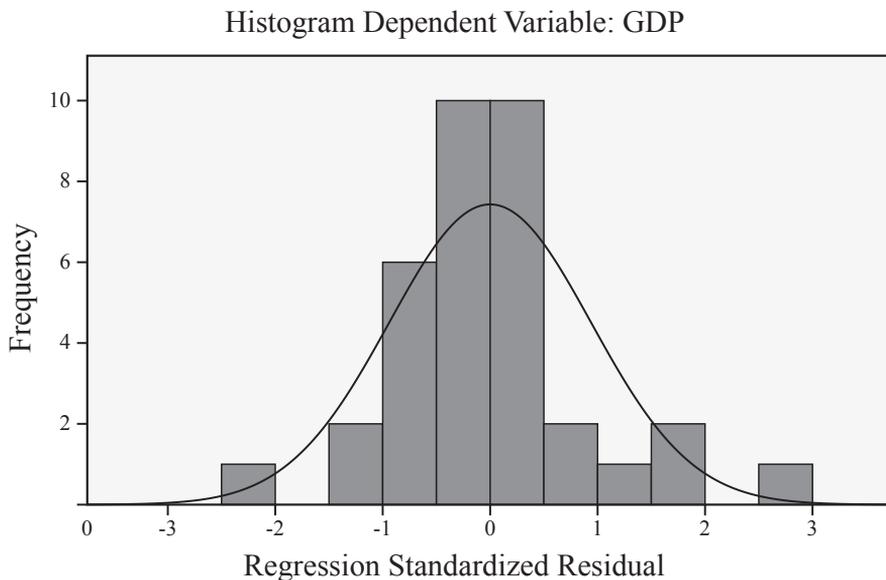
This entails that the local economies benefit from the presence of HEIs, essentially, though the expenditure patterns by students.

Using a similar approach, future research might seek to incorporate additional data sets or create more refined indicators of HEI activities and other regional factors which measure the impacts of the various HEI functions in particular regional settings in a more precise way. By combining the results from this and future studies, we can continue to expand and refine our understanding of the processes by which HEIs affect their regions and the factors that mediate this influence.

Notes

1. The sample consists of 35 geographical areas from continental Greece at the level of NUTS-III and these are: Evros, Xanthi, Rodopi, Drama, Kavala, Imathia, Kilkis, Pella, Pieria, Serres, Grevena, Kastoria, Kozani, Florina, Karditsa, Larisa, Magnisia, Trikala, Arta, Thesprotia, Ioannina, Preveza, Aitolokarnania, Achaia, Ileia, Viotia, Evvoia, Evrytania, Fthiotida, Fokida, Argolida, Arkadia, Korinthia, Lakonia and Messinia.
2. Collinearity (or multicollinearity) is the undesirable situation when one independent variable is a linear function of other independent variables.
3. Diagnostics of Distance. Measures to identify cases with unusual combinations of values for the independent variables and cases that may have a large impact on the regression model. i). Cook's. A measure of how much the residual of all cases would change if a particular case were excluded from

Figure 2: Standardized Residual Plots.



- the calculation of the regression coefficients. A large Cook's D indicates that excluding a case from computation of the regression statistics changes the coefficients substantially and ii) Leverage values. Measures the influence of a point on the fit of the regression. The centered leverage ranges from 0 (no influence on the fit) to $(N-1)/N$.
4. Residual is the actual value of the dependent variable minus the value predicted by the regression equation Residuals, more specifically, the Durbin-Watson test for serial autocorrelation of the residuals.

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MERGERS IN THE PUBLIC SECTOR. CONSIDERATIONS FOR EFFECTIVE IMPLEMENTATION OF AN AMBITIOUS VENTURE

VASSILIS KEFIS*

Abstract

The executives, who will undertake the leadership of the newly established agencies, must be supplied by the state, with those tools that offer confidence and free decisions under the Constitution and laws. Even wrong decisions, as much as if it seems cynical and scientific. The common point between all management styles which are referred to the international literature, is the fact that the effective manager, whatever system to follow, he will make mistakes. And in many cases, even more mistakes, lead to better solutions for the organization's and society's benefit.

JEL classification: G34, H83, J58, L32

Keywords: public sector, economic crisis, mergers, restructuring, mediocracy, quality, new business model, fast track

1. Historical Overview

At the first decades after the Second World War, the countries of Western Europe revealed the concept of the nation, namely the public sector, as a helper, leader and pillar of their development path, focusing on state interventionism in important strategic sectors such as education, health, housing and provision of social goods and services. The high quality services offered the opportunity to citizens to work unobstructedly, to create and accept the philosophy of the state-guarantor for social peace, stability and normality. The welfare states of the postwar period, took action in the areas of transport, telecommunications, energy, water resources, waste, in which the private sector had not involvement and development opportunities. The governments' aim was to ensure the principles of consistency, continuity, safety and affordability. The decades of 1970 and 1980 were impeached by strong recession in the economic

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activity, and by the conversion efforts of the social model, to a more liberal (neoliberal) one, with the USA and GB as pioneers. The first negative results appeared soon, with more typically, the depreciation of the welfare state, the high unemployment, a cheeping inflation that was soon to become galloping, and finally, the social upheaval in the major economies of the West.

The European Economic Community and its transformation, the European Union, the 80's and 90's, and the decade of 2000 with the Integrated Mediterranean Programs, the Structural Funds, the Cohesion Fund for the four economically weaker countries (Greece, Spain, Portugal, Ireland), and now the Integrated Strategic Reference Framework (NSFR) provided and continue to provide a bundle of money, despite its extensive and maybe untimely expansion, for investment plans, for restructuring the productive base, for a rational use of natural and energy resources, for the implementation of innovation and modern/ contemporary technology, compatible and environmentally friendly, for replacing the obsolete capital businesses' equipment, and for stimulating the entrepreneurship. The high funding had a positive impact on the society, workers, market, environment, providing thus equal opportunities for human development, improving, the working conditions and worker's rights, and ensuring thereby satisfactory conditions of hygiene and safety. Then, a business culture was created, that linked the economic benefits with the social and environmental ones. Attempts were made to achieve a relationship between a balanced development of the private sector and an assurance of public goods by public enterprises and organizations.

2. Current Conditions

The formulation of public policies, although it was subject to legislation and government controls, it set the basis and gave the opportunity for public companies to grow and contribute to the "financial pending" for a social spring, which would characterize the decade of 2010. However, the global economic crisis and the "memorandum period", which is experiencing and in which the Greek citizen is operating, leaves indelible signs, which will be judged by the objective (and sometimes subjective) scholars of the economic history and sociology. This is a theoretical approach.

The practical perception, or the market perception, with the insatiable need for more profit, expects the development of macroeconomic sheet (i.e. the numbers' development) for a "more completed" representation of the achievements. As Richard Hudson (2006) notes, at the preface of his book *Financial markets are very risky places. And hitherto our understanding of them has*

been laden by the elaborate mathematics of orthodox financial theory- with many misguided assumptions, mis-applied equations and misleading conclusions”

Furthermore, Mandelbrot himself, in order to reinforce this particular ascertainment, he strongly criticizes the various theories of markets' prediction. Elsewhere in the same book, Mandelbrot writes: “*Warren E. Buffet, the famously successful investor and industrialist, jested that he would like to fund university chairs in the Efficient Market Hypothesis, so that the professors would train even more misguided financiers whose money he could win*”. The author goes further by focusing on all the variables which must be taken into account and affect markets “*Shipbuilders design not just for the 95 percent of sailing days when the weather is element, but alsofor the other 5 percent, when storms blow and their skill is tested. The financiersand investors of the word are, at the moment, like marines who heed no weather warnings*”.

The global economy is in the midst of intensive turbulences, which are reflected in the swelling deficits of the developed countries, in the debt crisis, in the continuing price increases of the basic consumer goods, and finally in the increasing unemployment. The USA are faced with a debt that constantly makes difficult its service. The rating agencies, with their blamable and prejudices, warn and proceed to a deterioration of the creditworthiness of the largest economy in the word. The dollar's consumption is turning investors and holders of US debt in other currencies in order to save their investments. States such as Wisconsin, California, Illinois, and Detroit (called “State Junks”), in the recent years they have spent 500 billion dollars, more than they received. The largest US cities owe more than 2 trillion dollars. And there is continuity that follows. China believes that the current monetary system that is dominated by the dollar is a product of the past, so as to study measures for its gradual replacementfrom Yan.

3. The Greek Reality - The root causes of the problem

Since April 2010, the Greek society is experiencing an economic policy, a corollary of an unprecedented “virtual prosperity” (virtual reality). The negative international developments were the fuse to come to the surface the development' distorted perception. We realized too late that our attitude, our decisions, our actions, were moving into a realm of a virtual prosperity, which soon or later would make us to face the reality. Since the decade of 1950, Greece achieved high growth rates, based on non-rational allocation of resources. Longitudinally, causes of the current problem were born, such

as the over-collection of activities in major urban centers with agglomeration economies and scale economies, the internal migration, the industrialization, the lack of democracy, the improper management of the economy, the vicious cycle of firm's conservation by the state, the swelling public sector, the deficit of education, the development's support mainly in the tertiary sector rather than the secondary sector, where it creates mostly self-sufficient economies and societies, the depreciation of agriculture, the "enslavement" to the market's dictates through the "explosion" of the Bourse, the high equivalence "drachma-euro" for the country's entry to the Economic and Monetary Union and the Eurozone, the neoliberal policy experiments, the corruption at many levels of public life. All these factors, led to classifications, definitions and technical terms, known only to those who were dealing with them. We were initiated into the interior of the IMF, we dealt with the European Support Mechanism, we watched and we are anxiously continuing to watch the progress of spreads, while we're simultaneously wondering the reasons of why we came up here. The crisis, which, in an international level, began as a financial crisis, as well as it concerned the progress of credit institutions, has evolved into an economic and thus social crisis, due to its multiplier effects.

As one of the major root causes of the economic problem in Greece, is mentioned the excessive increase in public sector, as a result of a non-negotiable political party's outcome, which led to customer relationships-pledge for vocational rehabilitation. I do not accept the idealization or the devastating logic. In both the public and private sector, there are workers with excellent performances, who deserve their position, which the state or the businessman had trusted to them. In addition, there are other workers, with lower performances, as a result of poor management by those who are standing at the higher levels of hierarchical pyramid.

4. Management Systems

Contextually, comes to the mind the great difference between the two main schools of management, the US and Japanese, which is reflected in the way of action, in cases of negative results.

In the American system of Management if the economic entity is making losses, the market share which is attributable to the firm and leads to business' failure, then the immediate solution is the reduction of the operating costs. How is that accomplished; with massive downsizing (layoffs) from the base of the administrative pyramid, and especially from the workforce. In the Japanese management system the solution comes from the top, where the layoffs

are actively involved in strategic decisions and plan their business plans. The reference to those two dominant schools, aims to be emphasize the need for a new, innovative way of perception, regarding to human resources which staffs the public organizations, the public enterprises and services, We owe to stand at a new perception, regarding the management way of the country's public sector, away from party attitudes, at the implementation of a contemporary New Public Management, which is not a luxury and not a theoretical academic approach, but a necessity for its viability and for the survival of the country and its citizens.

5. A new business model for the public sector

The public-centered nature of Greek productivity, facing a crisis of social legitimacy, tends to turn into a private-centered one through privatization, denationalization, mergers, synergies, and strategic alliances. The present publication focuses on the search for a new business model for the entities, which will arise from the political leadership' announcements about "mergers and abolition of public sector bodies", which will incorporate a social vision with a view to the social acceptance and the expansion of their mission, an innovative leadership with contemporary perceptions, which will meet the increasing social needs and aspirations, and a way of decision making, based on sustainable and realistic solutions, in order to integrate the values of responsibility and public accountability.

Recently, the mergers and terminations of public agencies were announced, in order to reduce the expenses and the organizational cost of dormant organizations, of those organizations which were unprofitable and originated from the entire spectrum of government's action (health, tourism, construction. media, research centers, institutes and manufacturing). This strategic move for the state's restructure, is imperative, in order to create a new "strategic architecture" in the country's public sector, which will be characterized by changing the mindset of employees (reframing), (by) assisting with new skills and competences (renewal), by integrating new concepts (restructuring), and by adopting investment activities (revitalization) (Kefis, 2005)

These developments, which were reinforced by feasibilities and opportunisms, must be based on a scientific basis, with main pillar the effective management, that will lead their sustain ability and will become the springboard for the achievement of sustainable development. The next step is the elaboration of a completed plan, in order to list the needs of new organizations. In a second stage, within the fledging unit, there is a need of a new policy by eliminating or

merging similar parts, or parts that have been overtaken by the developments, and creating new, innovative ones, which will anticipate the developments. The systematic comparison (benchmarking) of the strategies, the functions, the procedures and, the practices, with relevant government units abroad, which use excellent practices and their excellent adaption to the Greek reality, are deemed necessary. This process can reach to remarkable results if it's based on the following principles:

1. Recognizing the specific action
2. Selecting the relevant public organization abroad
3. Collecting and analyzing data
4. Establishing performance goals
5. Implementing plans and controlling the results.

The Integrated Strategic Reference Framework (NSRF) anticipates emphatically to the innovation research, technology, entrepreneurship, investment and to the sustainable development, in order to improve the country's competitiveness, the educational quality and the strengthening of public services' administrative ability.

The restructuring, the reorganization and, the reengineering of the state, require titanic efforts. The aim of this policy's designers should be the long-term planning, which will yield in a time projection of three years duration. At the same time, as the top priority should be the continuous public information about the project's progress, in order to ensure the support for workers and society.

The environment in where is expected to operate these new units, is dynamic and constantly changing. The organizational changes that will occur through the reorganization programs and IT, require continual assessment and flexibility which lead to continuous changes-transformations. Despite the reactions, due to the culture that has been bound for decades concerning the innovation's entry, there is a margin for their adoption. The new technology through the Enterprise Application Integration (EAI), the Service Oriented Architecture (SOA), the software performance management, the Business Process Management systems (BPM), and the SIX SIGMA methodology for the reengineering a process, can lead to the networked organization, to the efficiency of procedures instead of resources' efficiency and to the organization's effectiveness instead of the operating efficiency. The admission of the Balanced Scorecard, the Co-sourcing, and the In-sourcing, into the public sector, helps to simplify and manage with a better way the business processes, to improve the worker's productivity without work intensification and to the cost's reduction by using a realistic cash-flow.

6. Questions for Managers

The executives, who will assume the administration of start-public organizations, must give convincing answers not only to the responsible for their appointment, but especially to the citizens (mostly to them). Some important questions to be put into consideration are following below:

1. How do they intend to improve their efficiency and therefore, the worker's efficiency?
2. What should they do to achieve better results?
3. What education-training systems are needed for themselves and for their subordinates?
4. How will they improve the organization's agility-flexibility?
5. How will they ensure organization's acceptance be the society;

These catalysts, which will give the necessary boost to the newly established public services, and will attach them to the restart chariot of the Greek economy and society, are:

1. The change of the administration/management methods
2. The adoption of best practices
3. The bottom-up communication
4. The new technology
5. The modernization of the institutional framework and public reference-accountability.

The executives, who will undertake the leadership of the newly established agencies, must be supplied by the state, with those tools that offer confidence and free decisions under the Constitution and laws. Even wrong decisions, as much as if it seems cynical and scientific. The common point between all management styles which are referred to the international literature, is the fact that the effective manager, whatever system to follow, he will make mistakes. And in many cases, even more mistakes, lead to better solutions for the organization's and society's benefit.

7. Fast Track procedures

The fast track procedures are a necessity for the viability of the project. Fast Track managers must create a long term value to the organization, seek new challenges, give vision, define a business process based on current international development and international standards, by incorporating a creative

system of payments-rewards (rewards system) and a bidirectional form of communication with the internal and the external environment, through the enhancement of worker's abilities and skills, and through the adoption of contemporary technology. The ever increasing citizens' demands from a state authority that never justified, their expectations, delete the "mediocracy" while the economic policy which strangles their incomes does not allow margins for deviation or discounts in making decisions and in adopting best practices from the political leadership.

8. Probabilities of project's success

In such an important, ambitious and necessary –under the new changing conditions– project, the political leadership and managers, who will undertake the management, owe to know that there are no success probabilities, unless not met, the following factors:

1. Support from the party mechanisms
2. Lack of communication. An ingredient of success is the comprehensive employee information about the new data.
3. Directors' appointment, with opaque criteria
4. Inadequate observation by the appropriate control mechanisms
5. Lack of education-training, particularly on subjects such as "digital economy". This term refers to the "recent and under development economies transformation, at the direction of the dependence of functions and processes by the digitalization of information, which is based on computers and complicated information systems. (Kyritsis, 2008)
6. Repeated and consistent work that leads to inertia, to entrenched systems and, to dysfunctional ways of behavior. "The routine is a powerful force of inertia, and attracts the whole organization system to the stationarity and stagnation, and finally to its extreme bureaucratization, with the apophatic sense of the term. (Makrydimitris, 2008)

9. Summary

Summarizing the above, it should be noticed that the resource utilization of a newly established public business, with the ensuring of their focus on certain areas of action, requires at a first stage, the hierarchy of steps of strategic thinking, and subsequently their implementation. The elaboration of a standard business plan is an opportunity to promote the teamwork, the feasibility of objectives, and the qualitative service to citizens. The political and

non-political commitments are an obstacle in developing projects with imagination and flexibility. If we overcome these obstacles, by establishing a strong institutional framework, then there is a high probability of satisfying the efficiency criterion by the public entities.

Moreover, the “quality achievement in the public sector requires the use of private sector’s methods and techniques. It must also be taken into account the peculiarities of public action and public goods and services in the TQM's design and in the application of its principles. The application of these principles in the public sector is feasible. It can be done by registering the roles and responsibilities, by transferring the responsibilities at the lower administrative levels, and by creating a climate of cooperation, clarity and transparency, which allows the objective evaluation and fair reward” (Kefis, 2005).

The new architecture of the public sector must ensure the sustainability and the healthy way into a long-term period. The radical, and without effects, overthrow of this uncontrolled structure, is the last chance to help the country’s exit from the economic crisis. The real difficulties are visible. Now, should be the leader minds, which will register the expected difficulties and the ways in order to overcome them. Such a table-catalogue is a basic tool of administrations actions to prevent crises. In this way, the administrations have ready solutions and specific options. The anticipation of these processes helps the efforts of enterprise's restructuring, whose the sole purpose isn’t in any case only the costs reduction. If the State and the Administrations stand only here, then an ambitious plan will not be ambitious as a plan, anymore. We will have seen the tree, but we will have lost the forest.

The restructuring, the capital adequacy, the strategic limitation of the operating costs, and the strategic architecture, are concepts that filled the private sector’s dictionaries. Now, that they surround the terminology of the public sector, they will face lots of obstacles until they find their final position.

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EVALUATING POST-MERGER PERFORMANCE AND RISK AT CONGLOMERATE MERGERS IN GREECE WITH ACCOUNTING VARIABLES

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Abstract

We examine empirically the impact of risk on the operating performance of a sample of firms that involved in mergers and acquisitions (M&As). Using financial ratios, the post-merger performance of a sample of Greek firms, listed on the Athens Stock Exchange (ASE). The sample is sub-tracted in two different groups: (i) firms that involved in M&As activities as acquirers with firms from their industry and (ii) firms that involved in M&As activities as acquirers but with firms from a different industry. Then, the study, compares the differences in firms' post-merger operating performance among the two sub-samples for four years after the M&A announcements, in order to measure the changes in operating performance from the extended risk exposure.

JEL classification: G34, L25, M40

Keywords: operating performance, risk, mergers, acquisitions

1. Introductory comments

The strategy literature commonly argues that mergers and acquisitions (M&As) are one of the mechanisms by which firms gain access to new resources and, via resource redeployment, increase revenues and reduce cost. The main hypothesis in successful M&As activities is that potential economic

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benefits arising from them are changes that increase value that would not have been made in the absence of a change in control. These changes in control are potentially most valuable when they lead to the re-deployment of assets, providing new operating plans or business strategies, as firms always seek for continuous increasing performance (Pazarskis, 2008).

Hence, except of the “well-explored” cases of the US and the UK capital markets, there were only a few of researches on conglomerate and non-conglomerate M&As in the majority of other countries globally, diachronically. This proposition seems to be even more correct, if it is referred to the operating performance studies which employ financial ratios, than event studies based on stock returns (Sudarsanam, 2003). Regarding the Greek market, which recently has been upwarded from a developing to a developed economy, there have been a few studies on M&As, and there is a scarcity of operating performance studies with ratio analysis regarding firms involved in M&A activities, and especially, on conglomerate and non-conglomerate M&As examining risk exposure.

Risk in this study is perceived as a firm’s exposure to uncertainty, which can lead to changes in the operating performance of this firm. Developing or changing a firm its operating activities from a particular industry to another industry could affect its operating performance. As one of the main elements of contemporary corporate restructuring is the formation of new business entities via M&As, this study proceeds to an analysis of the operating performance from a sample of Greek firms that involved in M&As transactions. For the purpose of the study, the sample of firms is sub-tracted in two different groups, which are: (i) firms that involved in M&As activities as acquirers with firms from their industry (horizontal or vertical mergers) and (ii) firms that involved in M&As activities as acquirers but with firms from a different industry and were exposed in extended risk (conglomerate mergers). Using an explanatory set of twenty-six essential financial ratios, the M&As effects on the operating performance of the selected sample is investigated.

The structure of this paper is as follows: the next section analyses and classifies M&As, Risk types and the interaction between the M&As activities and the risk level of the firm, Section 3 provides the analytical basis of the research design. Section 4 presents and analyses the results, and section 5 concludes the paper.

2. Classification of M&As & Risk types

2.1. Categorization of M&As activities

The term of “merger” is perceived, in general, as the action of unity from two or more companies. In this study, the terms “merger” and “mergers and acquisitions (M&As)” are used in many cases at the text, providing similar meanings for the terms “merger” and “acquisition”, while in others, wherever it is necessary, there is a clear distinction among them and always exists a provision of the exact meaning. To make clear, the perception of each term, they are analysed separately below (Mueller, 1989; Soubeniotis et al., 2006; Pazarskis et al., 2006; Pazarskis, 2008):

The type of M&As activity, or how a company can make an M&A and under which exact way can an M&A activity be formed, is possible in three ways:

- *merger by absorption*, where the acquiring firm retains its name and its identity, and it acquires all of the assets and liabilities of the acquired company; after the merger the acquired firm ceases to exist as a separate business entity,
- *merger by consolidation*, where an entirely new firm is created; both the acquiring firm and the acquired firm terminate their previous legal existence and become part of the new firm, and
- *merger by acquisition*, where one firm purchase another firm’s stock for cash, or shares of stock, or other securities.

Furthermore, according to the correlation of the activities of merged companies, the study makes a distinction for M&As activities of three types:

- *horizontal merger*, where a company takes over another from the same industry and at the same stage of the production process,
- *vertical merger*, where the target is in the same industry as the acquirer, but operating at a different stage of the production chain, either nearer the source of materials (backward integration) or nearer to the final customer (forward integration),
- *conglomerate merger*, where the acquiring firm and the acquired firm are apparently unrelated to each other (Gaughan, 1996, Weston et al., 1996).

2.2. Categorization of Risk types

The term of “risk” in this study is perceived as a company’s exposure to uncertainty, in general, and includes many risk types. Every company faces

different risks, based on its business, economic, social and political factors, the features of the industry it operates in – like the degree of competition, the strengths and weaknesses of its competitors, availability of raw material, factors internal to the company like the competence and outlook of the management, state of industry relations, dependence on foreign markets for inputs, sales, or finances, capabilities of its staff, and other innumerable factors. A list of the most important categories of risks in detail is stated below (Eleftheriadis, 2006; Karagiorgos et al., 2007; 2008; Olsson, 2002):

- *Credit risk* is the risk that a counterparty may not pay amounts owed when they fall due.
- *Sovereign risk*, the credit risk associated with lending to the government itself or a party guaranteed by the government.
- *Business risk*, the risk of not being able to achieve the business targets due to inappropriate strategies, inadequate resources or changes in the economic or competitive environment.
- *Market risk* is the risk of loss due to changes in market prices. This includes, interest rate risk, foreign exchange risk, commodity price risk and, share price risk
- *Liquidity risk*, the risk that amounts due for payment cannot be paid due to a lack of available funds.
- *Operational risk*, the risk of loss due to actions on or by people, processes, infrastructure or technology or similar, which has an operational impact including fraudulent activities.
- *Accounting risk*, the risk that financial records do not accurately reflect the financial position of an company.
- *Country risk* is the risk that a foreign currency will not be available to allow payments due to be paid, because of a lack of foreign currency or the government rationing what is available.
- *Political risk* is the risk that there will be a change in the political framework of the country.
- *Industry risk* is the risk associated with operating in a particular industry.
- *Environmental risk*, the risk that an company may suffer loss as a result of environmental damage caused by themselves or others which impacts on their business.
- *Legal/regulatory risk* is the risk of non-compliance with legal or regulatory requirements.
- *Systemic risk* is the risk that a small event will produce unexpected consequences in local, regional or global systems not obviously connected with the source of the disturbance.

- *Reputational risk* is the risk that the reputation of an company will be adversely affected.

2.3 M&As activities and Risk level

From several past research papers on accounting and finance, there is a common belief that, although M&As served firstly as a way to react shareholders to inefficient management and provide an evolution of the mechanisms of corporate governance in the 1970s, their further development was limited in the 1990s, as they did not serve anymore the interests of shareholders properly (Jarrell et al., 1988; Jensen & Ruback, 1983; Jensen, 1993). In addition, acquisitions generally increase managerial compensation, including bonuses, even when shareholder wealth declines (Grinstein & Hribar, 2004). Similarly, managers might make acquisitions that increase risk without a sufficiently large increase in return because of the private benefits that flow from them (Furfin & Rosen, 2006). As a result, in the period from 2000 till now, changes and improvement of corporate governance has been made, and the rationalism in M&As activities prevails, expressing a new global aspect in corporate strategy, in accordance to corporate governance perceptions (Andrade et al., 2001).

In recent years, a few companies have demonstrated exceptional proficiency in assessing their target acquisitions - evaluating them as stand-alone organizations and then factoring in the value of any potential synergies between them and their new partners (Buffet, 1981). Unfortunately, most companies fail to identify the risks in integrating two organizations with very different management and operational processes. An acquired part must be cut away from its host and quickly reattached to the acquiring company's business processes as soon as possible. Many executives will pledge to remain available to assist with the process throughout the integration. But in a risk-driven process, the acquiring company knows that the value of the acquisition falls down if top managers leave. Of course, the acquirer could spend a lot of its risk mitigation efforts on training its own team to run the acquired firm. The job of mitigating risk will fall to management and require an action plan based on the potential impact of all risk scenarios. Success will depend on determining both the probability of a major risk occurring and the impact if it does.

Similar systems that have emerged mainly in US and the UK capital markets are characterized by freely competitive markets, transparency in corporate affairs and regulatory structure to protect investors from the incompetence or dishonesty of agents (Holmstrom & Kaplan, 2001). Complementary monitoring patterns, one professional and the other governmental, provide assurances

in the Anglo-American markets of the reliability and currency of corporate information. This leads to a reduction of accounting risk. However, the most compelling issue in the recent history of Anglo-American corporate governance is now not whether there should be regulatory regimes; it is whether these regimes come within the purview of professional or governmental agencies and what the boundaries of supervisory authority are.

The most important element of this procedure is the way that antitrust laws interacted with business activities in each merger wave. For example, if the antitrust policy no longer approved industry monopolies by no means and started to take apart forcibly companies that had a monopolistic character, it encouraged, simultaneously and in paradox, companies to form oligopolies, instead of monopolies. If the antitrust policy no longer approved industry oligopolies, they determined firms to make acquisitions to diversify, instead of oligopolies (McCann & Gilkey, 1988). It is clear that government policy formed new laws to control corporate restructuring, but the latter reacted in a different way and created once again circumstances for new law formations. Whatever one thinks of the changes each wave brought, the antitrust policy is, to a large extent, responsible for them, along with the formation of new legal risk circumstances.

Furthermore, it is clear that changes and improvement of corporate governance, which has been made in interaction with merger waves, result that the rationalism in M&As activities prevails, while, concerning government policy towards merger activities, the support of lax antitrust enforcement of the sort that is applied in recent years in developed capital markets (US & UK) is proposed as a much more beneficial and business risk reducing framework for business activities.

On the other hand, in many cases risk increases, although it is proposed that diversification should reduce risk. For example, risk increases when companies in maturing industries are rebalancing their portfolios, or selling off pieces of the business. The pieces being sold include processes or cultures that are difficult to integrate into the buyer's organization. Another example is cross-border transactions which are riskier than those within a single country because they have additional country risk. A merger that employs the right mix of professionals prior to signing an agreement will obtain a more thorough assessment of its financial, operational, management and legal risks. The managers of each initiative can formulate risk mitigation plans to lower the potential of each risk factor.

3. Research Design

3.1. Selection of methodology and related past researches

Several past research papers on accounting and finance argue that stock price performance studies are unable to determine whether conglomerate or non-conglomerate M&As create real economic gains or losses and to provide evidence on the sources of any merger-related economic result, as it is difficult to distinguish between stock-market inefficiencies and improvements in economic performance resulting from the merger (for a comprehensive review on this argument, see: Healy, et al., 1992). The examined increases or decreases in equity values are typically attributed to some unmeasured source of real economic factors (such as synergy) or to a general and not well established idea (as management past decisions).

However, this kind of research, along with their explanations, could partially not be correct, as many other factors influence stock prices and their conclusions do not provide clear and conclusive results argumentation. In this context, the use of post-merger accounting data and, especially, financial ratios from financial statements that have been examined for their credibility is a better and safer path to test directly for changes in operating performance that result from mergers than stock price studies (Pazarskis, 2008; Pramod Mantravadi & A. Vidyadhar Reddy, 2008).

Furthermore, several studies on success of conglomerate M&As, that were conducted in the past, concluded on ambiguous results. Many of them supported a successful M&As action with a risk reduction after a conglomerate mergers due to special gains as: risk reduction through diversification, reduced financing costs, increased administrative efficiencies, etc. (Mueller, 1977; Lewellen, 1971; and others), while others claimed that conglomerates are less likely to succeed because the risk exposure of the managers in their “new” industry is too high (Jensen, 1986; and others).

3.2. Variable classification and ratio selection

Hence, there is not a commonly accepted concrete set of financial ratios as a successful operating performance measure (Courtis, 1978; Bayldon et al., 1984). Despite the fact that the above issue (finding a perfect model to measure operating performance before and after M&As action) remains unanswered, the determination of a set of financial ratios that could cover and examine the whole activities of a firm is the more appropriate solution to this problem,

according to a suitable ratio classification. In this study, the financial ratios are organised into five general groups (for an analytical review classification, see: Niarhos, 2002; Pazarskis, 2008):

(i) Liquidity ratios: which measure the ability of a company to pay its debts in the short-term and to meet unexpected cash needs;

(ii) Activity ratios: which indicate the degree of assets' effective use;

(iii) Profitability ratios: which gauge a company's operating success over a given period of time;

(iv) Financial structure and viability ratios: which indicate a company's ability to meet long-term commitments on a continuing basis, and

(v) Investment ratios: which provide several information among the share price of a company and net worth over a given period, dividends, or others assets.

Within this framework, twenty six essential financial ratios are selected and classified in to these five basic groups, as it is shown in the Table 1 (see, Appendix).

In fact, there are many other approaches for business evaluation performance, different from the above. Return on investment (ROI) type of measures are considered as the most popular and the most frequently used when accounting variables are utilised to determine performance. However, in considering Kaplan's (1983) arguments against excessive use of ROI types of measurements, the above referred ratio selection of this study is confirmed as better, as: "...any single measurement will have myopic properties that will enable managers to increase their score on this measure without necessarily contributing to the long-run profits of the firm" (Kaplan, 1983, p. 699).

Thus, an adoption of additional and combined measures is believed to be necessary in order to provide a holistic view of the long-term profitability and performance of a firm, in accordance with the short-term one (Pazarskis, 2008).

3.3. Sample and data

The final uncontaminated sample consists of fifty acquiring firms, listed in the Athens Stock Exchange (ASE) that executed one M&As action as acquirers in Greece during the period from 1998 to 2002. Table 2 shows the percentage of listed firms involved in M&A activities by year and the Table 3 shows the percentage of our sample firms in each industry classification category, according to the ASE classification (see, Appendix). The M&As action of each

company from the sample is considered as an investment that is evaluated by the NPV criterion (if $NPV \geq 0$, the investment is accepted). Based on this viewpoint, the study proceeds to its analysis and regards the impact of an M&A action similar to the impact of any other positive NPV investment of the firm to its ratios in the long-term (Healy et al., 1992; Pazarskis, 2008).

For the purpose of the study, the sample of firms is sub-tracted in two different groups, which are: (i) firms that involved in one M&As activity as acquirers with firms from their industry (horizontal or vertical mergers), that consists 75% of the sample, and (ii) firms that involved in one M&As activity as acquirers, that consists 25% of the sample, but with firms from a different industry and were exposed in extended risk (conglomerate mergers).

The data of this study (accounting variables) are computed from the financial statements of the M&As-involved companies. Some other data, relevant to the share prices of the firms, were received from the databank of the Department of Finance and Accounting of the University of Macedonia (Greece), that were later used for the computation of some specific financial ratios. However, since a few cases of the sample firms have been de-listed from the ASE for various reasons (bankruptcy, not meeting the standards of the market, etc.), they were excluded from the sample only for the years that there was no data for them.

3.4. Research Hypotheses

The evaluation of the relative change of each examined financial ratio of the sample (ratios from V01 to V26) is an empirical problem. Therefore, the general form of the hypothesis that is examined for each financial ratio separately is the following:

H_{0i} : There is **no** significant difference of the financial ratio i in post-merger operating performance between conglomerate and non-conglomerate mergers.

H_{1i} : There is significant difference of the financial ratio i in post-merger operating performance between conglomerate and non-conglomerate mergers.

where, $i = \{V01, V02, \dots, V26\}$

The crucial research question that the research tries to investigate by

examining the above mentioned ratios is the following: Corporate performance in the post-merger period of conglomerate M&As is greater or not than this of the non-conglomerates.

In this context, the study, compares the differences in firms' post-merger operating performance among the two sub-samples for four years after the M&A announcements, in order to measure the changes in operating performance from the extended risk exposure (Sharma & Ho, 2002; Pramod Mantravadi & A. Vidyadhar Reddy, 2008).

Analytically, the selected financial ratios for each company of the sample over a four-year period after (year T+1, T+2, T+3, T+4) the M&As event are calculated, and the mean from the sum of each company ratio with a conglomerate merger for the years T+1, T+2, T+3, and T+4 is compared with the equivalent mean from the years T+1, T+2, T+3, and T+4 of a company with a non-conglomerate merger, respectively. The study applies a static determination of ratios, while the year of M&A event (Year 0) is omitted from the comparisons because it usually includes a number of events which influence firm results in this period (as one-time M&As transaction costs, necessary for the deal, etc.). To test these hypotheses we apply two independent sample meant-tests. The results are presented in the next section (Pazarskis, 2008).

4. Analysis of Results

The results from the evaluation of the relative change of each financial ratio of the sample (ratios from V01 to V26), according to the above referred hypothesis are depicted in Table 4 (see, Appendix). From these results, it is obvious that the analysis of the ratios after the M&As actions indicates the existence of special peculiarities to the underlying firms' operating performance.

Regarding the first category (liquidity ratios: variables from V01 to V04, namely: current ratio, acid test ratio, cash ratio, working capital), the only variable that is affected by the M&As event is the variable V03 (cash ratio), since it is statistically significant at the 0.05 level (P-Value=0,026**). It is concluded that there is an improvement of the variable V03 (cash ratio) for conglomerate mergers than non-conglomerates based on the 95% Confidence Interval (1,81; 27,54), that are positive numbers. Regarding these liquidity ratios after the merger, it can be concluded that the targets from M&As transactions were mainly firms that have high liquidity levels and with a lot of their funds in cash, or nearly in cash, and for this reason it observed this real improvement in the acquirer firm's liquidity even four years after the examined conglomerate merger.

The second category of ratios (activity ratios: variables from V05 to V11, namely: average receivables conversion period, average payables deferral period, average inventory conversion period, working capital turnover ratio, asset turnover ratio, fixed asset turnover ratio, owner's equity turnover ratio), present no significant change of any examined variable after the M&As transactions between conglomerate and non-conglomerate mergers.

Regarding the category of the profitability ratios (variables from V12 to V16, namely: gross profit margin, net profit margin (before taxes), net profit margin (after taxes), return on total assets - ROA (after taxes), return to owner's equity - ROE (after taxes)), there is an increase after the M&As transactions for conglomerate mergers than non-conglomerates significant for two variables: (a) Variable V13 (net profit margin (before taxes)), that it is statistically significant at the 0.05 level (P-Value=0,046**), with 95% Confidence Interval (0,3; 43,5), (b) Variable V14 (net profit margin (after taxes)), that it is statistically significant at the 0.1 level (P-Value=0,089*), with 95% Confidence Interval (-2,8; 39,1), and an increase after the M&As transactions for non-conglomerate mergers than conglomerates significant for one variable: Variable V15 (return on total assets - ROA (after taxes)), that it is statistically significant at the 0.01 level (P-Value=0,001***), with 95% Confidence Interval (-5,22; -1,377). These results are consistent merely with the results of some other past studies on success of conglomerate M&As as for the Variables 13 and 14 concluded that conglomerate mergers were more successful M&As action than non-conglomerates with a risk reduction after a conglomerate mergers due to special gains as: risk reduction through diversification, reduced financing costs, etc. (Mueller, 1977; Lewellen, 1971; and others). Also, these results are consistent merely with some other studies that claimed that non-conglomerates are more successful than conglomerates which are less likely to succeed because the risk exposure of the managers in their "new" industry is too high (Jensen, 1986; and others) as for indeed from the Variable 15. Furthermore, our results for the Greek market, since there is improvement at ratios: net profit margin (before taxes) and net profit margin (after taxes) for conglomerate mergers than non-conglomerates, support from this point of view the hypotheses of market power for conglomerate mergers (Lubatkin, 1983; 1987). According to this approach, market power that gained by the acquirer after the merger or the acquisition should increase the new firm's profit margins and therefore, its profitability.

The fourth category of ratios (financial structure and viability ratios: variables from V17 to V20, namely: ratio of owner's equity to total assets, ratio of owner's equity to total liabilities, ratio of owner's equity to fixed assets,) present one change, since the only ratio affected from the M&As event, is the

variable V20 (ratio of net liabilities, which is equivalent: “total liabilities” minus “cash & equivalents”), that it is statistically significant at the 0.01 level (P-Value=0,001***). From the 95% Confidence Interval (-110,61; -30,73), that are both negative numbers, it is concluded that there is a worsening of the variable V20 (ratio of net liabilities) for non-conglomerate mergers than conglomerates.

Last, the fifth category of ratios (investment ratios: variables from V21 to V26, namely: earnings per share (EPS), dividends per share (DPS), dividend yield on equity capital, book value per share, price to book value (P/BV), price earnings ratio (P/E)) shows a decrease for conglomerate mergers than non-conglomerates after the M&As transactions of the relative value of three variables: (a) Variable V21 (earnings per share), that it is statistically significant at the 0.01 level (P-Value=0,001***), with 95% Confidence Interval (-0,3194; -0,0821), (b) Variable V23 (dividend yield on equity capital), that it is statistically significant at the 0.1 level (P-Value=0,055*), with 95% Confidence Interval (-1,316; 0,014), and (c) Variable V24 (book value per share), that it is statistically significant at the 0.01 level (P-Value=0,002***), with 95% Confidence Interval (-1,738; -0,399). From the 95% Confidence Interval, with all negatives prices, it is concluded that the above variables are reduced for conglomerate mergers than non-conglomerates. Also, there is a decrease for non-conglomerate mergers than conglomerates after the M&As transactions of the relative value of two variables: (a) Variable V22 (dividends per share (DPS)), that it is statistically significant at the 0.1 level (P-Value=0,100*), with 95% Confidence Interval (-0,93; 10,34), and (b) Variable V26 (price earnings ratio (P/E)), that it is statistically significant at the 0.1 level (P-Value=0,058*), with 95% Confidence Interval (-2,1; 121,2). From the 95% Confidence Interval, with all positive prices, it is concluded that the above variables are reduced for non-conglomerate mergers than conglomerates.

5. Concluding remarks

One of the main elements of contemporary corporate restructuring is the formation of new business entities via M&As. This paper examines the impact of risk on the operating performance of a sample of firms that involved in conglomerate and non-conglomerate mergers and acquisitions (M&As). Risk in this study is perceived as a firm’s exposure to uncertainty, which can lead to changes in the operating performance of this firm. Developing or changing a firm its operating activities from a particular industry to another industry could affect its operating performance.

In order to evaluate this trend, using accounting variables (financial ratios), the post-merger performance of a sample of Greek firms, listed on the Athens Stock Exchange (ASE) that executed at least one merger or acquisition in the period from 1998 to 2002 as acquirers, is investigated. For the purpose of the study, the sample of firms is sub-tracted in two different groups, which are: (i) firms that involved in M&As activities as acquirers with firms from their industry (horizontal or vertical mergers) and (ii) firms that involved in M&As activities as acquirers but with firms from a different industry and were exposed in extended risk (conglomerate mergers).

Then, the study, applying an explanatory set of twenty-six financial ratios, compares the differences in firms' post-merger operating performance among the two sub-samples for four years after the M&A announcements, in order to measure the changes in operating performance from the extended risk exposure. The financial ratios in this study are organised into five main groups: (i) liquidity ratios, (ii) activity ratios, (iii) profitability ratios, (iv) financial structure and viability ratios, and (v) investment ratios.

The results revealed that conglomerate mergers are more successful than non-conglomerates concerning the category of liquidity ratios (in one variable: V03) and the category of financial structure and viability ratios (in one variable: V20).

Also, concerning the categories of profitability ratios and investment ratios, there is no clear evidence if conglomerate mergers are more successful or not than non-conglomerates, as it is observed ambiguous results.

Last, at the category of activity ratios, there is no relative change of any examined variable and that do not support partially neither conglomerate nor non-conglomerates mergers.

From the above results, it can be concluded that the targets at conglomerate mergers were mainly firms that have high liquidity levels and with a lot of their funds in cash, or nearly in cash, and for this reason it observed this real improvement in the acquirer firm's liquidity even four years after the examined conglomerate merger.

Furthermore, the research results for the Greek market, since there is improvement at ratios: net profit margin (before taxes) and net profit margin (after taxes) for conglomerate mergers than non-conglomerates, support from this point of view the hypotheses of market power for conglomerate mergers (Lubatkin, 1983; 1987). According to this approach, market power that gained by the acquirer after the merger or the acquisition should increase the new firm's profit margins and therefore, its profitability.

All-in-all, it is clear that the results from the analysis of the ratios from the

post-merger performance indicate the existence of special peculiarities to the underlying firms' operating performance, and the financial ratios indicate that financial ratios could not be used as the sole and exclusive criterion for the evaluation of the performance of conglomerate M&As, comparatively to non conglomerate M&As, as we observed ambiguous results.

Future extensions of this study could examine the effects of the type of the M&As transaction (conglomerate mergers and non-conglomerates) not only with ratios, but also with stock returns. Also, this study could be applied to a larger sample that could include not only M&As-involved Greek firms listed in the ASE, but also non-listed firms and within other time periods.

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Appendix

Table 1: Classification of financial ratios

Class	Code	Variable Name
Liquidity ratios	V01	Current ratio
	V02	Acid test ratio
	V03	Cash ratio
	V04	Working capital
Activity ratios	V05	Average receivables conversion period
	V06	Average payables deferral period
	V07	Average inventory conversion period
	V08	Working capital turnover ratio
	V09	Asset turnover ratio
	V10	Fixed asset turnover ratio
	V11	Owner's equity turnover ratio
Profitability ratios	V12	Gross profit margin
	V13	Net profit margin (before taxes)
	V14	Net profit margin (after taxes)
	V15	Return On total Assets - ROA (after taxes)
	V16	Return to Owner's Equity - ROE (after taxes)
Financial structure and viability ratios	V17	Ratio of owner's equity to total assets
	V18	Ratio of owner's equity to total liabilities
	V19	Ratio of owner's equity to fixed assets
	V20	Net liabilities (=Total liabilities-Cash & Equivalents)
Investment ratios	V21	Earnings per share - EPS
	V22	Dividends per share - DPS
	V23	Dividend yield on equity capital
	V24	Book value per share
	V25	Price to book value - P/BV
	V26	Price earnings ratio - P/E

Table 2: Percentage of sample's M&A event by year

Year	Percentage
2002	40,32%
2001	25,81%
2000	16,13%
1999	9,68%
1998	8,06%
Total	100,00%

Table 3: Percentage of the firms according to the A.S.E. category classification

Category	Percentage
Primary Sector	2,00%
Manufacturing	42,00%
Utilities	0,00%
Commerce	14,00%
Hotel - Restaurant Services	0,00%
Transport - Communication Services	6,00%
Financial Services	6,00%
I.T. - Real Estate - Rental - Commerce Services	14,00%
Health - Public Care Services	2,00%
General Services	0,00%
Constructions	12,00%
Transitory Category	2,00%
Total	100,00%

Table 4: Results of sample firms for a four-year-period

V14	Congl. merger	22,00	1,71	0,089*	(-2,8; 39,1)
	Non-congl.-merger	3,80			
V15	Congl. merger	1,22	-3,38	0,001***	(-5,22; -1,377)
	Non-congl.-merger	4,52			
V16	Congl. merger	-0,80	-1,58	0,115	(-21,01; 2,30)
	Non-congl.-merger	8,50			
V17	Congl. merger	34,80	0,75	0,451	(-5,06; 11,35)
	Non-congl.-merger	31,70			
V18	Congl. merger	1,54	-1,12	0,264	(-0,958; 0,264)
	Non-congl.-merger	1,89			
V19	Congl. merger	1,97	-1,56	0,121	(-3,70; 0,43)
	Non-congl.-merger	3,61			
V20	Congl. merger	57,15	-3,49	0,001***	(-110,61; -30,73)
	Non-congl.-merger	127,83			
V21	Congl. merger	0,121	-3,35	0,001***	(-0,3194; -0,0821)
	Non-congl.-merger	0,322			
V22	Congl. merger	5,40	1,67	0,100*	(-0,93; 10,34)
	Non-congl.-merger	0,66			
V23	Congl. merger	0,54	-1,93	0,055*	(-1,316; 0,014)
	Non-congl.-merger	1,19			
V24	Congl. merger	2,35	-3,15	0,002***	(-1,738; -0,399)
	Non-congl.-merger	3,42			
V25	Congl. merger	16,70	0,25	0,804	(-23,8; 30,6)
	Non-congl.-merger	13,00			
V26	Congl. merger	91	1,92	0,058*	(-2,1; 121,2)
	Non-congl.-merger	31,8			

Notes:

1. At variable V04 and V20, the amounts are in millions euro.

*** statistically significant at the 0.01 level,

** statistically significant at the 0.05 level,

* statistically significant at the 0.1 level.

STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS FOR BELGIUM

ANTONIOS ADAMOPOULOS*

Abstract

This study investigated the causal relationship between stock market development and economic growth for Belgium for the period 1965-2007 estimating a vector error correction model (VECM). The purpose of this study was to investigate the short-run and the long-run relationship between the examined variables applying the Johansen cointegration analysis based on panel unit root tests theory. The results of Granger causality tests indicated that there is unidirectional causal relationship between stock market development and economic growth for Belgium.

JEL classification: O11, C22

Keywords: stock market, economic growth, panel unit roots, Granger causality

1. Introduction

The relationship between economic growth and stock development has been an extensive subject of empirical research. The question is whether banks or stock markets proceed or follow economic growth unless there is a complementary relationship between them. Stock market contributes to the mobilization of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios providing an important source of investment capital at relatively low cost. A well functioning and liquid stock market that allows investors to diversify away unsystematic risk will increase the marginal productivity of capital Pagano (1993). Another important aspect through which stock market development may influence economic growth is risk diversification. Obstfeld (1994) suggests that international risk sharing through internationally integrated stock markets improves the allocation of resources and accelerates the process of economic growth.

The remainder of the paper proceeds as follows: Section 2 describes the

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specification of the model, develops the Johansen cointegration analysis, analyses the vector error correction models and presents Granger causality tests, while section 3 presents the empirical results. Finally, section 4 provides the conclusions of this paper.

2. Data and Methodology

2.1. Data analysis

In this study the method of vector autoregressive model (VAR) is adopted to estimate the relationship between economic growth and stock market development. Suppose that a general vector model can be estimated separately, regarding each variable as a dependent one with other independent variable respectively.

$$V = f(\text{SM}, \text{GDP}) \quad (1)$$

where

GDP = gross domestic product

SM = stock market index

Following the empirical studies of King and Levine (1993a), Adamopoulos (2010a) Vazakidis and Adamopoulos (2011a), the variable of economic growth (GDP) is measured by the rate of change of real GDP, while the stock market development is expressed by the stock market index. This measure has a basic advantage from any other monetary aggregate as a proxy for stock market development (Katsouli, 2003; Vazakidis, 2006, Adamopoulos, 2010b). The data that are used in this analysis are annual covering the period 1965-2007 for Belgium, regarding 2000 as a base year. All time series data are expressed in their levels and are obtained from International Stock Statistics, (International Monetary Fund, 2007).

2.2. Panel unit roots

Following the study of Christopoulos and Tsionas (2004), Levin, Lin, and Chu (2002) denoted as LL panel unit root tests consider the following basic ADF specification:

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + X'_{it} \delta + \varepsilon_{it}$$

where assume a common $\alpha = \rho - 1$ but allow the lag order for the difference

terms, p_i to vary across cross-sections. The null and alternative hypotheses for the tests may be written as: $H_0: a=0$ but $H_1: a<0$. In LL panel unit root test, the null hypothesis is the existence of a unit root, while under the alternative, there is no unit root. The LL test statistic is a t – statistic on ρ given by

$$t_\rho = \frac{(\hat{\rho}-1)\sqrt{\sum_{i=1}^N \sum_{t=1}^T \tilde{y}_{i,t-1}^2}}{s_e} \text{ where } \tilde{y}_{it} = y_{it} - \sum_{s=1}^T h(t,s)y_{is}, \tilde{u}_{it} = u_{it} - \sum_{s=1}^T h(t,s)u_{is}$$

$$h(t,s) = z_t' \left(\sum_{t=1}^T z_t z_t' \right) z_s, s_e^2 = (NT)^{-1} \sum_{i=1}^N \sum_{t=1}^T \tilde{u}_{it}^2, \text{ and } \hat{\rho} \text{ is the OLS estimate of } \rho.$$

If the time series (variables) are non-stationary in their levels, they can be integrated with integration of order 1, when their first differences are stationary.

Im, Pesaran and Shin (1997) denoted as IPS panel unit root tests respectively resulted to the same conclusion. In IPS panel unit root test, the null hypothesis is the existence of a unit root. The IPS statistic is based on averaging individual Dickey-Fuller unit root test (t_i) according to

$$t_{IPS} = \frac{\sqrt{N}(\bar{t} - E[t_i | \rho_i = 0])}{\sqrt{\text{var}[t_i | \rho_i = 0]}} \rightarrow N(0,1) \text{ where } \bar{t} = N^{-1} \sum_{i=1}^N t_i.$$

The moments of and are obtained by Monte Carlo simulation and are tabulated in IPS. Following the study of Kiran et al (2009) finds that IPS suffers a dramatic loss of power when individual trends are included, and the test is sensitive to the specification of deterministic trends. The Eviews 5.0 (2004) software package which is used to conduct the panel unit roots tests, reports the simulated critical values based on response surfaces. The results of panel unit roots tests (LLC and IPS) for each variable appear in Table 1.

2.4. Cointegration test

Since it has been determined that the variables under examination are integrated of order 1, and then the cointegration test is performed. The testing hypothesis is the null of non-cointegration against the alternative that is the existence of cointegration using the Johansen maximum likelihood procedure (Johansen and Juselius, 1990). Following the study of Chang and Caudill (2005), Johansen and Juselius (1990) propose two test statistics for testing the number of cointegrated vectors (or the rank of Π): the trace (λ_{trace}) and the maximum eigenvalue (λ_{max}) statistics

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^p \ln(1 - \hat{\lambda}_i) \quad (6)$$

$$\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \quad (7)$$

where $\hat{\lambda}_i$ = is the largest estimated value of i th characteristic root (eigenvalue) obtained from the estimated Π matrix, $r = 0, 1, 2, \dots, p-1$, and T is the number of usable observations. The λ_{trace} statistic tests the null hypothesis that the number of distinct characteristic roots is less than or equal to r , (where r is 0, 1, or 2,) against the general alternative. The λ_{max} statistic tests the null hypothesis that the number of r cointegrated vectors is r against the alternative of $(r+1)$ cointegrated vectors. Thus, the null hypothesis $r=0$ is tested against the alternative that $r=1$, $r=1$ against the alternative $r=2$ and so on.

It is well known that Johansen's cointegration tests are very sensitive to the choice of lag length. Firstly, a VAR model is fitted to the time series data in order to find an appropriate lag structure. The Schwarz Criterion (SC) (1978) and the likelihood ratio (LR) test are used to select the number of lags required in the cointegration test and suggested that the value $p=1$ is the appropriate specification for the order of VAR model for Belgium. Table 2 presents the results from the Johansen and Juselius cointegration test.

2.5. Vector error correction model

Since the variables included in the VAR model are found to be cointegrated, the next step is to specify and estimate a vector error correction model (VECM) including the error correction term to investigate dynamic behaviour of the model. Once the equilibrium conditions are imposed, the VEC model describes how the examined model is adjusting in each time period towards its long-run equilibrium state.

The dynamic specification of the model allows the deletion of the insignificant variables, while the error correction term is retained. The size of the error correction term indicates the speed of adjustment of any disequilibrium towards a long-run equilibrium state (Engle and Granger, 1987). The error-correction model with the computed t -values of the regression coefficients in parentheses is reported in Table 3. The final form of the vector error-correction model (VECM) was selected according to the *general to specific* methodology suggested by Hendry. The general form of the vector error correction model (VECM) is the following:

$$\Delta X_t = b_0 + \sum_1^n b_1 \Delta X_{t-1} + \sum_1^n b_2 \Delta Y_{1t-1} + \sum_1^n b_3 \Delta Y_{2t-1} + \sum_1^n b_4 Y_{3t-1} + \lambda EC_{t-1} + \varepsilon_t \quad (8)$$

where: Δ is the first difference operator, EC_{t-1} is the error correction term lagged one period, λ is the short-run coefficient of the error correction term ($-1 < \lambda < 0$), ε_t is the white noise term Chang (2002).

2.6. Granger causality tests

Granger causality is used for testing the long-run relationship between stock market development and economic growth. The Granger procedure is selected because it consists the more powerful and simpler way of testing causal relationship (Granger, 1986). The following bivariate model is estimated:

$$Y_t = a_{10} + \sum_{j=1}^k a_{1j} Y_{t-j} + \sum_{j=1}^k \beta_{1j} X_{t-j} + u_t \quad (9)$$

$$X_t = a_{20} + \sum_{j=1}^k a_{2j} X_{t-j} + \sum_{j=1}^k \beta_{2j} Y_{t-j} + u_t \quad (10)$$

where Y_t is the dependent and X_t is the explanatory variable and u_t is the white noise error term in Eq (9), while X_t is the dependent and Y_t is the explanatory variable in Eq (10). The hypotheses in this test may be formed as follows:

H_0 : X does not Granger cause Y, i.e.

$$\{\alpha_{11}, \alpha_{12}, \dots, \alpha_{1k}\} = 0, \text{ if } F_c < \text{critical value of F}$$

H_a : X does Granger cause Y, i.e.

$$\{\alpha_{11}, \alpha_{12}, \dots, \alpha_{1k}\} \neq 0, \text{ if } F_c > \text{critical value of F} \quad (11)$$

and H_0 : Y does not Granger cause X, i.e.

$$\{\beta_{21}, \beta_{22}, \dots, \beta_{2k}\} = 0, \text{ if } F_c < \text{critical value of F}$$

H_a : Y does Granger cause X, i.e.

$$\{\beta_{21}, \beta_{22}, \dots, \beta_{2k}\} \neq 0, \text{ if } F_c > \text{critical value of F} \quad (12)$$

(Katos, 2004, page 1043). In order to test the above hypotheses the usual Wald F-statistic test is utilised, which has the following form

$$F = \frac{(RSS_R - RSS_U) / q}{RSS_U / (T - 2q - 1)}$$

where: RSS_U = is the sum of squared residuals from the complete (unrestricted) equation

RSS_R = the sum of squared residuals from the equation under the assumption that a set of variables is redundant, when the restrictions are imposed, (restricted equation)

T = the sample size and q = is the lag length.

Examining this model the following cases can be distinguished

1. If $\{\alpha_{11}, \alpha_{12}, \dots, \alpha_{1k}\} \neq 0$ and $\{\beta_{21}, \beta_{22}, \dots, \beta_{2k}\} = 0$, there exists a unidirectional causality from X to Y, denoted as $X \rightarrow Y$
2. If $\{\alpha_{11}, \alpha_{12}, \dots, \alpha_{1k}\} = 0$ and $\{\beta_{21}, \beta_{22}, \dots, \beta_{2k}\} \neq 0$, there exists a unidirectional causality from Y to X, denoted as $Y \rightarrow X$
3. If $\{\alpha_{11}, \alpha_{12}, \dots, \alpha_{1k}\} \neq 0$ and $\{\beta_{21}, \beta_{22}, \dots, \beta_{2k}\} \neq 0$, there exists a bilateral causality between Y and X, denoted as $X \leftrightarrow Y$

The validity of the test depends on the order of the VAR model and on the stationarity or not of the variables. The results related to the existence of Granger causal relationships between stock market development and economic growth appear in Table 4.

3. Empirical results

Based on Levine and Zervos (1998) and Shan (2005) studies the model of stock market development is mainly characterized by the effect of economic growth. The significance of the empirical results is dependent on the variables under estimation. The LL unit root test results for both levels and first differences of economic growth and stock market development are reported in Table 1. The results of panel unit root tests (LL but not IPS) suggested that all variables can be characterized as stationary and integrated of order one, $I(1)$. So, these variables can be cointegrated as well, if there are one or more linear combinations among the variables that are stationary. IPS test suggested that stock market index (SM) is not stationary in first differences but in second differences, so is $I(2)$.

The process of estimating the cointegration vector is related with the assessment of eigenvalues, which are the following for Belgium: $\hat{\lambda}_1 = 0.39$, $\hat{\lambda}_2 = 0.09$. The critical values for the trace statistic defined by equation (6) are 11.22 for none vector, 3.96 for at most 1 at the significance level 5%, while critical values for the maximum eigenvalue test statistic defined by equation (7) are 12.32 for none vector, 4.12 for at most 1.

The number of statistically significant cointegration vectors for Belgium is equal to 1. It is obvious from the estimated cointegrated vector that economic

Table 1: Panel unit root tests

Country	Variables	Levels				Differences			
		LLCN	LLCC	LLCT	IPST	LLCN	LLCC	LLCT	IPST
Belgium	GDP	0.0212	0.0277	-0.0526	-1.2971	-0.0653	-0.4067	-0.6512	-4.2640
	SM	0.1099	0.0943	-0.1482	-2.2726	-0.3535	-1.1730	-1.9064	-5.6651*

Notes:

LLC is the Levin, Lin, and Chu t-test for unit root test in the model.

The critical values for LLC_N test are 3.6433 and -2.0668 without constant or trend in levels and first differences respectively.

The critical values for LLC_C test are 6.4966 and -3.1585 including only constant in levels and first differences respectively.

The critical values for LLC_T test are 0.5234 and -3.4493 including constant and trend in levels and first differences respectively, IPS is the Im, Pesaran and Shin test tests for unit root in the model. The critical values for IPS_T test are 0.6712 and -4.7649 including constant and trend in levels and first differences respectively.

* indicate that those values are not consistent with relative hypotheses at the 5% level of significance relatively.

IPS_T test shows that SM is not stationary in first differences but in second differences, so is I(2)

Table 2: Johansen and Juselius Cointegration Tests

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0,389685	24,20790	12,32090	0,0003
At most 1	0,092132	3,962922	4,129906	0,0552
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0,05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None*	0,389685	20,24498	11,22480	0,0010
At most 1	0,092132	3,962922	4,129906	0,0552
Trace and Max-eigenvalues tests indicates 1 cointegrating eqn(s) at the 0,05 level				

* denotes rejection of the hypothesis at the 0.05 level

** MacKinnon-Haug-Michelis (1999) p-values

growth has a positive effect on stock market development in the long-run. According to the signs of the vector cointegration components and based on the basis of economic theory the above relationship can be used as an error correction mechanism in a VAR model for Belgium respectively.

The results of the estimated vector error correction model suggested that a short-run increase of stock market index per 1% induces an increase of economic growth per 4% for Belgium. The estimated coefficient of EC_{t-1} is statistically significant and has a negative sign, which confirms that there is not any problem in the long-run equilibrium relation between the independent and dependent variables in 5% level of significance, but its relatively value (-0.021) for Belgium shows a satisfactory rate of convergence to the equilibrium state per period

From the above results the VAR model in which economic growth is examined as a dependent variable has obtained the best statistical estimates. In order to proceed to the Granger causality test the number of appropriate time lags was selected in accordance with the VAR model. According to Granger causality tests there is unidirectional causality between economic growth and stock market development with direction from economic growth to stock market development for Belgium.

5. Conclusions

This study examined the causal relationship between stock market development and economic growth estimating a multivariate vector error correction model for Belgium for the period 1965-2007. Initially, the results of panel unit root tests suggested that all variables can be characterized as stationary and cointegrated of order one, $I(1)$. Once a cointegrated relationship among relevant economic variables is established, the next issue is how these variables adjust in response to a random shock.

The error correction (EC) term, picks up the speed of adjustment of each variable in response to a deviation from the steady state equilibrium. The VEC specification forces the long-run behaviour of the endogenous variables to converge to their cointegrating relationships, while accommodates the short-run dynamics.

The dynamic specification of the model suggests deletion of the insignificant variables while the error correction term is retained. The results of Granger causality tests indicated that there is unidirectional causal relationship between stock market development and economic growth with direction from economic growth to stock market development.

Table 3: Vector Error Correction Model

Sample (adjusted): 1967 2007 Included observations: 41 after adjustments Standard errors in () & t-statistics in []		
Cointegrating Eq:	CointEq1	
SM(-1)	1.000000	
GDP(-1)	-1.312036 (0.13513) [-9.70960]	
Error Correction:	D(SM)	D(GDP)
CointEq1	-0.232683 (0.05096) [-4.56614]	-0.021029 (0.01172) [-1.79477]
D(SM(-1))	0.640285 (0.11210) [5.71190]	0.042776 (0.02577) [1.65965]
D(GDP(-1))	-1.933594 (0.58496) [-3.30552]	0.693172 (0.13450) [5.15378]
R-squared	0.556503	0.298610
F-statistic	23.84136	8.089060

Table 4: Pairwise Granger Causality Tests

Sample 1965-2007 Lags (2)			
Null Hypothesis:	Obs	F-Statistic	Probability
SM does not Granger Cause GDP	41	0,5430	0,5857
GDP does not Granger Cause SM		9,5049	0,0005

Many empirical studies examining the relationship between stock market development and economic growth differ relatively to the sample period, the examined countries, the measures of financial development and the estimation method. The results of this paper are agreed with the studies of Vazakidis, 2006, Vazakidis and Adamopoulos (2011a). However, more interest should be focused on the comparative analysis of empirical results for the rest of European Union members-states in future research.

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ECONOMICS IN SECONDARY EDUCATION: A CASE STUDY IN GREECE

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Abstract

The current project evaluates an interdisciplinary approach to teaching economic theory through literature, in the context of Greek secondary education (Senior High School). The research uses the timeless modern Greek novel *Honour and Money* from Konstantinos Theotokis, in teaching the lesson “Principles of Economic Theory” in the 3rd year of senior high school. The main research aim is to investigate the extent to which literature can contribute to the improvement of teaching and student learning.

JEL classification: I29, Z1

Keywords: interdisciplinary, action research, critical thought, literature and teaching economic theory, effective teaching and learning

1. Introduction

Throughout the last decades a radical transformation in the scientific observation of phenomena has occurred. The scientific perception, in which the independence and specialization of science can be a safe vehicle to acquire knowledge and truth, is insufficient. The complex nature of the phenomena as well as the increasing interaction makes the amalgamation of different scientific disciplines essential. The complementary sciences are necessary prerequisites not only for the advance of science but also for interpreting the world (Kastberg P., and Nielsen A.E., 2004).

The particular scientific approach to knowledge is quite relevant especially to the area of teaching. The interdisciplinary junctions usually commence on the level of scientific research and then expand to the education sector (Matsagouras I., 2004) Moreover, the subject of epistemology and teaching overlap to a great extent since both disciplines examine the way in which knowledge

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is constructed and adapted. The organization of teaching knowledge as well as the teaching access to the syllabus at school using interdisciplinary criteria may reveal the unity of natural and social reality aiding students realize the word as an entirety (Jacobs H.H., 1989).

2. Research issues

The concept of interdisciplinary disciplines has unfortunately not been applied in the Greek education system. The current research constitutes the first research effort in secondary education in Greece for teaching economics in a disciplinary manner in senior high school. The Economics discipline, due to its potential and its influence on every aspect of everyday life, is offered for interdisciplinary junctions with other scientific disciplines such as psychology, computer science, sociology, history, literature and others.

The current research allows for the junction of the teaching of economic science with literature in the context of senior high school in Greece. The research utilizes the timeless modern Greek novel "*Honour and Money*" from Konstantinos Theotokis when teaching the subject "Principles of Economic Theory", in the final year of Senior High School, in order to ascertain on a research level, the benefits, the difficulties, the weaknesses and the effectiveness in teaching and learning the particular subject. Below is a brief summary of the novel "*Honour and Money*" from Konstantinos Theotokis.

Honour and Money is a literature work that was written by Konstantinos Theotokis just before the Balkan War (1916 - 1918) and was first published in sequels in the reputable literature journal *Noumas* from August until December of 1912. It was published in its entirety in 1914 from the "Company of Nine" with illustrations from Markos Zavitsianos. The novel has been a monumental work for modern Greek literature, attracting the attention of both readers and researchers (Papavasiliou - Haralabaki I., 2006).

The plot unfolds in Mantouki, a coastal suburb of Corfu. A young man, named Andreas Xis, who comes from a well-off family is now financially broke, so he commences on trading sugar illegally in order to repay his debts, which were inherited by his father. One morning, as police was chasing him, he asks siora- Epistimi to hide the product in her home so as to avoid being apprehended. The woman hides the products in her basement. One of the following days, Andreas comes back to get his product, but siora- Epistimi requires part of his profit for the help she has offered. During the trade, Andreas falls in love with her beautiful daughter Rini, and pure romance unfolds between the two.

Andreas wished to marry Rini, but siora - Epistimi refuses to give six

hundred talara as marriage portion, a sum that would help Andreas pay out the debt for his home. So, the romance seems to fail as Andreas' uncle acts as a matchmaker with a rich bride, Savaina's daughter that Andreas rejects. When Andreas finds out that Rini is prepared to get married to somebody else, he returns and convinces her to follow him to his home. Siora - Epistimi argues with Andreas, but he responds to her, with lots of love, that he will marry her daughter without any marriage portion. However, the couple does not get married for the next few months as Andreas' business underperforms. The political party that allowed Andreas to trade sugar illegally, goes out of power, so Andreas and Rini's relationship is put to the test as financial problems put pressure to Andreas. Siora - Epistimi later sees Andreas' uncle Spyros who requires one thousand talara as marriage portion. However, she insists that she can only give him three hundred which is the amount that is appropriate for Rini, so as not to injure the other siblings. When Andreas hears about the response, he decides to work so as to pay out his house that is up for closeout. He abandons Rini, who he blames for his degradation and travels with commercial vessels in order to gain some money.

Rini is now alone, abandoned and pregnant but finds the willpower to go on with her life, and decided to work. However, she still loves Andreas and hopes he returns soon. Days go by but Andreas still does not return home. Siora - Epistimi finds her poor daughter and tells her that she decided to give the required marriage portion to Andreas for the wedding. The next morning she goes to the fish market where Andreas sells fish to tell him what she decided. Andreas rejects her offer, but she feeling almost insane hurts Andreas with her knife. While the police arrest siora - Epistimi, she throws a key to a chest of drawers to Andreas, mentioning that this is the location where the money is kept, and that he should take the marriage portion and marry Rini.

Despite being injured Andreas rushed full of joy to Rini to announce the great news. Nonetheless, she refuses to marry him exclaiming that she migrate so that she can provide for her child. The story comes to an end with the phrase "Money is damned", a phrase which shows the devastating role of money (Theotokis K., 1993).

3. Literature review

On an international level, the use of literature in economics education is not something new. Since 1970, the US education system when trying to upgrade the study programs of Social Science has restructured such programs by introducing analytical cross disciplinary curriculum such as the *Our Working World*

project (Senesh L., 1964) of Economics and literature (Rodgers Y.V, Hawthorne S. and Wheeler R.C., 2007). Although such venture target primary education students, it broaden the horizons towards an interdisciplinary approach of teaching Economic in all education levels.

There have been seventy different literature works from all over the world, which have reference to economics, and implied their use as teaching tools in secondary and higher education, making teaching of economics more interesting and effective (Watts M. and Smith R.F., 1989). The novels *Hard Times* by Charles Dickens, *Robinson Crusoe* by Daniel Defoe as well as the timeless classic *The Merchant of Venice* by William Shakespeare are classic examples. In particular, the last novel is a rather interesting one providing the ability to learners to perceive issues studied by Economic science in a different way (Kish - Goodling D.M., 1998).

A central role, among literature texts which can be used in teaching Economics is the Frank Baum's novel "*The Wizard of Oz*" (Watts M., 2002). An allegorical explanation of the text has also been attempted in order to reveal the political, economic and social condition of the time (Littlefield H.M., 1964). Similar studies followed one of which claimed that the particular literature text allows to be used not only for a useful pedagogical tool for teaching monetary theory and the elements of usury, but it also aids to associate our times with the times that this literature text was written (Rockoff H., 1990). The above studies have also been supported further as well as the use of literature in teaching Economic science (Hansen B., 2002).

With regards to Greek bibliography, the only remarkable attempt to join literature with teaching Economics science has been made from Margaritis Samaras (2004) with "*Narrative of Economics*" in which the author through the use of literature texts that are included in the curriculum of primary and secondary education, tries to narrate the issues and concepts surrounding the Economy so as to instill an awareness of Economics. Nonetheless, no particular research attempt has been made in Greek secondary education, to approach the Economics science through literature.

It is also worth mentioning that the use of literature in teaching economics in secondary education has been appreciated in an indirect way not only by the authors of the *Principles of Economy* for the 1st year of Senior high school but also by the authors of the *Principles of Economic Theory* for the 3rd year of senior high school. However, this approach is just a theoretical reference in two distinct parts of the school textbook without any educational orientation. In particular, in the 1st year textbook *Principles of Economy* (Dedousopoulos A. et al 2006) in the chapter "The economy system in crisis", a reference to

the novel *Oliver Twist* by Charles Dickens is made, in order to comprehend the notion of destitution and pauperization. Similarly, in the 3rd year textbook *Principles of Economic Theory* (Lianos T. Papavasiliou A. and Xajandreou A., 1999), in the chapter “Basic Economic Concepts”, in order for students to be acquainted to the four basic economic problems, which, constitute the subject of study for Economics science, reference is being made to the classic example of Robinson Crusoe, who organizes the new society in the island where he disembarks following his “shipwreck”, and he lays the economic foundations and principles of its operation being the embodiment of *homo economicus*.

The challenge for this particular research and for the Greek education system is to conjoin through teaching in an interdisciplinary manner the literature texts of senior high school to the teaching of the subject *Principles of Economic Theory* with main aim the full-scale education of senior high school students.

4. Research methodology

A central theme of the research questions and of the aim of the current research is the investigation of the attitudes, perceptions and views of the students of the 3rd year of senior high school with regards to the teaching of the subject “Principles of Economic Theory” through literature.

The choice of research framework for the collection of data is closely linked to the research aim and objectives (Bird M et al 1999; Faulkner P. et al 1999). The research approach that has been deemed as appropriate for achieving the research aim is a qualitative one, as it allows for an in-depth analysis and interpretation of views and attitudes and intends to understand processes through analytical induction (Bird M et al, 1999). Moreover, as suppleness is one of its main characteristics, it can provide the researcher with the whole spectrum of answers and the potential for revealing some visible issues or some factors that are not anticipated (Faulkner P. et al, 1999). This approach has been chosen as it relies on open and free communication and presupposes some kind of relation among the researcher and the subject of study. In addition, as data gathering technique it can approach the issues in- depth and use experiences and sensitive type of data.

The qualitative research includes the gathering of facts that represent the experience, the feelings and the perceptions of people that participate in the research process (Verma G.K. and Mallick K., 1998). The qualitative research can offer a better understanding and a thorough examination of the education reality as part of the society, making the various ties that connect them

more distinct. The aim of the researcher in a qualitative approach is to capture the sense, the meaning and the way that they are perceived from the people that participate in a process (Mason J., 2003). The researchers of a qualitative investigation aim to discover the breadth as well as the depth of the views that relate to the investigated subject. The “theoretical description” that is produced based on the qualitative method, is in essence a “full account” that usually aims to the formation of an idea that will enlighten the investigated aspects of a problem that, which are identified in the views of the educators on how adult learners learn and on the perceptions about the role. The qualitative approach identifies with the view that interest is focused on the discovery of all these knowledge that could derive by a sum of data and information (Bird M. et al 1999).

The presentation of the qualitative data that has been produced will commence as follows:

1. Formulation of research questions.
2. Description of the research approach and theme, as well as the research instruments.
3. Description of the sample that was employed for the research.
4. Presentation of the research process and results based on the research questions.

Research Questions

The introduction of the interdisciplinary notion in the Greek secondary education system and in teaching economics in senior high school in particular, may reveal new perceptions and problems of the economic concepts, which may in turn bring a new dimension into the teaching subject in senior high school and in the so far linear approach that occurs only through the school textbook. It is important to investigate whether attempt has the potential to positively predispose students with regards to their active participation in class, and also make them capable to distinguish the correlation and relationships that rule the various disciplines, with the aim of developing a general view of encountering economical concepts.

The current education research aims to enlighten the aspects of the issues mentioned above. In particular, the research questions that will be investigated touch on whether the interdisciplinary approach of teaching the subject “Principles of Economic Theory”, through the novel “*Honour and Money*” written by Konstantinos Theotokis,:

- a) contributes to the motivation of interest and active participation of learners in teaching the subjects creating powerful motives for learning and
- b) helps the students interpret the economic concepts in relation to the societal forces and the economic interests that define them.

Methodology approach to issue - Methodology of Interdisciplinary approach

It is common knowledge that literature includes all these characteristics which enable it to aid in any subject of study, as it constitutes an effective vehicle that for covering the gaps of science and highlight any significant elements. As for the use of literary texts into teaching economic science, it is evident that Senior High School readers are full of important elements for economics.

The reason for choosing literature and a social novel in particular, for the application of an interdisciplinary approach to the subject ‘Principles of Economic Theory’ is that the particular text, by Theotokis entails many economic terms and concepts. At the same time, through text- centered theories that have been formulated in order to study social novels, a useful methodological instrument is offered so as to better analyze an examine economic concepts.

Furthermore, the interdisciplinary study of economics through literature is facilitated by Greek literature that depicts the individual or social lifestyle of the Greeks in the 1950s and it reproduces the financial conditions that exist while depicting the economic activities of the main characters who strive to survive in order to aid the development of the plot. Therefore, the study of the economic conditions and activities that exist in the Greek society of the 1900s as depicted in the literary texts, is not at all random.

Taking as a departure point the text- centered literature theories, which support the interpretation of the social and economic elements during the development of the plot, we can approach critically and in-depth the economic concepts that emerge from Theotokis’ novel ‘Honour and Money”, in order to empirically facilitate the coexistence of these two disciplines and use it in teaching the subject “Principles of Economic Theory” in Senior High School.

Research Instruments

The research instruments that have been used in the current research are the observation and the questionnaire. The use of the observation as a data gathering method, is an appropriate choice in order to study in- depth the information that is required. Above and beyond in the heart of every case study lies the

observation method (Cohen L. and Manion L., 1994). Through the observation we have explored the teaching practice by recording the derived findings in research logs. Moreover, we have also managed to make use of the feedback that followed in order to adjust, adapt, redefine and improve teaching. The observation criteria that were set refer to the interaction of the students in the lesson, the education material, the teacher and the interaction of the students among themselves.

After the completion of the teaching practice, the students were asked to fill in a questionnaire. The main justification for employing a questionnaire lies in the immediate depiction of experiences, views and attitudes of students towards the interdisciplinary teaching of the subject and its evaluation of whether it has been effective or not.

Case Study

In the current research, the social novel from Konstantinos Theotokis *Honour and Money* that is included in the reader of the second year of Senior High School has been chosen in order to test its use and effectiveness for improving the teaching process.

The case study approach has offered the research potential to investigate in-depth the chosen subject, since it offers a varied spectrum of techniques that can be used in gathering and analyzing data (Stake R.E., 1995), and alongside action research has allowed to investigate the research questions.

It is worth mentioning that although the case study approach has received rigorous criticism in not being able to generalize individual phenomena, the case study approach can be judged by the degree of functions, their suitability and sufficiency for the one who teaches under similar conditions. (Bassey M., 1981).

Action Research

The application of the interdisciplinary approach as well as its effectiveness in teaching and learning the subject ‘Principles of Economic Theory’, is pursued in the current research. The research method that can successfully combine both of the above objectives is the action research.

The action research is a small- scale intervention in the function of the real world, and an observation of the effects that such intervention may have (Cohen L. and Manion L., 1994). The main feature that distinguishes such research method is the immediacy of involvement from the researcher in the

research process (Bell J., 1999). Therefore, action research is a systematically expanding live teaching method that is based on a dialectical relationship between action and research, so its breadth is quite immense. Applications of action research can be found in varying sectors such as the public sector, the industry, management administration, education and others (Cohen L. and Manion L., 1994).

As for the education sector, the aim of such intervention is the improvement of the quality of teaching and learning as well as the conditions in which students and teachers operate (Altrichter H. Posch P. and Somekh B., 2007). Similar applications of action research have revealed that the teachers who also act as researchers can significantly contribute to the educational research (Altrichter H, Posch P. & Somekh B., 2007). The teachers' free will and the challenging of their current teaching practice in order to seek solutions and improvements are all necessary prerequisites.

It is important to clarify that the findings that are produced from such research cannot be generalized and are mainly limited to the context that is used for the research. Furthermore, every case of action research is different and has a specific orientation in terms of goal setting and implementation.

The Questionnaire

For triangulation, validity and reliability reasons, it has been deemed as essential to gather data using additional sources, apart from the direct observation, but the same respondents that are the students. The questionnaire has been the most suitable research tool that allows the students to record their views, their preferences and their experiences in order to form a comprehensive portrayal of the new teaching approach. The questions of the questionnaire were directly related to the research questions and were open-ended, closed and scale (the form and content of the questionnaire is included in the appendix).

As for the first research question, the questions concerned the students' views on whether the lesson was interesting or not, and on whether the new teaching method has instilled additional motives for participating in class.

In point of the second research question, the questions aimed to investigate students' attitudes and views on whether the use of the novel has helped them to fully comprehend the economic concepts, which they were taught, enabling them to interpret the economic concepts through the social forces and the financial interests that define them.

All in all, the seven questionnaire questions were based on the relating literature which has assisted in defining the two main research axes. These

research axes correspond to the research questions that have been formulated. The questions that were employed were mainly open-ended in order to draw elements from the experience that the students had. There are also some closed-type questions that have been used as they do contribute to the reliability of the questionnaire.

Research Sample

A prerequisite for research design is the definition of the research population that research is going to be focused on (Cohen L. and Manion L., 1994). The population consists of all the people who may constitute a specific category (Faulkner P. et al 1999, 29). Such population can be significantly limited by the special conditions under which the research is undertaken. Such conditions are the resources- time and money that are available as well as the researcher's skills (Bird M. et al 1999; Cohen L. and Manion L., 1994). As the context of the current research lacks resources and the access to population is rather limited, the data gathering process has been reduced to a smaller population group, which is the sample (Faulkner et al 1999). The sampling method that was followed was the 'convenient' one (Cohen and Manion, 1994) also known as the method of the available sample or the 'opportunity and available sample' (Bird M. et al 1999). The 'convenient' or 'available' sample consisted of 14 students to whom the researchers had access capability. It is a 'non probability' sample in which the choice possibility of every case is unknown (Bird M. et al 1999; Cohen L. and Manion L., 1994). The sample has not been originated by any random sampling technique, so the representativeness can not be determined.

The particular sample is suitable for small scale research, such as the current one, as despite the drawbacks that arise from the fact that it is not representative, it is less complicated in compiling, much less time consuming and costly, and sufficient in the degree that there is not intention to generalize the research findings beyond the particular sample (Cohen L. and Manion L., 1994).

As it was not a probability sample, no statistical theory could be applied in order to calculate the size that is necessary to make it representative (Bird M. et al, 1999). The sample that consisted of 14 respondents is considered as sufficient for a qualitative research that always requires a smaller number of cases comparing to a quantitative research project (Bird M. et al, 1999).

The research process was undertaken in the context of the classroom of Senior High School. For ethical reasons we have maintained the anonymity of

the students and school. The research was undertaken in a Senior High School in Ipiros, during the second semester of the 2010 - 2011 school year (January-May). As it has been mentioned above, the sample consists of fourteen students from secondary education (3rd year of Senior High School), aged between 16 and 17 years old. The school is located in an inaccessible mountainous area, inhabited by people whose main job is agriculture, cattle - breeding, and their standard of living is rather low having limited access to cultural stimuli. The research has lasted for four weeks and was executed during the school program offering 8 hours of teaching daily.

5. Research process

The teacher's main priority before the start of the education research was the briefing of the students about the new way of teaching of the subject 'Principles of Economic Theory' that was to be followed in the next few hours and the context in which the teaching will be followed. The enthusiastic acceptance from the students sparked the start of the research. Before the projection of the movie, the teacher handed out the summary of the novel to the students so that they can have a holistic view of the development of the novel's plot.

The research began with the projection of the movie *The Price of Love* directed by Tonia Marketaki (1984), which is a movie adaptation of the Theotokis' novel. The initial aim of the movie was to reinforce the psychological and emotional rush of the students which was achieved as students watched closely the plot of the movie. After the end of the movie there was an open discussion where all students expressed positive remarks about the movie and made observations about points that referred to economic issues.

The first teaching hour was devoted to the concept of work. Based on an extract in which some of the characters exercise daily work, the teacher with the students formulated the definition of work. Even though, students did not manage to accurately define work, by complementing on each other's views they found some of its characteristics defining in this way the concept of work.

Within the next two teaching hours, the teacher suggested that the students should investigate the work relationships, as formed in the production system, which works according to the market laws. *Honour and Money* is a social novel that refers to Greece in the 1905 to 1915 era, with a rather sociological challenge and timeless character, which allows us to know the deep socio-economic and production system structures of the time.

In particular, the teacher handed out some information sheets that briefly

depict the basic characteristics of society, as described in the novel, such as the distinction between classes (working and middle-class). After, the teacher gave the students some time to study the text there was a discussion with the students about the role that each class takes on and the relationships that develop between them.

During the discussion, some students did not participate enough, while others formed strong opinion based on the content and plot of the novel, and significantly helped the development of the lesson. In particular some student views are: “The middle class exploits the working class, in the production system”, “the workers organize themselves in trade unions so as to safeguard their working rights”.

With the aim of motivating students and enriching the discussion, in the next teaching hour the teacher focused with the students on an extract where there is a dialogue between two characters of the novel. This dialogue is rather interesting due to the ambiguous meaning of its content, as the novel characters have rather opposing views in the topic of working relations. This dialogue has allowed to exchange and challenge views as well as to examine and analyze further the structures of the production system and the social organization of the production process.

After the initial discussion the classroom was organised in a Π shape, that facilitates communication and interaction, and the teacher tried with questions to initiate dialogue in order to enlighten any unknown aspects of the particular. Even though all students were initially eager to participate in the discussion, such participation was gradually diminished. Furthermore, even the students that actively participated in the discussion, making remarkable comments, displayed some difficulty in exchanging views and effectively interact. Thus, it was evident that there had to be additional ways to ensure the constant participation of all the students and the conditions had to be appropriate for a dialectical teaching process. This could be achieved if the students worked in teams in the context of such complicated process. This project entailed as a central axis of the investigation, the relationships (rights and duties) that develop between an employer and employee in the context of the business that operated according to the free market and competition rules. For this reason, the teacher separated the class into two groups of seven students, the first approaching the issue using the employer’s lenses while the other group used the employees’ lenses. It should be noted that throughout the whole duration of the project, the teacher actively participated in the students’ discussion, sharing and appreciating both groups’ views as an equal member.

The teacher’s main priority was to nurture a sense of trust and initiative

among the students, stressing the value and importance that the participation of each one of them has for the benefit and effectiveness of the team.

During the next teaching hour, the teacher distributed a hand out to the first team that related to the concept, the features and the objectives of a business, in order to offer some additional information for them to consider, while he would work with the second team. The students in the second team, who had to examine the rights and the duties of the employees of a business, seemed to adapt quickly to working as a team and were willing to cooperate something that aided discussion and free exchange of ideas. Moreover, with the right cues provided by the teacher when needed, the students did gradually form some useful rationing that led to the definition of the employees' rights and duties. The teacher encouraged the students to further examine the issue and asked from the students of the first group to inform him about the progress of their work. The students' views were in the right direction and team seemed to develop coherence and homogeneity. The teacher also worked with the first team in the same manner as with the second, and when the issue was exhausted the two teams sat together to discuss and interact with the intention of synthesizing their work to complete the project.

For the next hour, the teacher used role playing between the two teams as the students pretended to be employers and employees. With the intention of setting a common ground for the discussion, some hypothetical problems were posed. Some of such problems were the following: "How would you handle your relationship with employees that are organized in order to contest for a pay rise?", "What would your reaction be towards the management trying to extend your hours of employment?". Through such challenging situations both sides were asked to rationally negotiate with their counterparts, based on what was already mentioned about rights and obligations in order to effectively deal with the above problematic situations. Students from both teams successfully rose to this challenge and seemed to be enjoy such process. In addition, it is rather positive that through dialogue, some rather interesting views were mentioned by both sides.

The separation of the students in groups for the purposes of the project was the initial point of departure for implementing dialectical teaching through which students could challenge views, contemplate and exchange views (Brinia V., 2006a). The fact that students adapted and started taking on initiative as members of their teams, assured the teacher that he could work following the same method but with one group instead of two.

Within the next teaching hour the teacher attempted to predispose students to perceive the class as a team, which has all the team features such as a

common communication code and common objectives. Afterwards, based on an extract, from the literary text of Theotokis, which strongly criticizes the working conditions in the production units of the time, the teacher intends to instigate a discussion with the students about the respect for the personality and dignity of the worker by the employer in the workplace. It is worth mentioning that there was wide participation by the students in class. The students interacted with each other, exchanging and defending their views with strong arguments. In particular, some notable remarks were: “I would not pay any attention to someone who does not respect me in the workplace, I know who I am and I would not be bothered”, “I would be deeply affected if I was not given the right amount of respect, I would feel inferior”, “Such a situation would put pressure on me, physical and mental tiredness, and a feeling of alienation”, “I would definitely feel that I am unfairly treated”.

As the new teaching method was concluded, in the eighth teaching hour the students were given the questionnaires that they filled and handed to the teacher. The teacher thanked the students for their participation and promised to undertake a similar project in the near future.

6. Research process results

The results of the research process entail the data that was produced by the observation calendar that was kept by the teacher, and by the questionnaire that was filled by the students at the end of the research process.

Observation calendar results

The observation was the initial research instrument that was used by the teacher in order to gather insightful data. At the end of every lesson the teacher recorded his observations and the students’ feedback, his reactions and speculations and thoughts for improving teaching, as mentioned by the students regarding the teaching process.

As for the first research question that investigates whether the interdisciplinary approach of teaching the subject ‘Principles of Economic Theory’ through the novel *Honour and Money*, can contribute to instigating students’ interest and participation creating learning motives, it is safe to say that such teaching approach has created a positive mood and attracted their interest for the subject. The students’ interest was mainly infused by the projection of the movie *The Price of Love*, which was left a positive sensation to the totality of students. The use of the novel and the use of unchanged extracts, which offer

lively representations of situations and everyday life conditions, has aided the students' active participation in class. In particular, half of the students did participate actively during the teaching process, expressing freely their opinion and significantly helping the lesson with their comments and remarks. The rest of the students, adjusted to the lesson requirements taking up an active role, even though they were hesitant in participating and expressing their views. An enabling role for the total participation of students was the grouping of the students and the formation of an appropriate climate that encourage the free exchange of views assisting students in feeling comfortably and expressing freely.

The second research question inquired whether the interdisciplinary approach to teaching 'Principles of Economic Theory' through the novel *Honour and Money* can help students interpret the economic concepts through the societal forces and financial interests that define them. In that respect all the students have made significant progress towards this direction. The interpretation of the economic concepts through the societal view of Theotokis, as articulated in his novel as well as the societal view of the novel, have been utilized for the particular subject. Moreover, an analysis of the production system has been undertaken illustrating the tight ties that link the economic phenomena with society's structures and the economic interests that exist in a society.

The increasing interaction among students has contributed to the above effort as it commenced with the group work and was continued with the role-playing and the dialogue that took a central role in the lesson. This process allowed the students to question important issues and to seek for answers helping each other. In particular, the good students did help the supposedly bad students express themselves without hesitation to form a view about the studied subjects, resulting in an interesting and comprehensible lesson.

Questionnaire results

The questionnaire was the second research instrument that was used for gathering data derived by the students. The first two questions of the questionnaire investigated the students' views and experiences regarding the first research question. On the same note, questions three and four are linked to the second research question. The fifth research question has some reference to the first two research questions, while questions six and seven aimed at depicting the students' beliefs about the weaknesses and benefits that were obtained by the teaching. The results that came to light from the data processing are presented below:

Question one: The totality of the students uttered that the lesson was interesting and believe that teaching based on the interdisciplinary approach has created motives for active participation in class. Some typical students' answers, as to what contributed to the creation of motives for active participation in teaching, are the following.

"The teaching approach motivated me to participate in the lesson, as the climate was friendlier, and I did not perceive the lesson as something compulsory but as a pleasant experience". "The particular literary text presents events and situations that we may also see today". Another responded added "I liked the way of teaching as it made participate actively in the learning process". Finally, an additional remark exclaimed "We had more dialogue than before, and the way in which we formed groups made the lesson more interesting".

Question two: Ten students responded that the use of the novel facilitated their participation in class, while four of the respondents mentioned the real-life examples, which were included in the novel, as the main reason for participating in class.

Question three: Five of the respondents cited that the use of the novel, especially the unchanged extracts aided their understanding of the basic features of economic terms to a great extend, while four respondents mentioned that the novel aid their understanding to a satisfactory level.

Question four: All of the students responded that the interdisciplinary teaching approach aids them in understanding the socio- economic relations that are developed in the society context and their interaction. As for the second part of the question, eight students cited that they would have the ability in analyzing and interpreting the economic phenomena and terms in a similar way, while six students uttered that they have not yet gained such ability.

Question five: All students agreed that team work contributed the most so that the lesson becomes more effective. In particular some of the students' answers on ways that team work has helped are mentioned below.

"Team work has helped significantly in the effectiveness of the lesson because we have come closer to our classmates, we have cooperated with each other, we have expressed our views without criticizing one another and we have come a long way from the traditional way of teaching". A supposedly *weak student* mentioned "the fact that we worked as a team, helped me a lot, as through others' opinions I formed my own, and understood better quite a few things". On a similar note, another respondent said "It helped me a lot, as all came close to our teacher and I cooperated with my classmates". Finally, two more statements were "The lesson became more interesting and through

such process I understood more things”, “I was helped a lot as I was given the chance to actively participate in class”.

Question six: Ten students stated that there is not a thing that should be improved and changed in the teaching approach and in the actions of the teacher. On the other hand, four of the students suggested that they should also visit the computer to take advantage of the use of the Internet in order to find additional information about the issues that were been investigated.

Question seven: Regarding the overall benefits that the students gained from the teaching process, below are some of the students’ answers. “ I acquired a lot of useful knowledge and aided a lot in expressing myself without any hesitation”. Another student stated “It helped me form an opinion on various issues and to discuss topics sharing and respecting the opinions of others”. A similar utterance expressed that “ I was benefited from the whole process, as I now know how to think in an unbiased manner and to look at an issue holistically”. Ultimately, a more simple statement read “We learnt about Honour and Money”.

7. Summary of results

It can be concluded from the results that the interdisciplinary approach towards teaching Economic Theory has been an innovative idea for students. The literature text that was used alongside the projection of the movie *The Price of Love* has attracted a lot of attention and has contributed to a pleasant, interesting and creative lesson.

According to the majority of the students, the lesson become more interesting and easy to comprehend especially when the students were separated into groups and the students worked in teams. This created additional motives for students’ participation as the new teaching method sparked an active interaction among students and the teacher, allowing for the exchange of ideas and fostering communication and cooperation skills. Throughout their classmates’ views, students have understood the economic terms and have been able to disambiguate their views regarding such.

In contrast to the classic way of teaching, the class climate was rather friendly and the students identified with their classmates and teachers, having a sense of security, trust and freedom to express themselves. The formation of the climate was aided by role playing that left a positive sensation and experiences to the majority of the students.

The use of the literature text and the use of unchanged extracts in particular, helped students understand the basic characteristics of the economic terms.

Moreover, the fact that situations and life conditions of Greek society are lively depicted facilitates the active participation of students in class and allows for distinguishing the economic terms that are developed in the societal context.

To sum up, the main benefits that students have acquired through the new interdisciplinary process, include new useful knowledge which has helped them form views about economic issues that they have encountered and develop an overall view of economic science in relation to literature and real life.

8. Conclusion – further discussion

The introduction of interdisciplinary studies in Greek secondary education and the study of economic science through different disciplines allows for a deeper analysis by the teacher and students.

The economic science, which is also compatible with other sciences as it is illustrated by the current research, allows for teaching innovations that lead to new insightful data for the effectiveness of teaching and learning of the students (Brinia V., 2006b).

The connection of economic science and other sciences and especially literature broadens the horizons the teaching and learning approach of the economic phenomena. The literature offers the capability to study the social, political and economic environment, since most Greek literature texts of the 1900-1970 time period, depict with accuracy the economic and social conditions in Greek society, better than statistical evidence and economic models. Furthermore, the power of speech of major Greek writers is an element that can facilitate the teaching of economic science in the Greek education system, and can reveal the fallacies of the economic and political systems in Greece which brought about the current economic recession. Moreover, the use of literature can also contribute to the development of critical thought of students and future citizens of the Greek society.

Through this way, the teaching of economic science in Senior High School can diverge from the strict lesson structure which is enforced from the Ministry of Education and the general examinations for entry into higher education. Consequently, economic terms constitute discussion topics, and points of criticism and speculation between teacher and students, connecting such with the real world.

A necessary prerequisite is the formation of an appropriate climate in the class as well as the safeguard of the necessary conditions for participatory and interactive teaching (Whitehead D.J. and Makridou-Bousiou D., 1995). The active participation of all the students in class and the free exchange of views

among students can aid the development of their personality and facilitate the creation of critical thought in students (Matsagouras I., 2003).

As it has been illustrated by the current research, the grouping of students is a unique opportunity for Senior High school students, who face intense competition, to have a key active role in the lesson and constructively cooperate with other students sharing their learning and emotional experiences (Brinia V., 2006a). Moreover, throughout this research process the teacher is offered with the potential to emotionally approach students as an equal group member, to take note of their views and get to know them better (Matsagouras I., 2000). In this way the teaching process can become more human.

Finally, it is worth noting that during the research process it is realized that the teaching material is not as important as is the nature of learning, the communication, the dialogue, the development of critical thought and the students' action. The challenge for the teacher lies in choosing and applying the methods for achieving the above.

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Appendix

Questionnaire

1. a. The lesson was:

boring / indifferent / interesting

b. Do you believe that the teaching approach has created motives for active participation in class?

Yes

No

If yes, why do you believe this has happened or what has contributed to the creation of such motives?

.....

2. Do you consider the realistic depiction of situations and conditions of real life as a contributing factor in relating the economic concepts to your everyday reality facilitating your participation in class?

Not at all / a little / at a satisfactory level / a lot / very much

3. How important is the contribution of the novel and the unchanged extracts in particular to achieving an understanding of the economic concepts and their main features?

Not at all / a little / at a satisfactory level / a lot / very much

4. In the teaching approach that was applied, the economic concepts of work and business were entailed as well as their social context. Moreover, we attempted to analyze such economic concepts in relation to the societal forces and the economic interests that define them e.g. capitalism system of production: work-working relations (employer-employee), social classes (social inequalities)

a. Do you consider the applied teaching approach as beneficial to achieving an understanding of these relationships and the interaction among them?

- Yes
- No

b. Do you believe that you would be able in a similar situation to analyse and interpret economic phenomena and concepts in a similar manner (what would be the likelihood of achieving so)?

Not all / very unlikely / unlikely / possible / very possible

5. The fact that you worked as a team contributed to the lesson being more effective.

I disagree / Indifferent / I agree

If you agree with the above statement, in which ways the teamwork way of teaching has assisted you?

.....

.....

6. Are there any suggestions for the improvement of the teaching process, or something that you would like to see being added during the teaching process?

.....

.....

7. Do you feel that you have acquired any benefits from the whole process?

- Yes
- No

If yes, can you describe briefly the benefits that you may have acquired?

.....

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