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The impact of the Greek government debt crisis on the financial and operating performance of Greek companies

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Kurzfassung

Das Ziel dieser Masterarbeit ist es, zu untersuchen, ob und wie die griechischen börsennotierten Unternehmen durch die griechische Schuldenkrise, welche sich 2009 abzeichnete, beeinflusst wurden. Die griechische Wirtschaft leidet unter endogenen und exogenen Problemen, die das Land und seine Wirtschaft, seit 2010, in eine langanhaltende Rezession führten. Die Gesamtstichprobe besteht aus 269 börsennotierten Unternehmen, wobei der Zeitraum von 2005 bis 2015 untersucht wird. Die Methodik basiert auf vierzehn Indikatoren, die die finanzielle und betriebliche Leistung eines Unternehmens messen. Neben der Analyse der Endstichprobe werden auch die Auswirkungen der Krise auf SMEs und große Unternehmen, sowie auf Unternehmen aus dem Dienstleistungs- und Fertigungsbereich, untersucht.

Die Ergebnisse zeigen, dass die meisten Leistungsindikatoren einen deutlichen Rückgang in der Periode nach dem Beginn der Schuldenkrise aufweisen. Demnach wird für die Gesamtstichprobe festgestellt, dass die Rentabilität, die operative Effizienz (realer Umsatz pro Mitarbeiter), die Liquidität, die Beschäftigung, die Dividenden, der Output (realer Umsatz) und die Kapitalfähigkeit im Zeitraum nach dem Beginn der griechischen Schuldenkrise deutlich zurückgegangen sind. Demgegenüber lassen sich keine eindeutigen Auswirkungen der griechischen Schuldenkrise auf die Kapitalstruktur des Unternehmens dokumentieren. Es wird auch festgestellt, dass hinsichtlich der operativen Effizienz griechische börsennotierte Unternehmen mehr von der Schuldenkrise betroffen sind, als die griechische ökonomische Entwicklung insgesamt. Währenddessen mindert sich durch die Schuldenkrise die Beschäftigung griechischer börsennotierter Unternehmen weniger stark als die griechische Wirtschaft insgesamt.

Die Ergebnisse für die Sub-Samples von SMEs und großen Unternehmen stehen im Einklang mit den Ergebnissen der Gesamtstichprobe. Dennoch ist festzustellen, dass SMEs mehr als große Unternehmen bezüglich den Variablen operative Effizienz, Beschäftigung, Output und Kapitalanlagen beeinträchtigt sind. Darüber hinaus ist nachgewiesen, dass griechische Unternehmen des Produktionssektors, in der Zeit nach dem Beginn der Krise, einen höheren Verschuldungsgrad als Unternehmen aus dem Dienstleistungssektor aufweisen.

Abstract

The aim of this master thesis is to investigate whether and how Greek listed companies were influenced by the event of the Greek debt crisis, which emerged in late 2009. The Greek economy has been suffering by endogenous and exogenous problems, which brought the whole country and its economy into a long recession period since 2010. The main sample consist of 269 listed companies, while the selected time frame covers the period from 2005 to 2015. The methodology is based on fourteen indicators that measure the financial and operating performance of a company. Besides the comparison of the final sample, the impact of the crisis is also examined with respect to SMEs and Large companies, as well as to companies from service and manufacturing sector.

Findings show that most performance measures exhibit a significant decline in the period post- the beginning of the debt crisis. Thus, for the main sample it is documented that profitability, operating efficiency (real sales per employee), liquidity, employment, dividends, output (real sales) and capital investments significantly decrease in the period post-to the beginning of the Greek debt crisis. However, mixed evidence is found concerning the impact of the Greek debt crisis on the capital structure. It is also found concerning operating efficiency that Greek listed companies suffer more by the debt crisis than the economic development of the Greek economy, while with respect to employment Greek listed companies are less affected than overall the Greek economy by the event of the debt crisis.

The results for the sub-samples SMEs and large companies are in line with the results of the full sample. Nevertheless, it is found that SMEs are affected more than large companies concerning operating efficiency, employment, output and capital investments. Furthermore, it is documented that companies of the manufacturing sector have a higher leverage than companies from the service sector in the period after the beginning of the crisis.

Acknowledgments

Keep Ithaka always in your mind.
Arriving there is what you are destined for.
But do not hurry the journey at all.
Better if it lasts for years,
so you are old by the time you reach the island,
wealthy with all you have gained on the way,
not expecting Ithaka to make you rich.
(C.P. Cavafy, 1911. Translated by Edmund Keeley and Philip Sherrard, 1992)

This master thesis was one more challenging part of the road to my "Ithaca". The journey was long and not easy, but through the difficulties I faced on this "journey", I perceive myself stronger. However, this would not have been possible without the contribution of a few persons. Thus, I want to thank:

A.o. Univ.- Prof. Dr. Wolfgang Aussenegg for the opportunity he gave me to write this master thesis about a topic relevant with my interests, as well as for being always there when help was needed.

My girlfriend Jelena Vukotic for her great support during this time and my uncle Loukas Bekiaris for believing in me and giving me the opportunity to study abroad.

And of course, my parents, for their support and their love all these years. Without them "Ithaka" would have never be possible.

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1. Introduction

The introductory chapter provides an overview of the present thesis and is structured as follows: After a short introduction of previous research on operating performance, the focus lies on the Greek government crisis and its implications on Greek economy. Subsequently, the aim of this thesis and the research question is presented. Finally, a short presentation of the structure of the present study is given.

1.1 Problem Definition and Research Gap

The operating performance of a company measures how efficiently the company is using its assets and is usually examined with respect to corporate events, such as privatizations, mergers and acquisitions, management buyouts and initial public offerings (D'souza and Megginson, 1999; Powell and Stark, 2005; Kaplan, 1989; Jain and Kini, 1994). Furthermore, operating performance has been also investigated with respect to factors such as, the ownership structure of the firm and the size of the board (Drakos and Bekiris, 2010; Eisenberg *et al.*, 1998; Himmelberg *et al.*, 1999). However, literature regarding the impact of the Greek debt crisis on operating performance is limited.

Greece is the European country that has suffered the most after the global financial crisis of 2008, even if the Greek debt crisis is not directly linked to the global financial crisis of 2008. The Greek fiscal crisis that started in late 2009 has affected the Greek nation and beyond the government and the banking system, also businesses and people in multiple ways. Besides the social effects of the crisis, the real economy has been also severely affected. Since the beginning of the crisis the Greek Government has introduced several austerity measures, which have caused an important decrease in demand for goods as well as services pushing the Greek economy and the property market in deep recession (Vlamis, 2014). However, the property market was not the only sector of the Greek economy that was negatively influenced. According to Bourletidis and Triantafyllopoulos (2014) SMEs in Greece are seriously affected due to their limited financial resources and high interest rates in case of external financing.

As a result, the Greek economy has been characterized by increased uncertainty during the Greek debt crisis. Dealing with declined demand, Greek companies had no other alternative than readjust their operations that would help them remaining successful during recession years.

1.2 Aim and Research Question

With this thesis, the author wants to examine the implications of the Greek fiscal crisis on the performance of Greek listed companies, since prior research does not support enough evidence. Specifically, the present study focuses on the operating and financial performance during the Greek debt crisis. Thus, the research question behind this study is the following:

- How does the Greek debt crisis affect the operating and financial performance of Greek companies?

1.3 Structure of the Thesis

The thesis will be subdivided in 7 Chapters as following:

1) Introduction, 2) Literature Review, 3) Methodology, 4) Data, 5) Empirical Results, 6) Conclusion and 7) References

The first chapter is a short introduction of the master thesis, which provides the reader with the necessary information regarding the content and the structure of the study, followed by the literature review in the second chapter.

The second chapter begins with the definition of a financial crisis and is devoted to discussing three essential parts of the present study. The literature review, thus, begins with an overview of the last financial crises, followed by a synopsis of the Greek economy between 2005 and 2015. Beyond the impact of the global financial crisis both in global and in European economies and the brief review of key features of the Greek debt crisis, evidence of previous studies on the operating and financial performance is also highlighted.

After the presentation of the theoretical background, the next chapter is dealing with methodological issues. Specifically, the third chapter presents the theoretical background regarding the used methodology, the selected operating and financial performance measures, the appropriate benchmarks for some of the variables and the preferred statistical models.

The fourth chapter deals with the data used in this study and highlights main characteristics of the sample of companies. Moreover, the selection process of the main sample is in detail discussed, followed by descriptive statistics concerning the main sample.

The fifth chapter presents the results of the statistical analysis, while the sixth chapter summarizes the main conclusion of this thesis.

2. Literature Review

2.1 Financial Crises

2.1.1 Global Financial Crisis

There are a few definitions for the event of a financial crisis. A financial crisis is considered a time period with a continuous decline of economic activities, followed by changes in macroeconomic data, like an increase of the unemployment rate, a decline of the national income or a reduction of investments (Allen and Carletti, 2010).

By late 2008, such a financial crisis with global dimensions started on the other side of the Atlantic Ocean to emerge. A combination of unique events led to the financial crisis of 2008, which is the worst crisis that the world economy faced since the Great Depression. More specifically, the real estate market of the US experienced a great growth between 1997 and 2006, which is well known as the housing bubble. That real estate bubble combined with bank regulators who did not do appropriate their job, absence of transparency of rating agencies and smugness of the market led to a worldwide economic downturn (Zingales, 2008).

After the bankruptcy of the financial services company Lehman Brothers on 15th of September 2008, the global financial system has entered a new era, which was identified by destabilization and raise of uncertainty. As a result, stock markets around the world experienced record losses, while macroeconomic indicators were severe affected. The first signs of how big that crisis was, did not take long to appear and the reaction of the financial markets globally was worse than expected. Allen and Carletti (2010) review the causes and consequences of the global financial crisis and propose measures for preventing a possible collapse of the financial system in the future.

Chorafas (2009) gives an overview of the impact of the crisis on financial markets worldwide: "[…] *on 18 October 2008 the Nikkei index saw its biggest decline in 21 years. On the same day, year to date, India's Sensex had fallen by 48.1 percent; Hong Kong's Hang Seng, 46.8 percent; Japan's Nikkei, 45.9 percent; Germany's Dax, 43.7 percent; France's CAC 40, 43.5 percent; and Britain's FTSE 100, 39.1 percent. Russia's equity index had beaten all others, falling by nearly 70 percent."* (Chorafas, 2009, p. 260).

Beyond the crisis' consequences on stock markets, there was also a decline in the global growth for the upcoming years. Furthermore, the GDP of countries with strong economies such as Germany and Japan decreased significantly in the last quarter of 2008, which indicates that the global financial crisis did not affect only the US, but other economies as well (Allen and Carletti, 2010).

2.1.2 The Impact of the Global Financial crisis to Europe

Since the mortgage bubble burst in the US was transformed to a financial crisis beginning with the bankruptcy of Lehman Brothers, it was a matter of time to experience its consequences in other economies outside the US. Thus, not long after the global financial crisis of 2008, the European economy entered a new phase, as in late 2009 some of the state members started to show weaknesses on repaying their government debt, while the levels of public debt were higher than expected (Nelson et al., 2012).

The first signs of an upcoming crisis within the Eurozone began after the Greek state reported that, in order Greece to be able to entry the European Monetary Union, previous governments have published miscalculated budget data (Nelson et al., 2012; Lane, 2012). Specifically, in October 2009 the new Greek government announced the accurate value of the fiscal deficit which was 12.7% of GDP[1] and the credit rating of the Greek economy dropped below A grade (Petrakis et al., 2013, p. 13). The fact that European economies have been hit by the global financial crisis, affected the increasing long-term growth rates in Europe and a new era of stagnation of the European economy begun. The effects of the crisis touched mostly the so-called PIGS countries -Portugal, Ireland, Italy, Greece and Spain-, of which Greece faced the most problems due to both internal and external reasons.

The recent debt problems were not similar for all countries, since economies among members share different characteristics. In Greece, for instance, the serious debt problems were mainly in the public sector, while other European economies, such as Ireland and Spain suffered from debt issues in the private sector (Nelson et al., 2012). However, besides the government debt problems among European countries, another vital part of the European economy was affected, namely the banking

[1] The initial (predicted) value of the fiscal deficit for the year 2009 was 3.7%

sector. Specifically, the European banking sector was operating in a similar way as the banking sector of the US, which led most of the European countries to provide the banks with extra liquidity (Petrakis et al., 2013, p. 14) and in other cases to nationalize them, such as the Anglo Irish Bank in January 2009 (Mody and Sandri, 2012).

Furthermore, the increased uncertainty within the Eurozone after the first signs of the forthcoming crisis, led to a shrinkage of investments, both in the public and the private sector (Petrakis et al., 2013, p. 58-59). Additionally, the reduction of private investments from one side and the liquidity problems of the banking sector from the other, created an unfriendly environment for existing and new businesses. After the global financial crisis of 2008, Europe has also started to face the problem of underinvestment. The uncertainty in combination with problems in the financial sector affected countries with problematic economies, but also countries with economies in better shape, leading to decreased new investments (Kolev et al., 2013). Specifically, the gross fixed investment in 2013 declined in European countries by 17% compared to 2008, while the shrinkage for the PIGS countries was more than 40% (Kolev et al., 2013). Furthermore, the number of unemployed persons increased, especially in the PIGS zone while the high unemployment rate remains one of the biggest problems of the Greek economy (see Figure 4).

2.1.3 The Greek Debt Crisis

Apart from the consequences in the US, the financial crisis of 2008 had a huge impact on the rest of the world, as both developed and developing countries were affected (Ozturk and Sozdemir, 2015). After the first signs of the global financial crisis appearing in European economies, Greece was one of the countries which suffered at most within the Eurozone. However, the Greek debt crisis was not only a result of what happened in the US, as the causes of the Greek debt crisis were both endogenous and exogenous (Kouretas and Vlamis, 2010).

Furthermore, Gourinchas et al. (2017) claim the Greek debt crisis has its roots in three irrespective events, (i) the increasing government debt, (ii) the emerging banking crisis, and (iii) the end of foreign investments. However, the current debt crisis in not the first for Greece, since the Greek economy has experienced more crisis periods over the past years. In particular, the first Greek

default on external debt was in 1826, where the access for Greece to international markets was denied for a period of 53 continuous years (Reinhart and Rogoff, 2011).

In the past, financial crises have hit developed economies, such as the US and Japan, but also developing countries such as Mexico (Mishkin, 1996). Although the Greek crisis initially emerged as a government debt crisis rather than as a financial crisis, it is interesting to notice the factors that can lead to a financial crisis. Mishkin (1996), for instance, examines the impact of the financial crisis of Mexico in 1994 on economic growth and claims that *"Four categories of factors that promote financial crises: increases in interest rates, increases in uncertainty, asset market effects on balance sheets, and bank panics".* Unfortunately, the above statement describes the situation in Greece since 2008, where both political and financial events with a huge impact on the Greek economy took place.

The increased uncertainty regarding the future of Greece can be observed via the development of Greek government bond yields. As indicated in Figure 1, the credit default swap spread (CDS) or probability of default of the Greek economy reached especially high values in the second half of 2011, after the second bailout package was approved in July 2011. A few months later, after the Greek government signed the second bailout package in March 2012, high values of the Greek five years CDS were documented again (Castle, 2012).

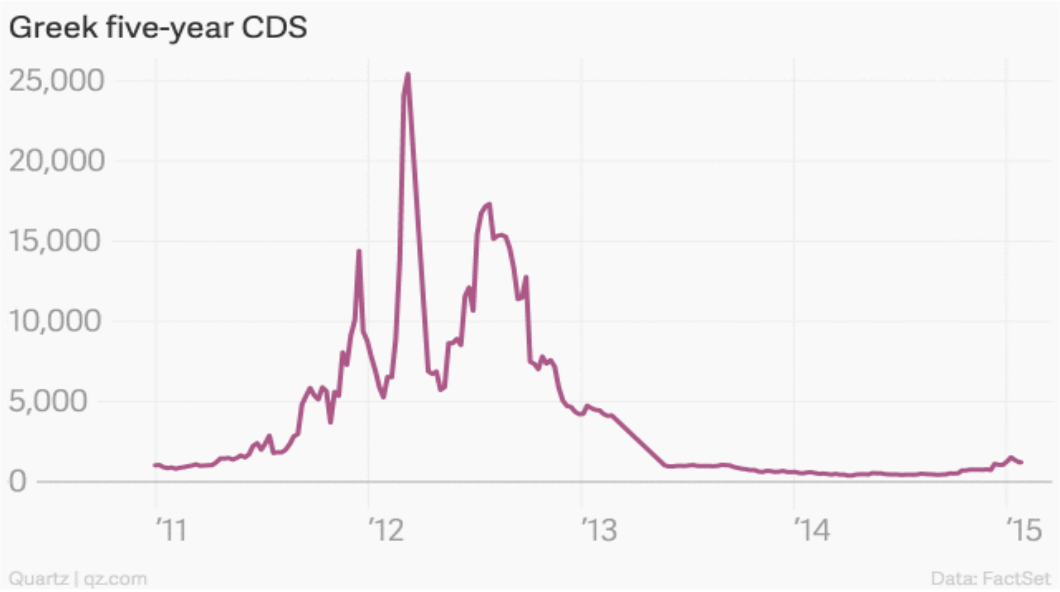

Figure 1. Greek 5-year credit default swap spread (2011 – 2015). Source: Backman (2015)

The fact that the Greek economy has been facing so many difficulties since 2008 has its roots in events taking place both pre- as well as post- 2009. According to Varoufakis and Tserkezis (2014) there are three important factors that led the Greek economy to crash after the global financial crisis of 2007-08. The first is the way that the global financial crisis affected Greece and its conversion to the Greek fiscal crisis. Nevertheless, Greece was not the only harmed economy in Europe, as stronger economies were also affected by the financial crisis. The second factor is the weaknesses of the Greek economy before 2008, which exposed Greece on potential external crises. The last, but not least factor, is the economic policies that did not lead to a successful end of Greek's fiscal crisis. Considering the factors discussed above, the Greek debt crisis was not caused by a single event, but by a combination of events as indicated by Figure 2.

Figure 2. Internal and External factors of Greek Debt Crisis. Source: Varoufakis and Tserkezis (2014), Own graph

The advantage of borrowing with low interest as described by Gibson et al. (2012), resulted in a huge growth of the Greek debt. Specifically, Gibson et al. (2012) states that *"[…] markets may have helped lull the Greek governments into believing that the low interest-rate environment would be a permanent feature of the Greek economy*". Moreover, Greece as a member of the European Monetary Union had the advantage of external financing from international markets with lower interest rates compared to the past, which led initially to overborrowing, and consequently to deficits of the public sector (Varoufakis and Tserkezis, 2014).

It is well known that Greece after 2008 is not a country which is famous for its strong economy. But even in the period before the crisis of 2007-08, the Greek economy was mainly based on tourism and services rather than on production compared to other members of the European Monetary Union. Therefore, Greece was lacking competiveness, and thus, could not attract easily foreign investors. As a result, in the last two decades the development of the Greek economy was based mainly on both private and public debt (Varoufakis and Tserkezis, 2014).

2.2 The case of Greece: 2005 - 2015

2.2.1 Economic and Social Effects of Greek Debt Crisis

Greece, as the second country of the south-European countries with the longest history within the European Union after Italy, suffers during the debt crisis from increasing unemployment and major financial problems. The effects of the Greek debt crisis on the Greek economy are more than visible. According to Petrakis (2012, p. 275) the Greek economy is characterized by low demand and relatively high corporate taxes (see Table 2). As a result, many Greek companies are struggling to survive and to overcome the crisis regardless of the sector of the economy in which they operate. Furthermore, budget surpluses of corporate savings of Greek companies were used for consumption instead of new investments, preventing any perspectives for economic growth (Kolev et al., 2013).

According to Eurostat, the Gross Domestic Product (GDP) is a basic indicator of a country's total economic output, since it measures the total value of goods and services produced. In the case of Greece, the GDP has been shrinking for more than 7 years, which has never happened in a developed country before. Overall, according to Eurostat, Greece has lost approx. 28% of the Gross Domestic Product (GDP) since 2008. The annual change of the GDP of Greece from 2006 to 2015 is shown by Figure 3. Moreover, for the same period, namely between 2006 and 2015 the government debt of Greece has increased from 117.4% to 178.2% of GDP. The fact that Greece has lost approx. ¼ of its economic power combined with the fact that the state continues to owe more to its creditors, led Greece deeper into the debt crisis.

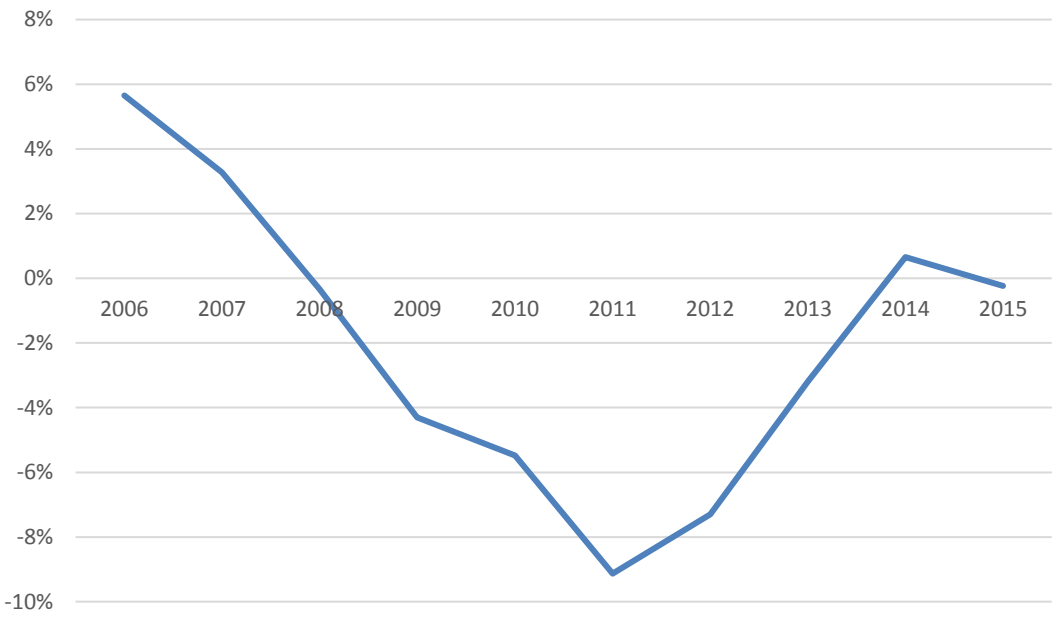

Figure 3. Annual % change of Greek GDP. Source: World Bank national accounts data, and OECD National Accounts data files, Own graph.

The case of Greece does not differ from other financial crises, concerning the consequences of the crisis. Thus, the growth of the economy has stopped, the unemployment rate has been fundamentally increased, and the GDP has been shrinking for several years. Beyond the financial problems that Greece has been facing since 2008, emphasis must be given on the numerous social consequences of the crisis, which according to Markantonatou (2013) are:

- The extended recession due to decreasing GDP.
- The constant problem of unemployment, the various issues in the labor market.
- The eclipse of the middle class.
- The migration of young educated people.
- The enlarged poverty.
- The increased number of suicides.
- The atrophy of the public health due to lower resources.

Possibly the biggest social effect of the Greek debt crisis is the high unemployment rate, which is the highest among European countries. After the financial crisis of 2007-08 all members of the European Union experienced an increase in unemployment rates, while this increase is especially significant for Greece, but also among PIGS countries. However, the change in unemployment rate in Greece is by far greater than the EU average, as between 2008 and 2015 the unemployment rate grew from 9% to approx. 25%, as indicated by Figure 4.

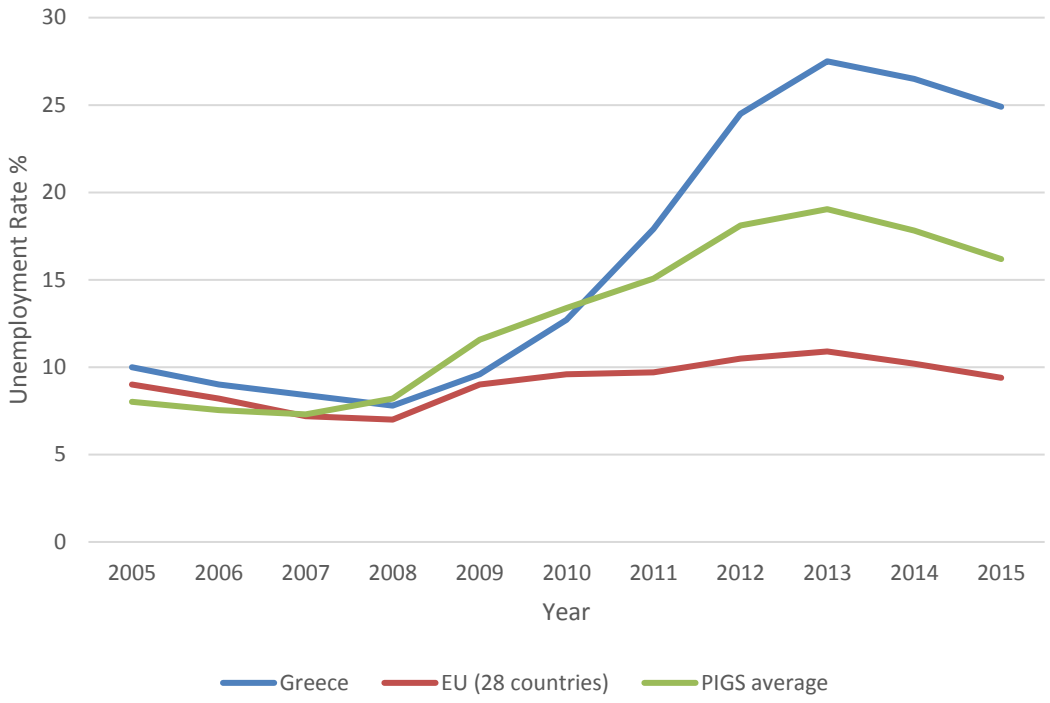

Figure 4. Development of Unemployment rate in Greece and in the EU (2005 – 2015). Source: Eurostat, Own Graph

Many of the social problems described above are the result of the deterioration of the Greek economy. Overall, the present thesis aims to give an overview of the actual situation not only about the Greek economy, but also for Greece as member of the European Union. However, the main interest is focused on the Greek economy and particularly on the operating and financial performance of the companies during the years of recession.

2.2.2 Athens Stock Exchange - History and Impact of the crisis

Although the Athens Stock Exchange (ASE) was founded in 1876, it has a significant role in the growth of the Greek economy during the last 60 years. The long history of the Athens Stock Market is characterized by two significant events which are described below:

The first event is known as the biggest Greek stock market bubble in 1999. In late 1990s Greek companies had an easy access to investors' money since the stock investments in Greece were tempting for many investors. Thus, in 1999 there was a big increase in the value of transactions and stock prices, which was associated with the forthcoming participation of Greece in the European Monetary Union (Thalassinos et al., 2006).

On 17th September 1999, the ASE achieved a record high of 6.484,3 points which remains the highest value until today and finally closed at 6.355,04 index points (GR Reporter, 2014). Moreover, during the summer of 1999 many of the transactions in the ASE were made by people who did not have the basic understanding of how the market works. In contrary to the expectations of investors concerning the further increase of stock prices, the biggest bubble in the history of the Athens Stock Exchange burst in late 1999 (Thalassinos et al., 2006).

The second event is highly associated with the Greek debt crisis, as well as with closed banks and the introduction of capital controls in the Greek economy. Specifically, the Athens Stock Exchange remained closed for a period of five weeks during the summer of 2015. Finally, after the approval of the European Central Bank the Greek stock market reopened on 3rd of August 2015 declaring losses of 16.2 %. Furthermore, the banking sector was heavily affected on this day, as the stocks of all Greek banks closed at the minimum daily limit, approx. 30% lower at the end of the first session (Ellyat, 2015).

As indicated by Figure 5, the performance index of the Athens Stock Exchange has experienced a couple of shocks through the years. Furthermore, the market index declines significantly several times since 2005 (see Figure 5). Specifically, the index is negatively affected by the global financial crisis in 2008, the announcement of the Greek debt crisis in late 2009 and the introduction of capital controls in summer 2015.

The amount of companies listed on the ASE has also experienced a decline during the last decade. In particular, between 2005 and 2015 the number of listed companies decreased from 356 to 212 according to Hellenic Capital Market Commission [2], while the Greek stock market index has fallen by approx. 84% since 2008 (see Figure 5).

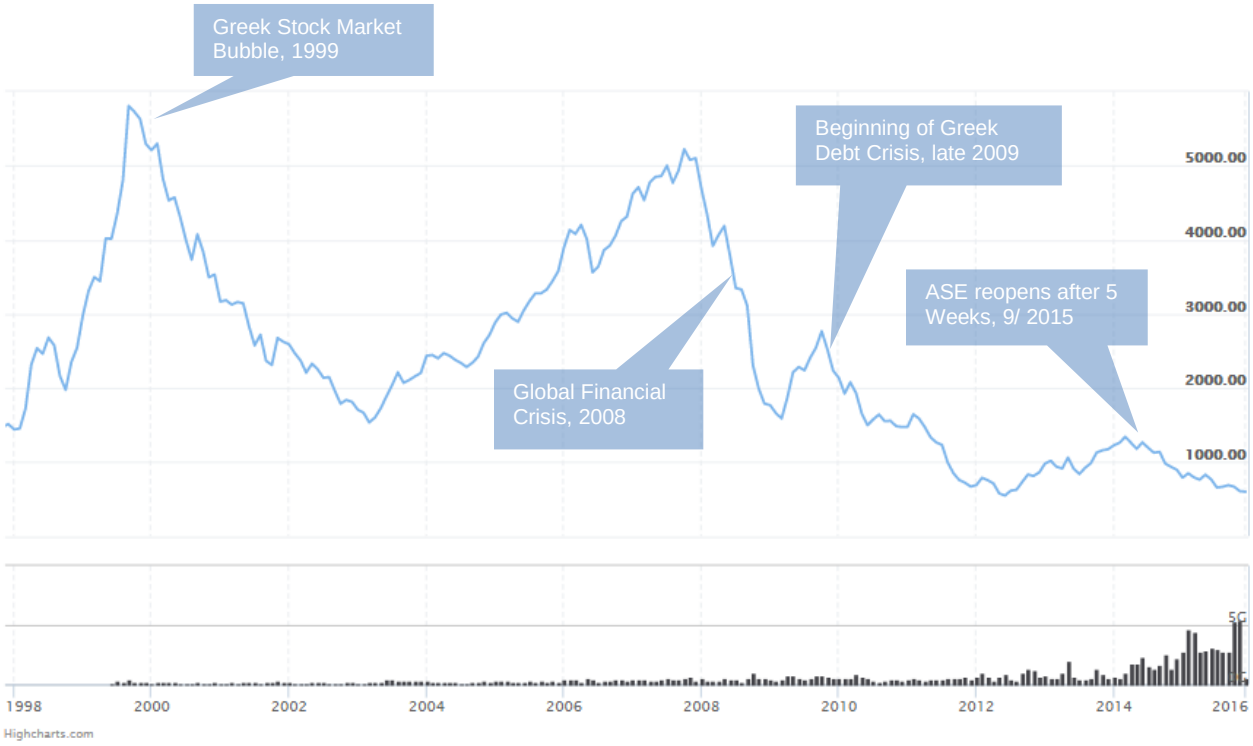

Figure 5. Athens Stock Exchange Index 1998 - 2015, Source: www.capital.gr

2.2.3 Greek Companies During the crisis

Companies within a problematic economy, which has been hit by a financial crisis, usually suffer from internal and external problems, which typically have their origin in the crisis itself. However, both kinds of problems have a negative impact on companies, since unstable economies do not provide the ideal environment for business growth. The impact of the Greek debt crisis on employment, investments, operating activity, capital structure and strategic actions is discussed below.

[2] Source: Hellenic Capital Market Commission, annual reports for years 2005 and 2015. Available at: http://www.hcmc.gr/en_US/web/portal/annualreports

Most Greek companies have less than 10 employees, while large firms with more than 250 employees are the minority, as indicated by Table 1. According to the European Commission (2003/361/EC) SMEs are defined as follows: "*The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.*"

Small and medium enterprises (SMEs) are the backbone of the Greek economy (See Table 1), as they represent 99.94% of the total Greek companies, a percentage that is the greatest among all European countries. However, not all SMEs have many alternatives to finance their business apart from bank financing. Therefore, SMEs are more exposed in case of a banking crisis compared to large firms according to Kolev et al. (2013). Regarding to the degree of leverage, SMEs in Greece, Italy and Spain have increased leverage ratios compared to other European countries like Czech Republic, Hungary, Lithuania, Poland and Romania (Kolev et al., 2013).

Table 1. Classification of Greek companies

Type of Company	Number of Companies	Total # of Employees	Value Added (in millions €)
Micro (< 10 employees)	682,132 (96.79%)	1,264,804 (59.13%)	17,036 (35.93%)
Small (10-49 employees)	19,631 (2.79%)	361,331 (16.89%)	9,616 (20.28%)
Medium (50-249 employees)	2,576 (0.37%)	241,105 (11.27%)	8,972 (18.32%)
Large (> 250 employees)	397 (0.06%)	271,720 (12.71%)	11,790 (24.87%)
Total	**704,736 (100%)**	**2,138,960 (100%)**	**47,414 (100%)**

Source: European Commission (2016), Own table

Since the SME sector includes more than 99% of all companies, the focus of the effects of the debt crisis is given on this sector which in the case of Greece is very representative. Thus, as endogenous problems can be defined the problems linked directly to the company such as, liquidity problems or high operating costs. Liquidity problems can emerge due to shortage of external financing and increased interest rates (Bourletidis and Triantafyllopoulos, 2014). On the other side, exogenous problems affect indirectly the operation of the company. For instance, low demand typically emerges in crisis periods and affects beyond the companies also the national income. Due to the

shrinkage of the national income, the Greek state issued higher corporate taxes (see Table 2). Specifically, Greek companies had to face an additional external problem of increased corporate taxation from 20% in 2011 to 29% in 2015, as indicated by Table 2.

Table 2. Corporate taxation in Greece

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
Corporate tax rate (%)	25	25	25	24	20	20	26	26	29

Source: KPMG, Own Table

In periods of economic crisis usually all kind of businesses experience negative consequences due to decreased demand of goods and services. Vlamis (2014) provides evidence of the negative effect of the Greek debt crisis on Greek property market. However, property market was not the only sector of the Greek economy that was negatively affected, since around 230,000 SMEs have closed in Greece after 2008 and around 700,000 jobs have disappeared (Stamouli, 2015). Small and medium enterprises (SMEs) have a significant role in the Greek economy as they capture 57% of overall employment in Greece, while small enterprises capture 71% of the retail trade sector's employment (Mylonas and Tzakou-Lambropoulou, 2016b).

In addition to the debt crisis, another problem reached the Greek economy in June 2015. Specifically, the Prime Minister of Greece Mr. Alexis Tsipras was forced to announce that Greek banks will remain closed until the referendum and to impose capital controls, trying to avoid a possible bank run, as the Grexit scenarios were discussed for one more time (BBC, 2015). However, capital controls had not only negative effects on the Greek economy. According to Mylonas and Tzakou-Lambropoulou (2016a) the introduction of capital controls affected positively the use of e-banking and POS terminals, as many transactions had to be done either through internet or debit cards, which was a positive step against tax evasion. Of course, the introduction of the capital controls had also a very negative side, since many Greek SMEs faced problems concerning their investments, while other companies proceed to stuff reduction and unfortunately some of them closed down for a while (Mylonas and Tzakou-Lambropoulou, 2016a).

2.3 Operating and Financial Performance

2.3.1 Definition

There are many parties such as, shareholders, investors, creditors, competitors, employees and managers who are interested in measuring the financial performance of a company. Of course, each group has different objectives with respect to the financial performance. However, the measurement of the financial performance can provide valuable information for a company's financial health. For listed companies, the necessary data is provided usually by the company, according to international financial reporting standards. Since the financial performance can be measured by several means, the performance measures must be defined.

The operating performance of a company is typically measured by ratios. In case of Greece, the performance of companies is examined with respect to the event of the Greek debt crisis, as it has been reported in the first chapter. The performance measures of this study are presented in detail in the third chapter, where the methodological approach is also introduced.

Since the event of an economic crisis has not been investigated with regard to the operating performance of companies, it is problematic to review relevant literature concerning this topic. However, there are various past scientific articles analyzing the operating and financial performance around corporate events, such as privatizations, corporate takeovers, management buyouts or initial public offerings. Specifically, previous literature on operating performance of privatized firms seems to depend on the level of development of the corresponding economy. E.g., Aussenegg and Jelic (2007) provide, for companies in Central and Eastern European transition economies, no evidence of a significant improvement for the first six years after privatization in terms of profitability, capital investments, efficiency and output. On the other hand, studies on privatization in developed economies indicate that state-owned companies, which have been transformed to private ownership companies, have improved their operating performance (D'Souza and Megginson, 1999; Farinós et al., 2007).

In addition, Powell and Stark (2005) indicate that 191 corporate takeovers completed in the UK between 1985 and 1993 exhibit modest improvements in operating performance. Furthermore, Kaplan (1989) examines 76 large management buyouts of public companies over the period 1980

to 1986 and indicates changes in operating performance in 48 companies. Specifically, the operating income and the net cash flow have increased, while capital expenditures have decreased. Academic research on IPO firms indicates that IPO firms usually underperform after going public. Chi and Padgett (2006) examine the operating performance of 382 Chinese IPO firms listed between 1996 and 1997, finding a significant decline in efficiency, profitability, sales growth rates and leverage in the post-listing period, while sales increased after going public.

2.3.2 Evidence from European economies

Firm's performance can be explored in a global, regional or domestic dimension, depending on the scale and the purpose of the research. Since the focus is set to the Greek economy, primarily relevant studies with the Greek as well as the European economy are mentioned below.

As the global financial crisis has affected the European economy, it is expected that the consequences of the crisis on firm's performance will have a negative impact on European firms. Thus, besides the international evidence, emphasis is given to the performance of companies that operate in Europe. Specifically, Novotná (2013) investigates the financial performance of industrial companies among selected European countries before and after the global financial crisis of 2007-2008, pointing out that the financial crisis has significantly affected their performance. Moreover, the results indicate that the crisis had a significant impact on the performance of Greek industrial companies as well, particularly in the period 2008 - 2009.

Dolenc et al. (2012) investigate, based on micro accounting data, the impact of the global financial crisis of 2008 on the Slovenian economy. Specifically, their study of all Slovenian firms over the period from 2003 to 2010 points out the negative impact of the crisis since the financial performance of firms was significantly negatively affected in most business sectors (Dolenc, Grum, and Laporsek, 2012).

According to Demirguc-Kunt et al. (2015), the level of financial leverage typically decreases during financial crises in both high income as well as in developing countries, since companies deal with greater risk and more uncertainty. Moreover, during a financial crisis the access to external financing for most companies also declines. Specifically, Demirguc-Kunt et al. (2015)

investigate the impact of the financial crisis of 2007-08 on 277,000 companies from 79 countries (including the Greek as well as most European economies) between 2004 and 2011 and indicate that the financial leverage experience a significant decrease after the financial crisis, especially for smaller non-listed companies, but also for (bigger) listed companies. Contrary to that, Iqbal and Kume (2014) examine 392 German, 871 UK and 464 French non-financial listed firms over the period 2006 to 2011 and point out financial leverage levels increased between pre- and during the crisis period for UK and Germany firms, while did not experience any significant change between pre- and post- financial crisis period for all three countries.

2.3.3 Evidence from the Greek economy

Regarding the Greek economy, the literature on operating performance of Greek companies is scare. However, Liargovas and Repousis (2011) examine the effect of 11 mergers and acquisition events in a total sample of 26 Greek commercial banks on operating performance of the Greek banking sector, finding that the operating performance of Greek banks is not affected after mergers and acquisitions. Moreover, Pazarskis et al. (2006) provide strong evidence of decreased profitability after merger and acquisition event, by investigating the operating performance of 50 Greek listed companies with respect to M&A in the period between 1998 and 2002.

Thomadakis et al. (2012) examine the stock performance of 254 Greek initial public offerings using buy-and-hold adjusted returns (BHARs) and provide some interesting findings concerning the short-term and long-term performance of Greek IPOs. Specifically, the mean-adjusted stock performance of Greek IPOs increases for a short period after listing (6 and 12 months), which is in line with the international evidence, while this overperformance remains for a longer time period (18 and 24 months) than in other countries. However, the long-term (36 months) stock performance of Greek companies underperforms the market, since the three years mean-adjusted return is negative, which is again in line with international evidence.

Furthermore, the research of Liargovas and Skandalis (2010) examines the financial performance of 102 Greek listed companies from 15 industries before the Greek fiscal crisis period (1997 - 2004), by using three performance variables: return on assets (ROA), return on equity (ROE) and return on sales (ROS). Their research indicates that firm performance in Greece is significantly

affected by leverage, export activity, location, size and effective management. Moreover, Florou and Chalevas (2010) investigate whether accounting variables can affect the stock value of a firm for the period between 2004 and 2006, providing some evidence that stock returns of Greek companies are influenced by the operating performance, their growth opportunities and their ability to generate profits from sales. Their research is based on 287 Greek listed companies, while companies from financial sector are excluded.

2.4 Test Hypotheses

Considering the problem statement as well as the literature review, the emerged hypotheses of this study are presented below. In this study, the author examines the impact of the Greek debt crisis on the performance of Greek listed companies by calculating selected financial ratios.

Based on the previous literature, economic crises usually have a negative effect on firm's performance. Specifically, in this study it is expected that (1) profitability, (2) operating efficiency, (3) solvency, (4) capital investment spending, (5) output, (6) dividends, and (7) employment levels are negatively affected by the crisis. In addition, it is expected that the Greek debt crisis will influence the (8) capital structure of Greek listed companies after the beginning of the debt crisis, i.e. it is expected that the leverage level of Greek listed companies is decreased during the debt crisis period. Moreover, the null hypothesis (H_0) for median changes in performance (adjusted and unadjusted) will be tested.

H_0: The change in profitability, operating efficiency, employment levels, liquidity, dividends, output, capital investment spending and capital structure of Greek listed companies between a pre-period and a post-period around the beginning of the Greek debt crisis is not significantly different from zero.

3. Methodology

3.1 Overview

The impact of an event on a company's performance can be examined both in short- and in long-term perspective. The present study is a long-term event study since the focus relies on the impact of the event of the Greek debt crisis on the operating and financial performance of Greek companies. Event studies measure the impact of a specific event on the value of firms based on financial market data. Specifically, MacKinlay (1997) indicates that event studies have been mainly successful in the field of corporate finance, having the advantage of directly measuring the change in the value of equity. Unlike event studies that are based on financial market data, long-term operating performance studies are based on financial reports.

Mitchell and Stafford (2000) reexamine the reliability of long term event studies and suggest that event studies based on BHARs might not be appropriate for measuring long-term stock price performance, as this method assumes independence of event-firm abnormal returns. Specifically, they state that "event-firm abnormal returns are positively cross-correlated when overlapping in calendar time. As such, assuming independence is problematic for any long-term abnormal performance methodology." Furthermore, they recommend the calendar-time portfolio approach, which considers the dependency of abnormal returns.

The research objective of this thesis is to investigate the impact of the Greek debt crisis, which initially appeared in late 2009, on the operating and financial performance of Greek companies listed on the Athens Stock Exchange. The research of Barber and Lyon (1996) is one of the most important and cited papers on measuring abnormal operating performance. An important part of the methodological approach of this study is based on previous literature that has examined the operating performance with regard to diverse corporate events (Megginson et al., 1994; Barber and Lyon, 1996; Boubakri and Cosset, 1998; D'Souza and Megginson, 1999). Furhermore, the methodological approach from previous literature related to economical or financial crisis will also be considered (Novotná, 2013).

For listed companies in Europe the adaption of the IFRS is mandatory since 2005. Comparing companies from diverse regions could be problematic, since each region has also its own local accounting standards. However, the present study examines only companies operating in the Greek economy, reporting financial statements based on IFRS.

The preconditions to begin with the analysis of the data are: (i) to define the event window, (ii) to acquire financial data of the firms, and (iii) to compute the mean of each pre-defined operating and financial performance measure for each firm for the period pre- and post- the event.

The event is the start of the Greek debt crisis, which started in late 2009. In May 2010, the Greek government announced the first austerity measures, thus, the year 2010 is defined as year 0 as indicated by Figure 6. Moreover, the period prior to the event, i.e. the period 2005 to 2009 is determined as pre-crisis period and the period from 2011 to 2015 is defined as the post-event period. After defining the event period, the next step is to acquire financial data of Greek listed companies. The financial data is obtained from the Thomson Reuters WorldScope Database and from the Athens Stock Exchange (ASE) website[3]. All financial information is presented in Euro currency and, therefore, there is no need to transform the currency. More data issues are discussed in the 4th chapter.

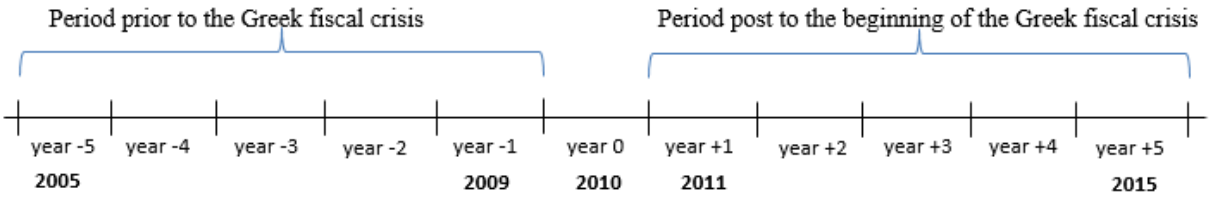

Figure 6. Time Frame of the Event of Greek Debt Crisis

Since all previous studies report median values, the present study is also based on median values. Moreover, reporting median rather than mean values reduce the effect of outliers in case that outliers exist. According to Barber and Lyon (1996), special attention should be paid to the model of the expected performance, as the expected value is the benchmark for measuring the abnormal performance. The Wilcoxon singed-rank test for testing changes in median values will be used,

[3] https://www.helex.gr/web/guest/home

since it is more powerful than the t-statistic (Barber and Lyon, 1996). Specifically, the null hypothesis of the Wilcoxon singed-rank test suggests that the difference of medians before and after the event equals zero (Weiers, 2008, p. 513).

Besides the Wilcoxon test, a proportion test is performed to determine whether at least half of the companies (p=0,5) display the predicted results (Megginson et al., 1994). A proportion test is typically used to compare the proportion of a sample with a hypothesized value.

It should also be mentioned that all numbers used in this study are in EUR. Furthermore, the consumer price index value (base year =2010) was used to deflate the nominal data of the variable "Net Sales". However, only firms with at least one observation in both event window are considered for the statistical analysis, as the Wilcoxon signed-rank test examines paired samples. This methodology allows us to compare the operating performance in the period prior and post of the beginning of the Greek debt crisis.

3.2 Unadjusted Performance

For the purposes of this study, both unadjusted and adjusted operating and financial performance is examined. Firstly, the unadjusted performance is computed. We assume that the expected performance of a firm in the post-period, is the performance of the same firm in the pre-period (see Equation 3).

$$E(P_{j,post}) = P_{j,pre} \quad [4] \tag{3}$$

The change of an unadjusted performance measure is calculated following the methodology of Megginson et al. (1994). Specifically, we calculate the mean of every single performance measure i, of a particular firm j for both the pre- and the post-event period (pre-Greek debt crisis = years -5 to -1; post-beginning of the Greek debt crisis = years +1 to +5). After means of a particular company j are calculated for both event windows, the next step is to test whether the difference of medians across all companies between both periods (i.e. pre- and post-) is zero for each performance measure. For that purpose, previous studies have used the Wilcoxon singed-rank test, which is one of the most popular non-parametric significance tests. Therefore, the Wilcoxon

[4] P: Performance Measure

singed-rank test for significant changes in medians values of performance measures is also used in the present thesis.

3.3 Adjusted Performance

Barber and Lyon (1996) developed nine models of expected performance based on the industry and the previous performance and categorized them in three categories. Specifically, models 1-4 are described as models of performance level, models 5-8 are described as models of change in performance and the 9th model as model of change in performance without matching. According to Barber and Lyon (1996), 'change' models are most often used and are more robust among all categories.

However, as a long-term study that deals with a longer period (11 years), changes in the economy might influence the performance. As we need to control such effects, relevant benchmark indexes (for the adjusted performance) of four essential variables are chosen, following the methodology proposed by Aussenegg and Jelic (2007). Specifically, we rely on the same benchmarks for the same performance measures as Aussenegg and Jelic in their study (2007, p. 863)[5]. The four benchmark indexes are presented below:

(i) the *industrial production index* of Greece as benchmark for the variable *Output* (Real Sales)[6]

(ii) the *employment index* of Greece as benchmark for the variable *Total Employment* (Numbers of Employee)[7]

(iii) the *industrial production index* of Greece divided by the *employment index* of Greece as benchmark for the variable *Operating efficiency* (Sales per Employee)

(iv) the *gross fixed capital formation* index of Greece divided by the *industrial production* index for Greece as benchmark for the variable *Capital investment spending* (Capital expenditures to Sales)[8]

[5] Concerning the (iv) benchmark, Aussenegg and Jelic (2007) use the gross fixed investment index (real) instead of gross fixed capital formation.
[6] Source: OECD
[7] Source: OECD
[8] Source: Eurostat

To calculate the abnormal adjusted performance, it is necessary to normalize to unity in year 0 all of four selected variables and their matching benchmarks. As it is described in equation (4), the abnormal performance of a specific variable is specified by the difference between the normalized variable and the matching normalized benchmark, which is in line with the 9th model described by Barber and Lyon (1996).

Specifically, $AP_{i,j,t}$ is defined as the abnormal adjusted performance for variable i and firm j in year t, and $P_{i,j,t}$ is defined as the change in the normalized performance for variable i and firm j in year t. Moreover, the benchmark value $B_{i,t}$ is determined as the change in the normalized performance of the specific benchmark for variable i and firm j in time period t (Aussenegg and Jelic, 2007).

$$AP_{i,j,t} = P_{i,j,t} - B_{i,t} \quad (4)$$

Since the benchmark models have been defined, we procced to the next step that contains the calculation of abnormal performance for both pre- and post-event period for the cross section of the firms. Then we examine whether the abnormal performance $AP_{i,j,t}$ differs significantly between the pre-debt crisis period and the debt crisis period following the same methodology for changes in performance as we did with the unadjusted performance. As it has been also mentioned above, the statistical methods used in our analysis, are the Wilcoxon signed-rank test and a proportion test.

3.4 Operating and Financial Performance Measures

The focus of this study is to measure the operating and financial performance of the sample firms before and after the beginning of the Greek debt crisis. Therefore, it is necessary to select carefully the performance measures according to the research question.

Traditionally, operating performance measures are based on accounting numbers. Barber and Lyon (1996) indicate that the use of operating cash flows is considered to be optimal for measuring the performance of firms after significant events, while they also investigate appropriate statistical and benchmark models in their study. Operating performance is usually evaluated relative to an

industry benchmark, while size, industry and past performance can be used as benchmarks as well (Barber and Lyon, 1996).

Concerning the operating and financial performance of companies, previous studies have used mostly specific performance measures based on the methodology suggested by Megginson et al. (1994) regarding profitability, operating efficiency, capital investment, output, employment levels, leverage, and dividends. Since there are many ways to measure the financial performance, for the purposes of this study it is necessary to focus on those performance measures, which are appropriate for the investigation of the impact of the Greek debt crisis. Therefore, since the impact of an economic crisis is examined, liquidity measures must be considered as well.

Thus, the present study investigates fourteen performance measures which are divided into eight relevant categories, mainly based on the methodology of Megginson et al. (1994). Specifically, these categories are: *Profitability, Operating Efficiency, Capital Structure, Liquidity, Capital Investment Spending, Output, Employment and Dividends* as indicated in Table 3 below.

Since most performance ratios measure similar features, it is not necessary to compute all the existing performance ratios. Ratios that measure profitability are broadly used in previous studies, thus, they cannot be dropped from this study. In order to minimize errors, most of the performance measures are provided by the Thomson Reuters Worldscope Database. However, performance ratios that examine a company's capital structure, were computed by the author, since the Thomson Reuters Worldscope Database did not provide these measures. Moreover, data regarding employment for some companies were acquired from their annual reports, since there were limited or no data in the Thomson Reuters Worldscope Database.

Regarding profitability, we rely on the following measures: Return on Assets (ROA), Return on Equity (ROE), Earnings before Interest and Taxes (EBIT) and Earnings before Interest, Taxes, Depreciation and Amortization (EBITDA). Two of the most known *profitability* ratios are the return on assets (ROA) and the return on equity (ROE). ROA has been often used in previous academic research (Barber and Lyon, 1996) and it is also included in this research. ROA is a frequently used indicator which shows how profitable a company is relative to its total assets. However, an important difference of this ratio compared to ROE, is that ROA does not take into

consideration any positive or negative leverage effects of the firm. On the following page, the definition of all performance measures is presented (see Table 3).

In a time period after an economic crisis the access to external money sources for companies is constrained, which can lead to readjustment of the capital structure of companies. Thus, we assume that the event of the Greek debt crisis will affect the debt level. In order to examine possible changes on the *capital structure* we rely on the following measures: Debt to Assets and Long-Term Debt to Equity. These financial ratios investigate the capital structure of the firm, showing to what extent the company finance its operations based on external financing or not (Megginson et al.,1994).

One of the consequences of an economic crisis is that the unemployment rate of the country typically rises. As the unemployment rate in Greece rose from 9% in 2010 to 25% in 2015, it is rational to examine the development of the *employment level* prior to and after the debt crisis.

The *liquidity* level is an important feature of recession times, as many companies after or even during a financial crisis face liquidity problems struggling to survive and be competitive. The current ratio is a common financial ratio that examines the liquidity of a company (Tatahi and Heshmati, 2009). It investigates the firm's ability to pay short-term and long-term obligations. Moreover, an additional solvency indicator is examined, namely the quick ratio (see Table 3).

Operating efficiency indicates how much revenue each employee is generating for the company. A low ratio could mean low productivity, while a high ratio shows that employees are producing enough sales for the company (see Table 3).

According Titman and Wessels (1998), *capital investments* is an important indicator of growth. As we deal with a problematic period for the Greek economy in terms of stability and growth, we assume that the growth of Greek listed companies is negatively affected as well. Therefore, capital expenditures over total assets and capital expenditures over sales are also examined in this thesis (Megginson et al., 1994).

Table 3. Definition of Performance Measures. (Source: Thomson Reuters, 2013)

Performance Measures	Datastream Code	Definition
(a) Profitability		
ROA (%)	WC08326	= (Net Income – Bottom Line + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) ÷Average of Last Year's and Current Year's Total Assets * 100
ROE (%)	WC08301	= (Net Income – Bottom Line - Preferred Dividend Requirement) ÷ Average of Last Year's and Current Year's Common Equity * 100
EBIT (in th. EUR)	WC18191	= Earnings Before Interest and Taxes
EBITDA (in th. EUR)	WC18198	= Earnings Before Interest, Taxes, Depreciation & Amortization
(b) Operating Efficiency		
Real Sales per Employee (in th. EUR)	WC08351	= Real Sales or Revenues ÷ Employees
(c) Capital Structure		
Long - Term Debt to Equity	WC03251 ÷ WC03995	= Long - Term Debt ÷ Total Shareholders' Equity
Total Debt to Total Assets	WC03255 ÷ WC02999	= Total Debt ÷ Total Assets
(d) Liquidity		
Quick Ratio	WC08101	= (Cash & Equivalents + Receivables (Net)) ÷ Current Liabilities
Current Ratio	WC08106	= Current Assets ÷ Current Liabilities
(e) Total Employment		
Numbers of Employee	WC07011	= Total number of employees
(f) Dividends		
Dividends Payable to Sales	WC03061÷ WC01001	= Dividend that has been declared but not yet paid ÷ Net Sales
(g) Output		
Real Sales (in th. EUR)	WC01001 ÷ CPI	= Net Sales or Revenues ÷ Consumer Price Index[9]
(h) Capital Investment Spending		
Capital Exp. to Assets (%)	WC08416	= Capital Expenditures ÷ Last Year's Total Assets * 100
Capital Exp. to Sales (%)	WC08421	= Capital Expenditures ÷ Net Sales or Revenues * 100

[9] Source: OECD (base year 2010)

4. Data

4.1 Data Issues

The present study focuses on Greek companies listed on the Athens Stock Exchange for two main reasons. Firstly, all companies listed in stock exchanges are required to publish their financial data, such as annual reports, quarterly and yearly financial statements etc. Thus, the access to the financial data of listed companies is easier than to non-listed companies. Secondly, listed companies in order to become more attractive for investors, have a strong incentive to show profits in case that those profits do exist. According to Lazarids and Tryfonidis (2006) non-listed companies in Greece could possibly hide their profits in order to avoid corporate tax payments. Therefore, non-listed firms could become inappropriate for further analysis based on their financial data.

The number of companies listed on the Athens Stock Exchange (ASE) decreased from 356 listed companies in December 2005 to 207 in December 2016 according to the Hellenic capital market commission. The initial sample of the present study contains 381 Greek companies, of which 356 were listed in 2005 and 25 were new listings between 2006 and 2015[10]. Since 2005, all listed companies on the ASE are required to adopt the International Financial Reporting Standards (IFRS)[11]. Moreover, financial data of Greek listed companies is published for most companies only in Greek.

The process of acquiring manually all financial data through the website of each company is a very time-consuming process, thus, alternatives practices are considered. Specifically, the main source to acquire data for the present thesis is the Thomson Reuters Worldscope Database, which contains financial data reported by firms' accounting reports. In order to avoid a delisting bias, delisted companies are also included in this study. However, it was not possible to find data for all companies of the initial sample, as some of the companies are missing in the Thomson Reuters Worldscope Database.

[10] Source: Hellenic Capital Market Commission, annual reports from 2005 to 2016. Available at: http://www.hcmc.gr/en_US/web/portal/annualreports

[11] http://ec.europa.eu/finance/company-reporting/standards-interpretations/index_en.htm

Companies that operate in the banking, real estate, insurance and finance industry are not included in the main sample since they operate differently from companies of the real economy. Additionally, companies whose data are not available in the Thomson Reuters Worldscope Database are also excluded from the main sample. However, companies of which the financial year is different than the calendar year are included in the main sample.

Table 4. Sample Selection Process

Initial sample: **381** companies
- **57** companies are excluded due to operating sector: Banking Sector, Real Estate, Insurance and Investment companies (see Table 15)
= **324** companies
- **55** companies are excluded due to non-availability of data in the Thomson Reuters Worldscope database (see Table 16)
= Main sample of **269** companies (see Table 17)

Based on the criteria mentioned above, the main sample consists of 269 companies, as indicated in Table 4. However, 52 companies of the main sample have observations only in one event window. Thus, the statistical analysis is based on 217 companies with paired observations. As a result, the final sample contains 217 companies.

Besides the main sample, two more sub-samples are considered in this study. The first sub-sample contains firms classified *by industry*, based on the first digit of the SIC code[12], while the second sub-sample includes firms categorized *by size*, based on number of employees in year 0 (2010)[13]. In previous studies, the classification of companies between small and large is typically based either on market capitalization or on the number of employees. However, in this study the classification is based on one of the criteria[14] of the EU (2003/361/EC) for SMEs and thus companies with 250 or less employees in year 0 (2010) are defined as SMEs, while the rest as large companies (see Table 5).

[12] Source: Thomson Reuters Worldscope Database
[13] Source: Thomson Reuters Worldscope Database
[14] Additional criteria of either annual turnover or balance sheet are not considered

4.2 Descriptive Statistics

After the discussion of the major data issues, characteristics of the final and main sample as well as descriptive statistics are presented below. In particular, Table 5 provides both the final and the main sample categorized by industry and by size. Concerning the final sample, most companies (43%) operate in the manufacturing sector, while the service sector (15%) is the second biggest among all industries. Furthermore, concerning the classification by size, the number of small and medium firms (47%) is slightly less than large firms (53%). Moreover, Table 5 reveals that the proportion of firms between final and main sample does not significantly change and thus the statistical analysis can be performed on the final sample without a distortion of the results. In the next page, Table 6 presents the descriptive statistics of the final sample of 217 companies, in which statistical analyses will be performed.

Table 5. Number of companies pre- and post- the beginning of the debt crisis in 2010

		Pre (2005-2009)	Post (2011-2015)	Final Sample	Main Sample
Variables by Industry	• Agriculture, Forestry and Fishing	11	10	9 (4%)	11 (4%)
	• Mining	4	4	4 (2%)	4 (1.5%)
	• Construction	22	20	19 (9%)	22 (8%)
	• Manufacturing	110	90	93 (43%)	112 (42%)
	• Transportation, Communications, Electric, Gas and Sanitary service	28	23	22 (10%)	28 (10%)
	• Wholesale Trade	29	19	23 (10%)	29 (11%)
	• Retail Trade	24	21	16 (7%)	24 (9%)
	• Services	39	31	32 (15%)	39 (14.5%)
Variables by Size	• Small and Medium Firms	120	102	101 (47 %)	122 (45%)
	• Large Firms	147	117	116 (53 %)	147 (55%)
Variables Total		267	219	217 (100%)	269 (100%)

Table 6. Descriptive statistics of important accounting variables for the paired observation in the final sample, measured in th. EUR for the year 2010 (t=0), as well as for the pre- and post-period

		EBIT	Real Sales	Total Assets	Total Equity	# Employees
	Median	3,408.5	67,248.8	94,494.5	31,561.5	353
Pre- period	**Mean**	28,072.1	330,025	421,362	158,684	1,102.6
2005- 2009	**STD. Dev.**	116,152	1,016,495	1,383,392	520,198	2,941.2
	No of Firms	215	217	217	217	212
	Median	263.5	53,215	98,768	30,059	308
t=0	**Mean**	4,418	312,112	460,474	157,041	1,129.77
(2010)	**STD. Dev.**	156,700	984,747	1,463,807	537,092	2,604.43
	No of Firms	214	217	217	217	208
	Median	0	39,969.6	78,075	18,706.5	245
Post- period	**Mean**	7,826.64	299,447	440,474	138,395	983.3
2011- 2015	**STD. Dev.**	94,975	1,042,972	1,487,444	506,857	2,604.4
	No of Firms	215	216	219	217	214

5. Empirical Results

The impact of the event of the Greek debt crisis on the performance of Greek companies is examined with respect to three main perspectives. The first part of the analysis deals with the main sample, while the second examines the performance changes with respect to firm size and the third with respect to industry. Beyond the main sample, the operating and financial performance of Greek SMEs and large companies as well as companies of the service and manufacturing sector in Greece is investigated.

The aim of the statistical analysis is to reveal statistically significant changes in operating and financial performance between the pre- and the post- of the beginning of the Greek debt crisis. Thus, median values for both periods are presented, as well as changes in median values for the pre- and post-beginning of the debt crisis period.

Fourteen (14) performance variables are examined for a period of five (5) years before and after the event and are divided in eight (8) groups. The empirical results of this study are discussed for each of those groups below.

5.1 Profitability

Profitability is expected to drop in the debt crisis period for all companies compared to the period before the beginning of the Greek debt crisis. The results, which are in line with the expectations, provide significant evidence for a decline in profitability of Greek companies, as all four variables (ROA, ROE, EBIT and EBITDA) dropped significantly between the pre- and the debt crisis period (see Table 7). Specifically, the median value of ROA decreased by 4.17% points (from 3.00% to -1.17%) and the median value of ROE by 11.80% points (from 4.42% to -7.38%) for the main sample. Additionally, more than 75% of the companies experience a significant performance decrease during the debt crisis period for all profitability measures as indicated by Table 7.

Table 7. Summary of results for changes in profitability measures

Profitability	N	Before (Median)	After (Median)	Change (Median)	Z-Statistic for difference in Medians	Proportion of Firms with decreasing performance	Z-Statistic for significance of Proportion Change
Main Sample							
ROA (%)	217	3.00	-1.17	-4.17	-10.61***	0.84	10.11***
ROE (%)	206	4.42	-7.38	-11.80	-11.31***	0.88	11.01***
EBIT (th EUR)	215	3,147.20	-271.80	-3,419.00	-8.39***	0.80	8.66***
EBITDA (th EUR)	215	5,760.00	1.327.60	-4,432.40	-7.43***	0.77	7.84***
SMEs vs Large companies							
ROA (%)							
SMEs	101	2.35	-1.19	-3.54	-6.496***	0.81	6.27***
Large Companies	116	3.56	-1.10	-4.65	-8.350***	0.87	7.98***
ROE (%)							
SMEs	97	2.25	-7.21	-9.46	-7.180***	0.87	7.21***
Large Companies	109	6.01	-9.05	-15.06	-8.678***	0.90	8.33***
EBIT (th EUR)							
SMEs	99	1,300.00	-159.60	-1,459.60	-4.996***	0.77	5.33***
Large Companies	116	9,376.40	-1,227.90	-10,604.30	-6.719***	0.82	6.87***
EBITDA (th EUR)							
SMEs	99	2,437.80	763.80	-1,674.00	-4.817***	0.75	4.92***
Large Companies	116	15,733.00	4,412.00	-11,321.00	-5.719**	0.78	6.13***
Service vs Manufacturing							
ROA (%)							
Services	32	4.97	-0.73	-5.70	-4.450***	0.91	4.60***
Manufacturing	95	2.27	-1.17	-3.44	-6.427***	0.81	6.05***
ROE (%)							
Services	31	8.68	-5.37	-14.05	-4.762***	0.97	5.21***
Manufacturing	92	1.54	-12.30	-13.84	-7.200***	0.85	6.67***
EBIT (th EUR)							
Services	31	2,546.80	-110.20	-2,567	-4.213***	0.87	4.13***
Manufacturing	94	2,661.90	-195.30	-2,857.20	-5.138***	0.76	4.95***
EBITDA (th EUR)							
Services	31	3,512.00	1,192.60	-2,319.40	-3.802***	0.81	3.41***
Manufacturing	94	5,778.60	1,477.60	-4,301.00	-4.915***	0.77	5.16***

***, **, * Significant at the 1, 5 and 10% percent levels, respectively.

The results for the sub samples do not differ from the findings for the main sample. Profitability measures dropped significantly for most Greek companies regardless of their size. However, small and medium enterprises (SMEs) are slightly less affected in terms of profitability than large companies. Specifically, the median ROA dropped 3.54% points (from 2.35% to -1.19%) for SMEs, but 4.65% points (from 3.56% to -1.10%) for large companies, both at the 1% significance level. Concerning the industrial sectors, both companies from the service and from the manufacturing sector are significantly affected by the Greek debt crisis, as the ROA-median decreased by 5.70% points (from 4.97% to -0.73%) and by 3.44% points (from 2.27% to -1.17%), significantly, and the ROE-median dropped by 14.05% points (from 8.68% to -5.37%) and 13.84% points (from 1.54% to -12.30%), respectively.

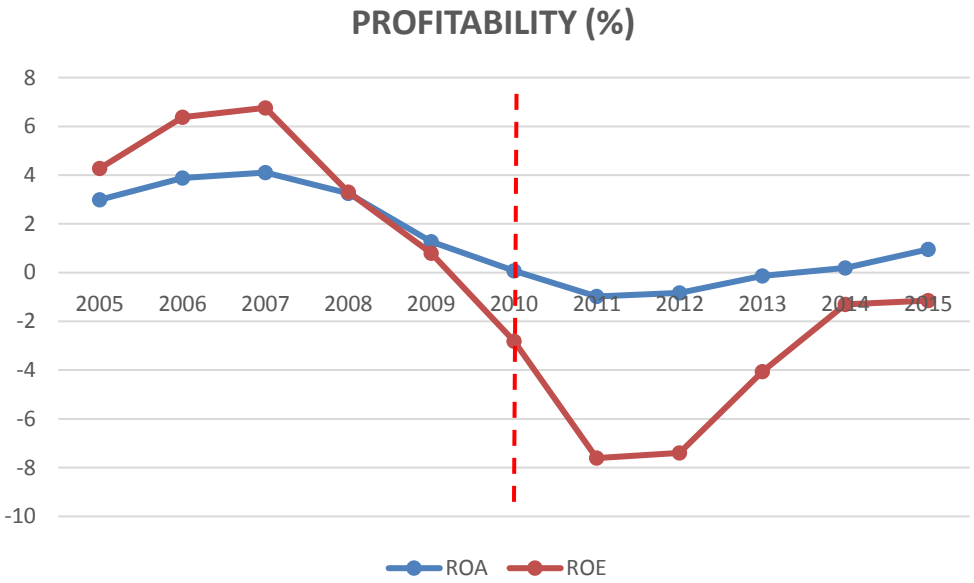

Figure 7. ROA and ROE profitability measures for the main sample

Novotna (2013) examines industrial companies across Europe and shows a significant decline in ROA and ROE median values for Greek companies for the years 2007-2008 and 2008-2009. As Figure 7 indicates, median values for both ROA and ROE experience a huge decrease from 2007 to 2011, while in the period after 2011 both indicators appear to recover.

5.2 Operating Efficiency

As predicted in the second chapter, operating efficiency is expected to drop in the debt crisis period for all companies compared to the period before the beginning of the Greek debt crisis. The operating efficiency variable (Real sales per employee) is computed as a ratio, with the value one for the year 2010, while the years from -1 to -5 and +1 to +5 are specified relative to unity.

The normalized operating efficiency and the respective benchmark are shown in Figure 8 below. Specifically, Figure 8 indicates that the Greek listed companies (main sample) underperform the benchmark (Greek economy) before the beginning of the Greek debt crisis, but also after the event of the Greek debt crisis in 2010, even more significantly. In particular, overall the Greek economy suffers less than listed companies during the debt crisis period.

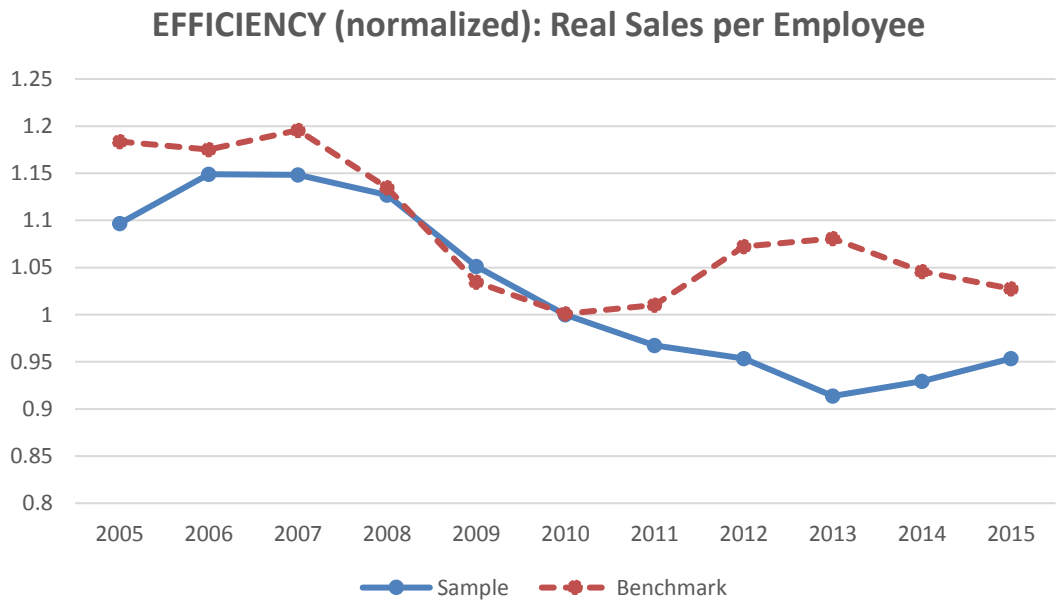

Figure 8. Efficiency and respective benchmark for the main sample

The results are in line with the expectation for the total sample, as both adjusted and unadjusted median value for the variable "Real sales per employee" decreased significantly. Specifically, the analysis indicates a significant decline of 19% points (from 113% to 94%) for the unadjusted operating efficiency, and 9% points (from -1% to -10%) for the market adjusted (see Table 8). Moreover, 68% (unadjusted) and 60% (adjusted) of the companies present a significant decreasing performance in the debt crisis period.

Table 8. Summary of results for changes in operating efficiency

Operating Efficiency	N	Before (Median)	After (Median)	Change (Median)	Z-Statistic for difference in Medians	Proportion of Firms with decreasing performance	Z-Statistic for significance of Proportion Change
Main Sample							
Real Sales per Employee (unadjusted)	207	1.13	0.94	-0.19	-6.072***	0.68	5.21***
Real Sales per Employee (adjusted)	207	-0.01	-0.10	-0.09	-3.306***	0.60	2.85***
SMEs vs Large companies							
Real Sales per Employee (unadjusted)							
SMEs	92	1.15	0.92	-0.23	-4.614***	0.72	4.17***
Large Companies	115	1.13	0.96	-0.17	-3.974***	0.65	3.26***
Real Sales per Employee (adjusted)							
SMEs	92	-0.78	-0.85	-0.07	-1.628	0.59	1.67*
Large Companies	115	-0.807	-0.808	-0.001	-0.243	0.49	-0.28
Services vs Manufacturing							
Real Sales per Employee (unadjusted)							
Services	29	1.27	0.90	-0.37	-3.471***	0.86	3.90***
Manufacturing	91	1.11	0.99	-0.12	-4.263***	0.68	3.46***
Real Sales per Employee (adjusted)							
Services	29	0.12	-0.15	-0.37	-3.060***	0.79	3.16***
Manufacturing	92	-0.03	-0.04	-0.01	-1.830*	0.55	1.04

***, **, * Significant at the 1, 5 and 10% percent levels, respectively.

However, the sub samples provide mixed evidence concerning adjusted and unadjusted operating efficiency. Specifically, SMEs and large companies reveal a significant decline in unadjusted efficiency, while the median decrease for adjusted efficiency is not significant for both categories. Furthermore, unadjusted operating efficiency shows a significant median decrease by 37% points (from 127% to 90%) for the service sector and 12% points (from 111% to 99%) for the manufacturing companies. A significant portion (86%) in the service sector experience a decline in unadjusted operating efficiency. Additionally, Table 8 also indicates a significant decrease in unadjusted operating efficiency by 37% points (from 127% to 90%) for service sector and by 1%

points (from -3% to -4%) for the manufacturing sector. However, the median change in manufacturing companies is significant only at 10% level.

5.3 Capital Structure

Concerning the impact of the debt crisis on the capital structure of Greek listed companies, it is expected that the crisis will affect the capital structure of Greek companies negatively. Furthermore, assuming that the access to external financing became more difficult during the Greek debt crisis, as banks were also hit by the crisis, it is expected that the leverage drops in the debt crisis period. However, since companies during an economic crisis typically face difficulties to repay their debt, someone could also expect that the debt crisis will increase the total debt of the companies and that in addition equity will be reduced. Moreover, Kolev et al. (2013) denotes that Greek SMEs have increased leverage ratios compared to other European economies, thus, it is interesting to examine whether the capital structure of Greek companies has changed and how.

To examine whether the capital structure of Greek companies is affected during the Greek debt crisis, two measures are considered: "Long-term Debt to Equity" and "Total Debt to Total Assets" (see Figure 9). Specifically, Figure 9 shows that the total debt to total assets ratio experienced an increase during the debt crisis, while the long-term debt to equity ratio documented a huge decline. However, the results of the statistical analysis provide mixed evidence for our performance measures, as we could not find a significant change for both ratios.

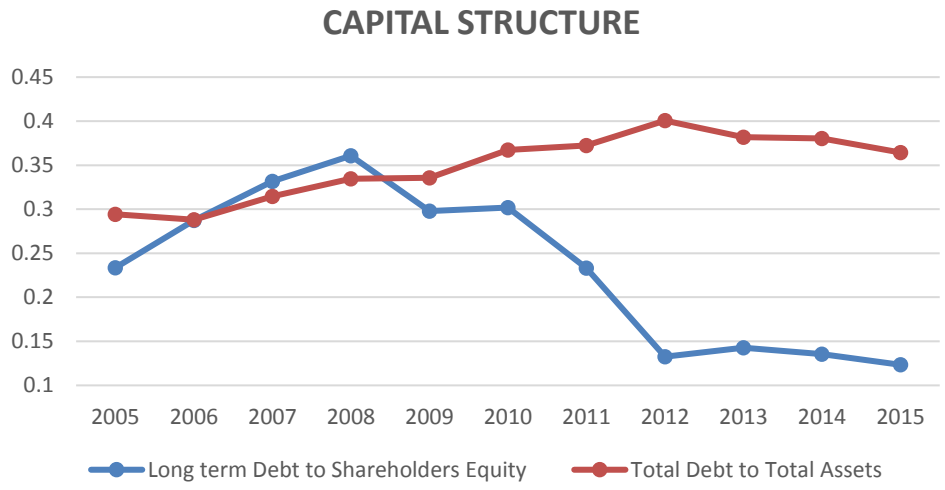

Figure 9. Capital Structure ratios for the main sample

The results in Table 9 reveals that the long-term debt to equity ratio decreased by 42% (from 33% to 19%) for the main sample, but not significant. Contrary to the expectations of decreased leverage levels during the debt crisis period, the results for the main sample indicate a significant increase by 26% (from 31% to 39%) for the variable "Total Debt to Total Assets", while a significant portion (68%) of the companies experienced an increasing leverage in the debt crisis period (see Table 9).

Table 9. Summary of results for changes in capital structure

Capital Structure	N	Before (Median)	After (Median)	Change (Median)	Z-Statistic for difference in Medians	Proportion of Firms with decreasing performance	Z-Statistic for significance of Proportion Change
Main Sample							
Long- term Debt to Equity	217	0.33	0.19	-0.14	-1.620	0.54	1.15
Total Debt to Total Assets	217	0.31	0.39	0.08	7.362***	0.32	-5.23***
SMEs vs Large Companies							
Long- term Debt to Equity							
SMEs	101	0.20	0.13	-0.07	-1.078	0.49	-0.30
Large Companies	116	0.53	0.29	-0.24	-1.063	0.59	1.86*
Total Debt to Total Assets							
SMEs	101	0.28	0.33	0.05	4.185***	0.32	-3.68***
Large Companies	116	0.35	0.47	0.12	6.148***	0.33	-3.71***
Service vs Manufacturing							
Long- term Debt to Equity							
Services	32	0.21	0.14	-0.08	-0.573	0.50	0.00
Manufacturing	108	0.36	0.38	0.02	1.752*	0.40	-2.12**
Total Debt to Total Assets							
Services	32	0.27	0.32	0.05	2.136**	0.38	-1.41
Manufacturing	95	0.35	0.47	0.11	5.249***	0.31	-3.80***

***, **, * Significant at the 1, 5 and 10% percent levels, respectively.

Moreover, the results of both sub-samples are in line with the results of the total sample. The leverage ratio "Total Debt to Total Assets", thus, increased significantly by 5% points (from 28% to 33%) and by 12% points (from 35% to 47%) for both SMEs and Large companies, respectively. According to the European Central Bank (2013), European SMEs show higher leverage ratios (Total debt to total Assets) compared to large firms. However, the results reveal that large

companies in Greece have greater leverage than SMEs both pre- and in the debt crisis period. Moreover, Table 9 reveals that firms from the service and the manufacturing sector also show a significant increase in "Total Debt to Total Assets" leverage level, by 5% points and by 11% points, respectively.

As the results reveal mixed evidence, two additional leverage ratios for the further investigation of the capital structure of Greek listed companies are considered (see Figure 10). These measures are: "Long-term Debt to Assets" and "Shareholders Equity to Total Assets", and Figure 10 presents their development between 2005 and 2015. Specifically, the equity to assets ratio experiences a slight decline after 2010, while the long-term debt to assets ratio also seems to decline after 2010. However, the decline of both ratios is not so sharp as the decline of the long-term debt to equity ratio.

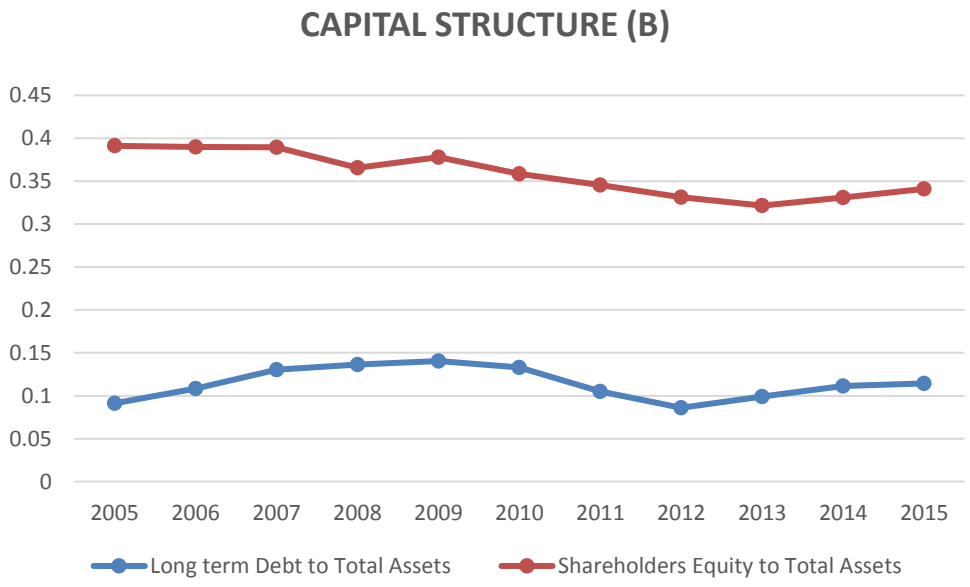

Figure 10. Additional Capital Structure ratios for the main sample

5.4 Liquidity

Novotna (2013) confirms the negative effect of the financial crisis of 2007-2008 to European companies with respect to profitability and liquidity. Greek companies were also hit by the crisis, thus, both liquidity ratios (Quick and Current ratio) are expected to drop in the debt crisis period.

The results in Table 10 reveal that both liquidity ratios decreased significantly for the total sample in the debt crisis period. Specifically, the median value of the quick ratio drops by 27% (from 1.05 to 0.78) and the current ratio also by 27% (from 1.56 to 1.13), both are significant changes. Moreover, a significant portion of 71% and 69%, respectively, experience a decreasing liquidity in the debt crisis period.

Table 10. Summary of results for changes in liquidity

Liquidity	N	**Before** (Median)	**After** (Median)	**Change** (Median)	Z-Statistic for difference in Medians	Proportion of Firms with decreasing performance	Z-Statistic for significance of Proportion Change
Main Sample							
Quick Ratio	217	1.05	0.78	-0.28	-6.166***	0.71	6.04**
Current Ratio	217	1.56	1.13	-0.42	-5.978***	0.69	5.63**
SMEs vs Large companies							
Quick Ratio							
SMEs	101	1.16	0.88	-0.28	- 3.621***	0.66	3.28***
Large Companies	116	0.95	0.7	-0.25	-5.190***	0.74	5.20***
Current Ratio							
SMEs	101	1.64	1.29	-0.35	-3.271***	0.65	2.89***
Large Companies	116	1.46	0.98	-0.48	-5.197***	0.73	5.01***
Service vs Manufacturing							
Quick Ratio							
Services	32	1.34	0.92	-0.42	-2.899***	0.72	2.47**
Manufacturing	95	0.95	0.75	-0.20	-5.028***	0.71	4.00***
Current Ratio							
Services	32	1.55	1.05	-0.50	-3.029***	0.72	2.47**
Manufacturing	95	1.52	1.13	-0.39	-4.824***	0.71	4.00***

***, **, * Significant at the 1, 5 and 10% percent levels, respectively.

Furthermore, European SMEs are ought to have higher liquidity levels than large firms. More than 40% of SMEs in Greece, Ireland and Spain have faced barriers applying for a bank loan (European Central Bank, 2013). The results reveal that Greek SMEs have higher liquidity levels than large companies. However, both SMEs and large companies show a significantly decrease in both liquidity ratios during the debt crisis period (see Table 10).

Figure 11 presents the change in both liquidity ratios from 2005 to 2015 for the main sample of 269 companies, where both liquidity ratios experienced a decline.

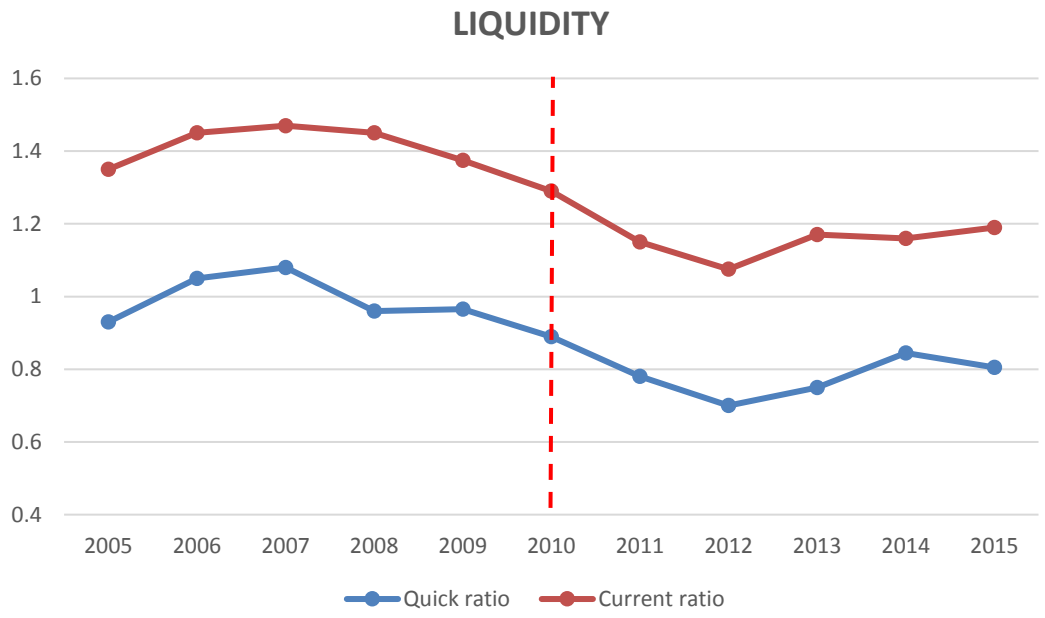

Figure 11. Liquidity measures for the main sample

5.5 Employment

Employment levels are expected to drop after the start of Greek debt crisis, as Greece is the country with the highest unemployment rate among European countries. Specifically, the overall Greece unemployment rate rose from 9% to 25% in the period between 2010-2015. The employment level is determined as one in year 2010, while years from -1 to -5 and +1 to +5 are specified relative to unity. Table 11 shows a significant decline for the total sample for unadjusted employment by 22% points (from 111% to 89%) and for adjusted employment by 6.5% points (from 8% to 1.5%). Employment drops for sub samples as well, but not significant in all cases.

The results present that the impact of the Greek debt crisis is greater on SMEs than on large companies. Moreover, unadjusted employment drops by 23% (from 120% and 93%) for SMEs and by 18% (from 107% to 88%) for large companies respectively, while both SMEs and large companies significantly underperform the benchmark. Specifically, the median declines in adjusted employment by 12% points (from 17% to 5%) for SMEs and by 4.8% points (from 4.3% to -0.05%)

for large companies, but the change is only for SMEs significant. Moreover, 74% (unadjusted) and 65% (adjusted) of SMEs present a significant decrease in employment in the debt crisis period.

Table 11. Summary of results for changes in employment

Employment	N	Before (Median)	After (Median)	Change (Median)	Z-Statistic for difference in Medians	Proportion of Firms with decreasing employment	Z-Statistic for significance of Proportion Change
Main sample							
Total Employment	208	1.11	0.89	-0.22	-7.922***	0.73	6.66***
Total Employment (adjusted)	208	0.08	0.015	-0.065	-3.530***	0.6	2.77***
SMEs vs Large companies							
Total Employment							
SMEs	93	1.2	0.93	-0.27	-5.811***	0.74	4.67***
Large Companies	115	1.07	0.88	-0.19	-5.431***	0.72	4.76***
Total Employment (adjusted)							
SMEs	93	0.17	0.05	-0.12	-3.661***	0.65	2.80***
Large Companies	115	0.043	-0.005	-0.048	-1.370	0.56	1.21
Service vs Manufacturing							
Total Employment							
Services	29	1.01	0.99	-0.03	-1.200	0.59	0.93
Manufacturing	92	1.13	0.90	-0.23	-6.106***	0.77	5.21***
Total Employment (adjusted)							
Services	29	-0.01	0.12	0.13	0.638	0.41	-0.93
Manufacturing	92	0.10	0.031	-0.07	-3.360***	0.64	2.71**

***, **, * Significant at the 1, 5 and 10% percent levels, respectively.

Employment of companies from the manufacturing sector decreased by 23% points (unadjusted) and by 7% (adjusted), both are significant changes. However, the results reveal mixed evidence for companies from the service sector, as unadjusted employment decreased by 3% points, while the adjusted employment increased by 13% points, both not significant changes.

Figure 12 shows that Greek listed companies (sample) overperform the market (benchmark) in the pre- as well as the post- of the beginning of the Greek debt crisis period. The significant decline on the employment of Greek listed companies begins in 2008 which indicates that Greek listed

companies are also severely affected by both the global financial as well the Greek debt crisis, while overall the Greek economy seems to be more affected by the Greek debt crisis in late 2009.

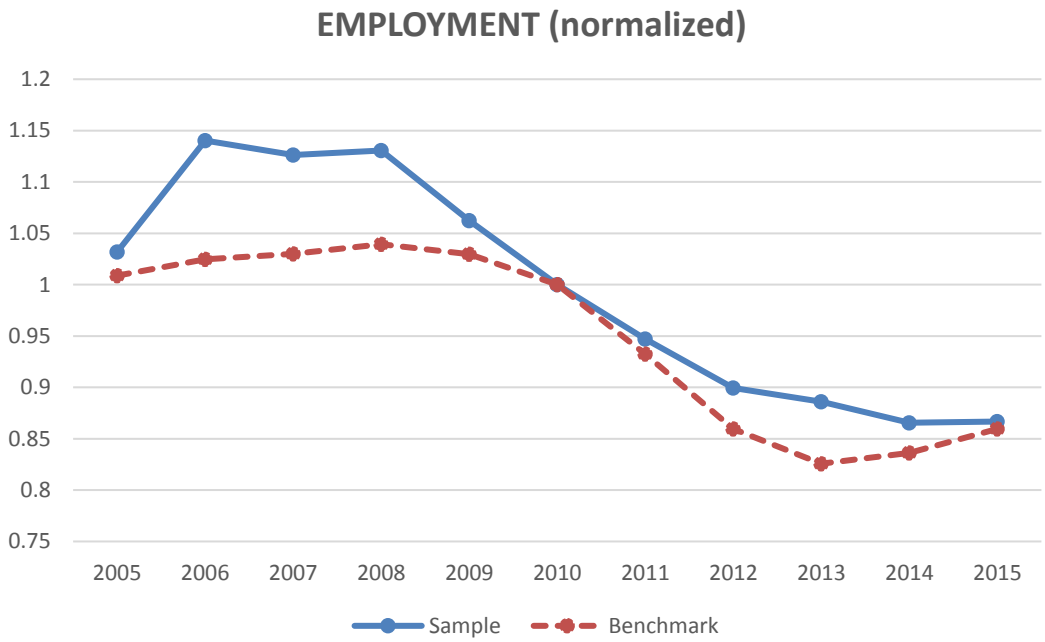

Figure 12. Employment level and respective benchmark for the main sample

5.6 Dividends

In order to examine dividends' performance, the "Dividends to Sales" ratio is considered. As most of performance measures drop are expected to drop in the debt crisis period, the variable dividends to sales is also expected to decrease. Table 12, thus, presents a significant decline for all samples, except from the service industry, where the decline is not significant. Specifically, for the total sample, the dividends to sales ratio declines by 65% (from 0.23% to 0.08%), which is in line with the prediction. Moreover, a significant portion of the main sample (73%) experience a performance decrease during the debt crisis period.

Concerning the sub-samples, all of them experienced a performance decrease (see Table 12). Specifically, the dividend to sales ratio dropped by 100% (from 0.06% to 0.00%) for SMEs and by 60% (from 0.5% to 0.2%). Moreover, 100% of SMEs and 70% of large companies experienced a significant decline during the debt crisis period. Furthermore, the ratio dividends to sales dropped

significantly by 0.1% points (from 0.01% to 0.00%) for the manufacturing sector. On the other hand, companies from the service sector did not experience a significant decrease in dividends to sales ratio during the Greek debt crisis (see Table 12).

Table 12. Summary of results for changes in dividends

Dividends	N	**Before** (Median)	**After** (Median)	**Change** (Median)	Z-Statistic for difference in Medians	Proportion of Firms with decreasing performance	Z-Statistic for significance of Proportion Change
Main sample							
Dividend to Sales	83	0.0023	0.0008	-0.0015	-2.937**	0.73	4.28***
SMEs vs Large companies							
Dividend to Sales							
SMEs	23	0.0006	0.0000	-0.0006	-2.737***	1.00	4.80***
Large Companies	61	0.005	0.002	-0.003	-2.259***	0.70	3.20***
Services vs Manufacturing							
Dividend to Sales							
Services	10	0.006	0.002	-0.004	-0.663	0.70	1.26
Manufacturing	38	0.001	0.000	-0.001	-2.023**	0.74	2.92***

***, **, * Significant at the 1, 5 and 10% percent levels, respectively.

The change in dividends to sales ratio from 2005 to 2015 for the main sample is presented in Figure 13 below.

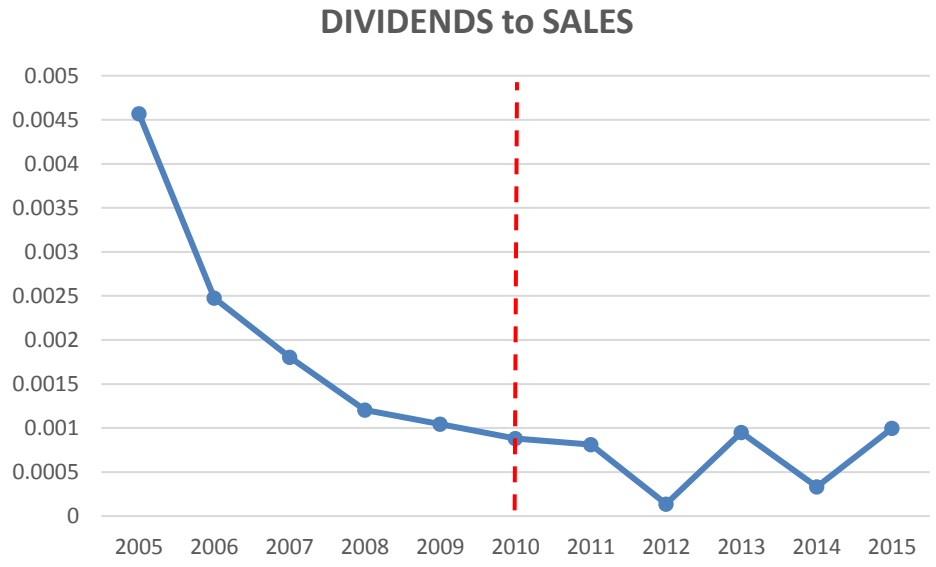

Figure 13. Dividends to sales for the main sample (in %/100)

5.7 Output

Recession periods are typically characterized by reduced demand and lower output. Thus, a decline in the variable output in the debt crisis period is expected. The variable output refers to inflation adjusted sales. Specifically, real sales are calculated as net sales divided by CPI [15] (with the base year 2010) and then are normalized to unity in year 0 (2010), with years from -1 to -5 and +1 to +5 are identified relative to unity. The normalized output and the respective benchmark are shown in Figure 14 below. In particular, both the output of Greek listed companies as well as the benchmark drop significantly after the financial crisis of 2007-08. However, the effect of the Greek debt crisis is greater for Greek sample companies, as they underperform the benchmark since 2010.

Concerning the main sample, the results in Table 13 indicate that the median real sales decreased significantly for both unadjusted and adjusted output variables. Specifically, unadjusted real sales decreased by 38% points (from 121% to 83%), while the market adjusted real sales dropped by 11% points (from 3% to -8%). Thus, the output (real sales) dropped significantly more for Greek listed companies than for the benchmark (real production of the Greek economy) during the Greek debt crisis period. Furthermore, a significant portion (61%) of sample firms appear to underperform the benchmark.

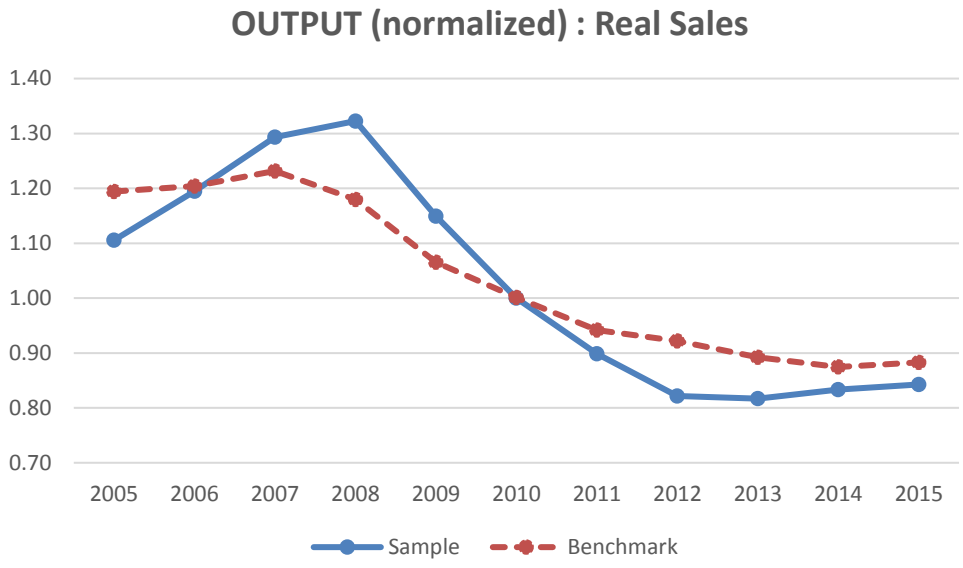

Figure 14. Output and respective benchmark for the main sample

[15] Source: OECD

The results of sub samples are in line with the total sample as indicated in Table 13. Specifically, the normalized output for SMEs and large companies for the period in the debt crisis is significantly declined by 34% (from 128% to 84%) and by 28% (from 114% to 82%), respectively. Contrary to that evidence, median adjusted real sale for large companies also dropped by 5% points, but not significant. This implies that the significant adjusted real sales decrease for the main sample is mainly caused by a significant output decline of SMEs.

Table 13. Summary of results for changes in output

Output	N	Before (Median)	After (Median)	Change (Median)	Z-Statistic for difference in Medians	Proportion of Firms with decreasing performance	Z-Statistic for significance of Proportion Change
Main sample							
Real Sales (unadjusted)	216	1.21	0.83	-0.38	-8.679***	0.75	7.35***
Real Sales (adjusted)	216	0.03	-0.08	-0.11	-3.452***	0.61	3.13***
SMEs vs Large companies							
Real Sales (unadjusted)							
SMEs	100	1.28	0.84	-0.44	-6.261***	0.76	5.20***
Large Companies	116	1.14	0.82	-0.32	-6.053***	0.74	5.20***
Real Sales (adjusted)							
SMEs	100	0.11	-0.06	-0.17	-3.445***	0.68	3.60***
Large Companies	116	-0.04	-0.09	-0.05	-1.355	0.54	0.93
Services vs Manufacturing							
Real Sales (unadjusted)							
Services	32	1.17	0.86	-0.31	-3.067***	0.69	2.12**
Manufacturing	94	1.28	0.85	-0.42	-6.201***	0.77	5.16***
Real Sales (adjusted)							
Services	32	0.00	-0.04	-0.04	-0.692	0.56	0.71
Manufacturing	94	0.10	-0.05	-0.15	-2.936***	0.64	2.68***

***, **, * Significant at the 1, 5 and 10% percent levels, respectively.

A significant decline in unadjusted output (real sales) occurred in companies from the service and the manufacturing sector by 26% (from 117% to 86%) and by 33% (from 128% to 85%), respectively. Moreover, a significant portion (64%) of companies from manufacturing sector underperform the market, while the adjusted output for the these group of companies dropped

significantly by 15% points (from 10% to -5%) for the period post to beginning of the debt crisis. On the other hand, companies from the service sector did not experience a significant decline in adjusted reals sales during the Greek debt crisis (see Table 13).

5.8 Capital Investment Spending

Since after the global financial of 2007-08 dropped foreign investments in Greece, it is also expected that capital investments in this study will further drop during debt crisis. The capital investment spending is examined based on two variables, "Capital expenditures to Assets" and "Capital expenditures to Sales". For the variable "Capital investments to Sales" both unadjusted and market adjusted performance is computed, where the year 2010 is fixed at unity and the years from -1 to -5 and +1 to +5 are expressed relative to unity.

The normalized capital expenditures to sales ratio and the respective benchmark are shown in figure 15 below. In particular, Figure 15 presents that both the ratio capital investments to sales and the respective benchmark drop significantly after the financial crisis of 2007-08, while the decline is greater for Greek listed companies during the debt crisis period, as they underperform the benchmark.

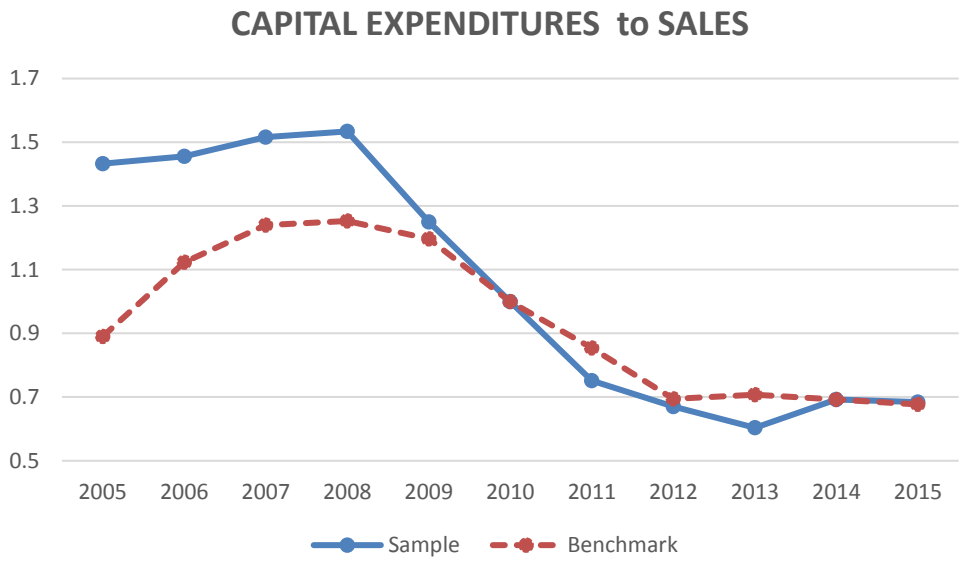

Figure 15. Capital investment spending for the main sample

Table 14. Summary of results for changes in capital investments

Capital Investment Spending	N	Before (Median)	After (Median)	Change (Median)	Z-Statistic for difference in Medians	Proportion of Firms with decreasing capital investments	Z-Statistic for significance of Proportion Change
Main Sample							
Capital exp. to Assets (%)	217	4.02	1.16	-2.86	-10.356***	0.86	10.66***
Capital exp. to Sales (unadjusted)	208	1.56	0.80	-0.76	-8.154***	0.8	8.60***
Capital exp. to Sales (adjusted)	208	0.39	0.07	-0.32	-4.745***	0.62	3.47***
SMEs vs Large companies							
Capital exp. to Assets (%)							
SMEs	101	2.65	0.86	-1.79	-6.579***	1	10.50***
Large Companies	116	4.75	1.34	-3.41	-7.951***	0.87	7.98***
Capital exp. to Sales (unadjusted)							
SMEs	93	1.67	0.76	-0.91	-4.918***	1	9.64***
Large Companies	115	1.51	0.81	-0.70	-6.561***	0.83	7.18***
Capital exp. to Sales (adjusted)							
SMEs	93	0.53	0.03	-0.50	-2.826***	0.63	2.59***
Large Companies	115	0.37	0.07	-0.30	-3.910***	0.64	3.08***
Services vs Manufacturing							
Capital exp. to Assets (%)							
Services	31	5.99	1.03	-4.96	-3,704***	0.84	3.77***
Manufacturing	95	3.56	1.47	-2.10	-5.943***	0.83	6.46***
Capital exp. to Sales (unadjusted)							
Services	31	0.95	0.64	-0.32	-2.214**	0.61	1.26
Manufacturing	92	1.61	0.87	-0.74	-4.712***	0.79	5.63***
Capital exp. to Sales (adjusted)							
Services	31	-0.19	-0.09	0.10	0.000	0.45	-0.54
Manufacturing	92	0.47	0.14	-0.32	-2.473**	0.60	1.88*

***, **, * Significant at the 1, 5 and 10% percent levels, respectively.

The results in Table 14 indicate a significant decline for both variables of capital investments. Specifically, the median performance of "Capital expenditures to Assets" shows a significant decline by 71% (from 4.02% to 1.16%) between both periods, while a significant portion of Greek listed firms (86%) experienced a decrease in capital expenditures to assets ratio during the debt crisis period. Concerning the "Capital expenditures to Sales" ratio, the unadjusted performance declined significantly by 49% or 76% points (from 156% to 80%), while the market adjusted ratio underperforms the benchmark significantly by 32% points (from 39% to 7%).

With respect to sub-samples, Table 14 reveals significant decline in most unadjusted as well as market adjusted capital investments ratios for both sub samples in the debt crisis period. Moreover, both SMEs and large companies underperform the market, by 30% points and 50% points, respectively. A significant portion of SMEs (100%) and large companies (83%) reveal decreasing capital expenditures to assets ratio (unadjusted) in the debt crisis period, while also a significant portion of SMEs (63%) and large companies (64%) experienced a decrease in capital expenditures to assets ratio (adjusted) during the debt crisis period. Although companies from the service sector still underperform the benchmark, they managed to reduce this underperformance by 10% points in the period after the beginning of the Greek debt crisis. The results further reveal that the manufacturing sector experienced a stronger decline in capital investments than the service sector. E.g. the unadjusted performance of the manufacturing sector drops by 74% points compare to 32% points of the service sector, while the market adjusted investment spending drops by 32% points in the manufacturing sector compared to a relative increase of 10% points in the service sector (see Table 14).

6. Conclusion

This master thesis compares the financial and operating performance of Greek listed companies in the period pre- and post- of the beginning of the Greek debt crisis in 2010. Overall a main sample of 269 Greek listed companies is used (217 companies with paired observations). The methodology of this study is based on previous literature that examines the impact of an economic event on company's performance. In this case, the Greek debt crisis is the event and the overall examination period is from 2005 to 2015. Fourteen performance measures are examined, while the abnormal performance of four important performance measures is also investigated, in order to identify possible effects of the crisis.

In accordance with the expectations of the impact of an economic crisis on the performance of companies, the present thesis shows significant decreases in median values of most performance measures. Specifically, profitability, operating efficiency, liquidity, employment, dividends, output and capital investments significant decline in the debt crisis period, while mixed evidence is found concerning the impact of the Greek debt crisis on the capital structure.

As it is expected during a debt crisis period, all *profitability* ratios exhibit a significant decrease. Specifically, ROA and ROE experienced a huge decline during the debt crisis period. However, the decrease of both ROA and ROE occurred after the financial crisis of 2007-08 and the decrease continued further during the Greek debt crisis period. With respect to *operating efficiency*, the ratio real sales per employee (both adjusted and unadjusted) drops significantly in the debt crisis period. Moreover, it is documented that listed companies (sample) suffer more than overall the Greek economy by the Greek debt crisis in terms of operating efficiency, which is reasonable as the number of employees of listed companies affected less compared to the employment index of Greece and real sales of listed companies dropped significantly more than the development of the Greek economy during the crisis. Furthermore, both *liquidity* ratios (quick and current ratio) experienced a significant decrease in the debt crisis period. *Employment* levels (adjusted and unadjusted) drop significantly in the debt crisis period as well. However, the decline in employment has begun after the financial crisis of 2007-08 and it continues further after the beginning of the Greek debt crisis in 2010. Moreover, the employment level of Greek listed companies seems to be less affected than overall the Greek economy (benchmark) by the event of the debt crisis.

Concerning *dividends*, the dividends to sales ratio drops significantly, which is in line with our expectations. Furthermore, *Output* (unadjusted and adjusted) decreased significantly during the debt crisis period. Specifically, output (real sales) dropped significantly more for Greek listed companies than for the benchmark (real production index of the Greek economy). With respect to *capital investment spending*, both ratios (capital expenditures to assets and capital expenditures to sales) drop significant in the debt crisis period, However, the decline is greater for Greek listed companies than for the Greek economy overall during the debt crisis period. Contrary to our expectations of decreased leverage levels, the total debt to total assets ratio increased significantly in the debt crisis period, while the long-term debt to equity decreased, but not significant.

Beyond the effect of the crisis on the main sample, the impact of the crisis on several sub-samples is also examined. The results for the sub-samples are in line with the results of the main sample, as all sub-samples experienced a significant drop in profitability, operating efficiency, liquidity, employment, dividends, output and capital investments, while concerning the capital structure mixed evidence is found. Although European SMEs show typically higher leverage ratios than large companies, in the present study it is found that large companies have greater leverage levels than SMEs in Greece. Moreover, it is documented that Greek SMEs have higher liquidity levels than large companies. Furthermore, companies from the manufacturing sector experienced a significant decrease in both unadjusted and adjusted employment, while the service sector documented a decrease in unadjusted and an increase in adjusted employment, both are not significant changes. Overall, SMEs are affected more than large companies concerning operating efficiency, employment, output and capital investments. Furthermore, the service sector is affected more concerning operating efficiency and liquidity, while the manufacturing sector more concerning output and capital investments. To summarize, the results of this study confirm that the performance of Greek listed companies has been significantly affected since the beginning of the Greek debt crisis.

7. References

Allen, F. and Carletti, E. (2010). An overview of the crisis: Causes, consequences, and solutions. *International Review of Finance*, *10*(1), 1-26.

Aussenegg, W., and Jelic, R. (2007). The operating performance of newly privatised firms in Central European transition economies. *European Financial Management*, *13*(5), 853-879.

Backman, M, (2015, January 26). The market isn't freaking out too much about the Syriza win in Greece. *QWERTZ.* Available at: https://qz.com/333392

Barber, B. M., and Lyon, J. D. (1996). Detecting abnormal operating performance: The empirical power and specification of test statistics. *Journal of Financial Economics*, *41*(3), 359-399.

BBC, (2015, June 28). Greek debt crisis: Banks to stay shut, capital controls imposed. Available at: http://www.bbc.com/news/world-europe-33305019

Boubakri, N., and Cosset, J. C. (1998). The financial and operating performance of newly privatized firms: Evidence from developing countries. *The Journal of Finance*, *53*(3), 1081-1110.

Bourletidis, K., and Triantafyllopoulos, Y. (2014). SMEs Survival in Time of Crisis: Strategies, Tactics and Commercial Success Stories. *Procedia-Social and Behavioral Sciences*, *148*, 639-644.

Castle, S. (2012, March 14). With Details Settled, a 2nd Greek Bailout Is Formally Approved. *The New York Times*. Available at: http://www.nytimes.com/2012/03/15/business/global/greece-gets-formal-approval-for-second-bailout.html

Chi, J., and Padgett, C. (2006). Operating performance and its relationship to market performance of Chinese initial public offerings. *Chinese economy*, *39*(5), 28-50.

Chorafas, D. (2009). Financial boom and gloom: the credit and banking crisis of 2007–2009 and beyond. *Springer*.

Drakos, A. A., and Bekiris, F. V. (2010). Corporate performance, managerial ownership and endogeneity: A simultaneous equations analysis for the Athens stock exchange. *Research in International Business and Finance*, *24*(1), 24-38.

Demirguc-Kunt, A., Martinez-Peria, M., and Tressel T. (2015). The Impact of the Global Financial Crisis on Firms' Capital Structure. *World Bank Policy Research Working Paper,* No. 7522.

Dolenc, P., Grum, A., and Laporsek, S. (2012). The effect of financial/ economic crisis on firm performance in Slovenia - A micro level, difference-in-differences approach. *Montenegrin Journal of Economics*, *8*(2), 207-222.

D'souza, J., and Megginson, W. L. (1999). The financial and operating performance of privatized firms during the 1990s. *The Journal of Finance*, *54*(4), 1397-1438.

Eisenberg, T., Sundgren, S., and Wells, M. T. (1998). Larger board size and decreasing firm value in small firms. *Journal of Financial Economics*, *48*(1), 35-54.

Ellyat, H. (2015, August 3). Greek stock market closes down 16% after reopening. *CNBC.* Available at: http://www.cnbc.com/2015/08/03/greek-stock-market-reopens.html

European Central Bank, (2013). Monthly Bulletin July. Available at: https://www.ecb.europa.eu/pub/pdf/mobu/mb201307en.pdf

European Commission, (2003). COMMISSION RECOMMENDATION of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:en:PDF

European Commission, (2016). SME Performance Review. Available at: https://ec.europa.eu/growth/smes/business-friendly-environment/performance-review-2016

Eurostat. Title: Employment and activity by sex and age - annual data. Code: lfsi_emp_a. Available at: http://ec.europa.eu/eurostat/en/web/products-datasets/-/LFSI_EMP_A

Eurostat. Gross domestic product at market prices. Code: tec00001. Available at: http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tec00001&language=en

Farinos, J. E., Garcia, C. J., and Ibanez, A. M. (2007). Operating and stock market performance of state-owned enterprise privatizations: The Spanish experience. *International Review of Financial Analysis*, *16*(4), 367-389.

Florou, C., and Chalevas, C. (2010). Key Accounting value drivers that affect stock returns: evidence from Greece. *Managerial Finance*, *36*(11), 921-930.

Gibson, H.D., Hall, S.G., and Tavlas, G.S. (2012). The Greek financial crisis: Growing imbalances and sovereign spreads. *Journal of International Money and Finance*, *31*(3), 498-516.

Gourinchas, P. O., Philippon, T., and Vayanos, D. (2017). The analytics of the Greek crisis. *NBER Macroeconomics Annual*, *31*(1), 1-81.

GR Reporter, (2014, September 16). The index of the Athens Stock Exchange has fallen five times over the course of 15 years. Available at: http://www.grreporter.info/en/index_athens_stock_exchange_has_fallen_five_times_over_course_15_years/11707

Himmelberg, C. P., Hubbard, R. G., and Palia, D. (1999). Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of Financial Economics*, *53*(3), 353-384.

Iqbal, A., and Kume, O. (2014). Impact of financial crisis on firms' capital structure in UK, France, and Germany. *Multinational Finance Journal*, *18*, 249-280.

Jain, B.A., and Kini, O. (1994). The post-issue operating performance of IPO firms. *The Journal of Finance*, *49*(5), 1699-1726.

Kaplan, S. (1989). The effects of management buyouts on operating performance and value. *Journal of Financial Economics*, *24*(2), 217-254.

Kolev, A., Tanayama, T., and Wagenvoort, R. (2013). Investment and Investment Finance in Europe. Economics Department of European Investment Bank. *Published by the European Investment Bank*.

Kouretas, G.P., and Vlamis, P. (2010). The Greek crisis: causes and implications *Panoeconomicus*, *57*(4), 391-404.

KPMG. Corporate tax rates table. Available at: https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html

Lane, P. R. (2012). The European sovereign debt crisis. *The Journal of Economic Perspectives*, *26*(3), 49-67.

Lazaridis, I., and Tryfonidis, D. (2006). Relationship between working capital management and profitability of listed companies in the Athens stock exchange. *Journal of Financial Management and Analysis*, *19*(1), 26-35.

Liargovas, P., and Repousis, S. (2011). The impact of mergers and acquisitions on the performance of the Greek banking sector: An event study approach. *International Journal of Economics and Finance*, *3*(2), 89-100.

Liargovas, P., and Skandalis, K. (2010). Factors affecting firms' performance: The case of Greece. *Global Business and Management Research: An International Journal*, *2*(2), 184-197.

MacKinlay, A. C. (1997). Event studies in economics and finance. *Journal of Economic Literature*, *35*(1), 13-39.

Markantonatou, M. (2013). Diagnosis, treatment, and effects of the crisis in Greece: A "special case" or a "test case"? *Max Plank Institute for the Study of Societies MPIfG* Discussion Paper, No. 13/3.

Megginson, W. L., Nash, R. C., and Randenborgh, M. (1994). The financial and operating performance of newly privatized firms: An international empirical analysis. *The Journal of Finance*, *49*(2), 403-452.

Mishkin, F.S. (1996). Understanding financial crises: A developing country perspective. *48 Annual World Bank conference on development economics*, Washington DC: World Bank, 29-62.

Mitchell, M. L., and Stafford, E. (2000). Managerial Decisions and Long-Term Stock Price Performance. *The Journal of Business*, *73*(3), 287-329.

Mody, A., and Sandri, D. (2012). The eurozone crisis: how banks and sovereigns came to be joined at the hip. *Economic Policy*, *27*(70), 199-230.

Mylonas, P., and Tzakou-Lambropoulou N. (2016a). Survey of Greek SMEs Second half of 2015. *National Bank of Greece*.

Mylonas, P., and Tzakou-Lambropoulou N. (2016b). Survey of Greek SMEs Retail Trade. *National Bank of Greece*.

Nelson, R., Belkin, P., Mix, D., and Weiss, M. (2012). The Eurozone crisis: Overview and issues for Congress. *Congressional Research Service*, Report 42377.

Novotná, M. (2013). An event study approach to assessing the effect of the financial crisis on European companies. *ECON-Journal of Economics, Management & Business*, *23*(2), 91-106.

OECD, (2017). Long-term interest rates (indicator). doi: 10.1787/662d712c-en

Ozturk, S., and Sozdemir, A. (2015). Effects of Global Financial Crisis on Greece Economy. *Procedia Economics and Finance*, *23*, 568-575.

Pazarskis, M., Vogiatzogloy, M., Christodoulou, P., and Drogalas, G. (2006). Exploring the improvement of corporate performance after mergers–the case of Greece. *International Research Journal of Finance and Economics*, *6*(22), 184-192.

Petrakis, P., Kostis, P., and Valsamis, D. (2013). European Economics and Politics in the Midst of the Crisis. From the Outbreak of the Crisis to the Fragmented European Federation. *New York and Heidelberg: Springer*.

Powell, R. G., and Stark, A. W. (2005). Does operating performance increase post-takeover for UK takeovers? A comparison of performance measures and benchmarks. *Journal of Corporate Finance*, *11*(1), 293-317.

Reinhart, C. M., and Rogoff, K. S. (2011). From financial crash to debt crisis. *The American Economic Review*, *101*(5), 1676-1706.

Stamouli, N. (2015, January 20). Crisis in Greece: The Numbers. *The Wall Street Journal*. Available at: http://blogs.wsj.com/briefly/2015/01/20/crisis-in-greece-the-numbers/

Tatahi, M., and Heshmati, A. (2009). The financial and operating performance of privatized firms in Sweden. *IZA Discussion Papers 3953, Institute for the Study of Labor (IZA)*. Available at: https://ideas.repec.org/p/iza/izadps/dp3953.html or http://ftp.iza.org/dp3953.pdf

Thalassinos, E., Kyriazidis, T., and Thalassinos, J. (2006). The Greek Capital Market: Caught in Between Poor Corporate Governance and Market Inefficiency. *European Research Studies Volume IX*, Issue (1-2).

Thomadakis, S., Nounis, C., and Gounopoulos, D. (2012). Long-term Performance of Greek IPOs. *European Financial Management*, *18*(1), 117-141.

Thomson Reuters, (2013). Worldscope database: Data Definitions Guide. Issue 14.2.

Titman, S., and Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance, 43(1),* 1-19.

Varoufakis, Y., and Tzerkezis, L. (2014): Financialisation and the financial and economic crises: The case of Greece, *FESSUD Studies in Financial Systems*, No. 25, University of Leeds.

Vlamis, P. (2014). Greek fiscal crisis and repercussions for the property market. *Journal of Property Investment & Finance*, *32(*1), 21-34.

Weiers, R. M. (2010). *Introduction to business statistics*. Cengage Learning.

Zingales, L. (2008). Causes and effects of the Lehman Brothers bankruptcy. *Committee on Oversight and Government Reform US House of Representatives*.

Appendix

Table 15. List of companies excluded from the main sample

#	ISIN	NAME	INDUSTRY
1	GRS333031003	ACTIVE INVESTMENTS S.A.	Investment Company
2	GRS179003009	AEOLIAN INVESTMENT FUND S.A.	Investment Company
3	GRS318023009	AGROTIKI INSURANCE S.A.	Insurance Company
4	GRS331043000	ALPHA ASTIKA AKINHTA S.A.	Real Estate
5	GRS015003007	ALPHA BANK S.A.	Banking Sector
6	GRS433003019	ALPHA TRUST-ANDROMEDA INVESTMENT TRUST	Investment Company
7	GRS451001002	ALTIUS INVESTMENT FUND S.A.	Investment Company
8	GRS437003007	ARROW INVESTMENT FUND S.A.	Investment Company
9	GRS019023001	ASPIS PRONIA GENERAL INSURANCES S.A.	Insurance Company
10	GRS001003011	ATTICA BANK S.A.	Banking Sector
11	GRS421003005	BABIS VOVOS INTER/NAL TECHNICAL S.A.	Real Estate
12	GRS130003015	BALKAN REAL ESTATE	Real Estate
13	GRS130003015	BALKAN REAL ESTATE	Real Estate
14	GRS006013007	COMMERCIAL BANK OF GREECE SA	Banking Sector
15	CY0000200119	CYPRUS POPULAR BANK PUBLIC CO LTD	Banking Sector
16	GRS022003016	DIAS INVESTMENT CO. S.A.	Investment Company
17	GRS431003003	DOMUS INVESTMENTS SA	Investment Company
18	GRS452003007	DYNAMIC LIFE S.A.	Investment Company
19	GRS513003004	ELTECH ANEMOS S.A.	Real Estate
20	GRS250073004	ELVIEMEK	Real Estate
21	GRS018023002	ETHNIKI GENERAL INSURANCE CO.	Insurance Company
22	GRS323003012	EUROBANK ERGASIAS S.A.	Banking Sector
23	GRS479003006	EUROBROKERS INSURANCE BROKERS S.A.	Insurance Company
24	GRS429003005	EURODYNAMIC S.A.	Investment Company
25	GRS043003011	EUROHOLDINGS CAPITAL & INV. CORP. S.A.	Investment Company
26	GRS454003013	EUROLINE INVESTMENTS CO.	Investment Company
27	GRS277023008	EUROPEAN RELIANCE GEN. INSUR. S.A.	Insurance Company
28	GRS501003008	EUROXX	Finance Services
29	GRS025003005	EXELIXI S.A.	Investment Company
30	GRS145003000	GEK TERNA HOLDING REAL ESTATE CONSTRUCTION	Real Estate
31	GRS002013001	GENIKI BANK	Banking Sector
32	GRS483003000	GLOBAL NEW EUROPE FUND	Investment Company
33	GRS491003000	GRIVALIA PROPERTIES R.E.I.C.	Real Estate
34	GRS395363005	HELLENIC EXCHANGES-ATHENS STOCK EXCHANGES	Finance Services
35	GRS024031007	HELLENIC INVESTMENT S.A.	Investment Company
36	GRS516003001	INTERCONTINENTAL INTERNATIONAL REAL ESTATE	Real Estate
37	GRS030003024	INTERINVEST S.A.	Investment Company
38	GRS009013004	MARFIN EGNATIA BANK	Banking Sector

#	ISIN	NAME	INDUSTRY
39	GRS003003027	NATIONAL BANK OF GREECE S.A.	Banking Sector
40	N/A	NATIONAL INVESTMENT CO. S.A.	Investment Company
41	GRS136243003	NATIONAL REAL ESTATE S.A.	Real Estate
42	GRS509003018	NBG PANGAEA R.E.I.C.	Real Estate
43	GRF000055001	NBGAM ETF GREECE AND TURKEY	Investment Company
44	GRS436003008	NEXUS INVESTMENT COMPANY S.A.	Investment Company
45	GRS467003000	OMEGA S.A.	Investment Company
46	GRS459003018	OPTIMA PORTFOLIO INVEST. S.A.	Investment Company
47	GRS444001002	P&K PORTFOLIO INVESTMENT S.A.	Investment Company
48	GRS497003004	PASAL DEVELOPMENT S.A.	Real Estate
49	GRS020023008	PHOENIX - METROLIFE S.A.	Insurance Company
50	GRS014003016	PIRAEUS BANK S.A.	Banking Sector
51	GRS252043005	PIRAEUS LEASING	Finance Services
52	GRS490003001	PROTON BANK	Banking Sector
53	GRS106003007	REDS S.A.	Real Estate
54	GRS325003002	SCIENS INTERNATIONAL INVESTMENTS S.A.	Investment Company
55	GRS304013006	T BANK S.A.	Banking Sector
56	GRS487003006	TRASTOR REAL ESTATE INVESTMENT COMPANY	Real Estate
57	GRS492003009	TT HELLENIC POSTBANK S.A.	Banking Sector

Table 16. List of companies with data not available in Worldscope Thomson Reuters Database

#	ISIN	NAME	MNEMONIC CODE	REASON
1	GRS248071003	ALFA ALFA ENERGY S.A.	G:ESHA	Data N/A
2	GRS080103005	ALFA ALFA HOLDINGS S.A.	G:ALAK	Data N/A
3	GRS032043002	ALPHA LEASING S.A.	G:ALIS	Data N/A
4	GRS232213009	ALTE S.A.	G:ALTE	Data N/A
5	GRS119123008	BALAFAS S.A.	G:AGGE	Data N/A
6	GRS036051001	CASINO PORTO CARRAS S.A.	G:AEME	Data N/A
7	GRS203003017	CHIPITA INTERNATIONAL S.A.	G:CHIP	Data N/A
8	GRS303003008	CONNECTION S.A.	G:CON	Data N/A
9	GRS040061004	COSMOS S.A.	G:BELK	Data N/A
10	GRS217273002	D.A.N.E. SEA LINE	G:DANE	Data N/A
11	GRS380313007	DATAMEDIA S.A.	G:DME	Data N/A
12	GRS328121009	DELTA ICE-CREAM S.A.	G:PAP	Data N/A
13	GRS481003002	DELTA PROJECT S.A.	G:DET	Data N/A
14	GRS485003008	DIOLKOS CLOSED END FUND SA	G:DIOL	Data N/A
15	GRS512003005	DIVERSA S.A.	G:DCIT	Data N/A
16	GRS486003007	EBIK S.A.	G:EBIK	Data N/A
17	GRS280213000	EFKLEIDIS S.A.	G:ETA	Data N/A
18	GRS164003006	ELEPHANT S.A.	G:ATHK	Data N/A
19	GRS193003019	EMPEDOS S.A.	G:GNOM	Data N/A
20	GRS464003011	EMPHASIS SYSTEMS SA	G:EMPH	Data N/A
21	GRS499003010	ENVITEC	G:ENVI	Data N/A
22	GRS200213007	ERGAS S.A.	G:ERGAS	Data N/A
23	GRS194213005	EUROPEAN TECHNICAL S.A.	G:EUTE	Data N/A
24	GRS186003000	FANCO S.A.	G:FAN	Data N/A
25	GRS458003019	FEEDUS S.A.	G:SARI	Data N/A
26	GRS417003001	FITCO S.A.	G:FITC	Data N/A
27	GRS108111006	GLOBE S.A.	G:GKLO	Data N/A
28	GRS230111007	GOODYS S.A.	G:GOOD	Data N/A
29	N/A	GREEK POWDER CO.		Data N/A
30	GRS450003009	HITECH SNT S.A.	G:HITE	Data N/A
31	GRS361003015	INFORMATICS S.A.	G:INF	Data N/A
32	GRS311313001	INTERSONIC S.A.	G:DESP	Data N/A
33	GRS478003007	INTRAMET S.A.	G:INME	Data N/A
34	GRS465003002	IPIROTIKI S.A.	G:IPI	Data N/A
35	GRS121003008	KERANIS HOLDING S.A.	G:KERK	Data N/A
36	GRS215501008	MOURIADES S.A.	G:MOUR	Data N/A
37	GRS367263001	NAYTEMPORIKI PUBLISHING S.A.	G:NAFT	Data N/A
38	GRS455003004	NEW MILLENNIUM S.A.	G:NMIS	Data N/A
39	GRS056063001	NIMATEMPORIKI S.A.	G:NIMA	Data N/A
40	GRS086103009	O. DARING S.A.	G:DARK	Data N/A
41	GRS358503001	P. KOTSOVOLOS S.A.	G:KOT	Data N/A

#	ISIN	NAME	MNEMONIC CODE	REASON
42	GRS218081008	PHILIPPOU D.E. S.A.	G:FIL	Data N/A
43	GRS264313008	POULIADIS ASSOCIATES CORP.	G:POUL	Data N/A
44	GRS435003017	PROMOTA HELLAS S.A.	G:PRMT	Data N/A
45	GRS258183003	RADIO A. KORASSIDIS COMMERCIAL ENTERPR.	G:KORA	Data N/A
46	GRS113113005	SATELITE DIGITAL PROGRAMES INTERSAT S.A.	G:OINO	Data N/A
47	GRS291281004	SEAFARM IONIAN AQUACULTURE S.A.	G:SEAF	Data N/A
48	GRS390193001	SEX FORM S.A.	G:SEFP	Data N/A
49	GRS052061009	STABILTON S.A.	G:MAKK	Data N/A
50	GRS207213000	TECHNODOMI M. TRAVLOS BROS S.A.	G:TEXN	Data N/A
51	GRS031003015	THE GREEK PROGRESS FUND S.A.	G:PROO	Data N/A
52	GRS183213008	THEMELIODOMH S.A.	G:THEM	Data N/A
53	GRS105111009	THESSALIKI SPIRITS CO.	G:THES	Data N/A
54	GRS109003004	UNCLE STATHIS S.A.	G:MPSK	Data N/A
55	GRS305281008	XIFIAS S.A. - KAVALA'S FISHERY PRODUCTS	G:KAVC	Data N/A

Table 17. Main Sample

#	ISIN	NAME	SIC CODE 1	INDUSTRY
1	GRS404003006	A.S. COMPANY S.A.	5092	Wholesale Trade
2	GRS495003006	AEGEAN AIRLINES	4512	Transportation, Communications, Electric, Gas and Sanitary service
3	GRS182003004	AEGEK	1611	Construction
4	GRS373173004	AKRITAS S.A.	2493	Manufacturing
5	GRS322003013	ALAPIS S.A. (ex VETERIN)	2834	Manufacturing
6	GRS276003019	ALCO HELLAS S.A.	3354	Manufacturing
7	GRS098113004	ALFA-BETA VASSILOPOULOS S.A.	5411	Retail Trade
8	GRS480003003	ALPHA GRISSIN POWER & ENV. CONTROL SYS. S.A.	7373	Services
9	GRS441003001	ALSINCO S.A.	5139	Wholesale Trade
10	GRS242003002	ALTEC HOLDINGS S.A.	3571	Manufacturing
11	GRS289103004	ALUMIL ALUMINIUM INDUSTRY S.A.	3354	Manufacturing
12	GRS081103004	ALUMINIUM OF GREECE S.A.	3365	Manufacturing
13	GRS134191006	ALYSIDA S.A.	5139	Wholesale Trade
14	GRS316003003	ANEK LINES S.A.	4481	Transportation, Communications, Electric, Gas and Sanitary service
15	GRS388163008	ASTIR PALACE VOULIAGMENI S.A.	7011	Services
16	GRS321003006	ATERMON DYNAMIC COMMUNICATION S.A.	7312	Services
17	GRS233213008	ATHENA S.A.	1611	Construction
18	GRS147233001	ATHENS MEDICAL C.S.A.	8062	Services
19	GRS359353000	ATHENS WATER SUPPLY & SEWERAGE S.A.	4941	Transportation, Communications, Electric, Gas and Sanitary service
20	GRS415503002	ATLANTIC SUPER MARKET S.A.	5411	Retail Trade
21	GRS144003001	ATTICA HOLDINGS S.A.	4481	Transportation, Communications, Electric, Gas and Sanitary service
22	GRS340263003	ATTICA PUBLICATIONS S.A.	2711	Manufacturing
23	GRS205003007	ATTI-KAT S.A.	1542	Construction
24	GRS489003004	AUDIO VISUAL ENTERPRISES S.A.	7812	Services
25	GRS337003008	AUTOHELLAS S.A.	7514	Services
26	GRS447003005	AVENIR LEISURE AND ENTERTAINMENT INFORMATICS S.A.	7999	Services
27	GRS197003007	AXON S.A. HOLDING	8062	Services
28	GRS425003001	BETANET S.A.	3272	Manufacturing
29	GRS165063009	BIOKARPET S.A. IND. & COMM.ENT.	3334	Manufacturing
30	GRS508003001	BIOMEDICAL AND ROBOTICS TECHNOLOGY S.A.	8069	Services
31	GRS135003002	BIOTER S.A.	1531	Construction
32	GRS092103001	BITROS HOLDING S.A.	3312	Manufacturing
33	GRS199271008	BLUE STAR SHIPPING S.A.	4499	Transportation, Communications, Electric, Gas and Sanitary service
34	GRS368313003	BYTE COMPUTER S.A.	7373	Services
35	GRS269003000	C. CARDASSILARIS & SONS - CARDICO S.A.	2034	Manufacturing
36	GRS118003003	C. SARANTOPOULOS FLOUR MILLS S.A.	2041	Manufacturing
37	GRS449003003	CENTRIC HOLDINGS S.A.	7372	Services
38	GRS170103006	CH ROKAS S.A.	5084	Wholesale Trade

#	ISIN	NAME	SIC CODE 1	INDUSTRY
39	GRS348003005	CHATZIKRANIOTIS & SONS MILLS S.A.	2041	Manufacturing
40	CH0198251305	COCA-COLA HBC AG	2086	Manufacturing
41	GRS443003017	COMPUCON COMPUTER APPLICATIONS S.A.	7372	Services
42	GRS300103009	CORINTH PIPEWORKS HOLDINGS S.A.	3317	Manufacturing
43	GRS408333003	COSMOTE S.A.	4813	Transportation, Communications, Electric, Gas and Sanitary service
44	GRS413313008	CPI COMPUTER PERIPHERALS INTER/NAL	5045	Wholesale Trade
45	GRS326003001	CRETE PLASTICS S.A.	2821	Manufacturing
46	GRS125003004	CROWN HELLAS CAN PACKAGING S.A.	3411	Manufacturing
47	GRS067003004	CYCLON HELLAS S.A.	2992	Manufacturing
48	GRS382073005	DAIOS PLASTICS S.A.	3081	Manufacturing
49	GRS445003007	DIAGNOSTIC&THERAPEUTIC CENTER OF ATHENS YGEIA	8062	Services
50	GRS440003010	DIAS AQUA CULTURE S.A.	273	Agriculture, Forestry and Fishing
51	GRS226213007	DIEKAT S.A.	1542	Construction
52	GRS339003014	DIONIC S.A.	5045	Wholesale Trade
53	GRS364253005	DOMIKI KRITIS S.A.	1623	Construction
54	GRS502003007	DOPPLER S.A.	3534	Manufacturing
55	GRS412503005	DROMEAS S.A.	2522	Manufacturing
56	GRS308003003	DRUCKFARBEN HELLAS S.A.	2893	Manufacturing
57	GRS392193009	DUROS S.A.	5611	Retail Trade
58	GRS275073005	E. PAIRIS S.A.	3085	Manufacturing
59	GRS220003008	EDRASIS - C. PSALLIDAS S.A.	1541	Construction
60	GRS222213001	EKTER S.A.	1623	Construction
61	GRS054061007	EL. D. MOUZAKIS S.A.	2261	Manufacturing
62	GRS103003000	ELAIS - UNILEVER S.A.	2079	Manufacturing
63	GRS088003017	ELASTRON S.A.	3316	Manufacturing
64	GRS172111007	ELBISCO HOLDING S.A.	2051	Manufacturing
65	GRS352003008	ELECTRONIKI ATHINON S.A.	5722	Retail Trade
66	GRS389293002	ELEFTHERI TILEORASI S.A.	4833	Transportation, Communications, Electric, Gas and Sanitary service
67	GRS044063006	ELFIKO S.A.	2211	Manufacturing
68	GRS329503007	ELGEKA S.A.	5141	Wholesale Trade
69	GRS477003008	ELINOIL HELLENIC PETROLEUM COMPANY S.A.	5172	Wholesale Trade
70	GRS191213008	ELLAKTOR S.A.	1611	Construction
71	GRS141183004	ELMEC SPORT S.A.	5651	Retail Trade
72	GRS397003005	ELTON S.A.	5169	Wholesale Trade
73	GRS142003003	ELTRAK S.A.	5082	Wholesale Trade
74	GRS271101008	ELVAL S.A.	3341	Manufacturing
75	GRS240003012	ELVE S.A.	5651	Retail Trade
76	GRS143183002	EMPORIKOS DESMOS S.A.	5172	Wholesale Trade
77	GRS503003014	ENTERSOFT S.A.	7372	Services
78	GRS498003003	EPSILON NET S.A.	7371	Services
79	GRS195101001	ETEM S.A.	3354	Manufacturing

#	ISIN	NAME	SIC CODE 1	INDUSTRY
80	GRS046063004	ETMA S.A.	2821	Manufacturing
81	GRS439003005	EUROCONSULTANTS S.A.	7373	Services
82	GRS400003000	EURODRIP S.A.	3523	Manufacturing
83	GRS341003002	EUROMEDICA S.A.	8071	Services
84	GRS336113006	EVEREST S.A.	5963	Retail Trade
85	GRS385113006	EVROFARMA S.A.	2026	Manufacturing
86	GRS083003012	F.G. EUROPE S.A.	5064	Wholesale Trade
87	GRS309003002	F.H.L. I. KYRIAKIDIS MARBLES - GRANITES S.A.	1411	Mining
88	GRS456003003	FASHION BOX HELLAS S.A.	3842	Manufacturing
89	GRS332073006	FIERATEX S.A.	2211	Manufacturing
90	GRS060063005	FINTEXPORT S.A.	2281	Manufacturing
91	GRS259003002	FLEXOPACK S.A.	2671	Manufacturing
92	GRS438003006	FLOUR MILLS KEPENOS S.A.	2041	Manufacturing
93	GRS294003009	FOLLI FOLLIE COMM.	5921	Retail Trade
94	GRS287003016	FOLLI-FOLLIE S.A.	3911	Manufacturing
95	GRS510003015	FOODLINK S.A.	4225	Transportation, Communications, Electric, Gas and Sanitary service
96	GRS406003004	FORTHNET S.A.	4813	Transportation, Communications, Electric, Gas and Sanitary service
97	GRS096003009	FOURLIS S.A.	5712	Retail Trade
98	GRS346153000	FRIGOGLASS S.A.	3221	Manufacturing
99	GRS268271004	G. LEVENTAKIS TEX S.A.	724	Agriculture, Forestry and Fishing
100	GRS254183007	G.E. DIMITRIOU S.A.	5064	Wholesale Trade
101	GRS442003000	GALAXIDI FISH FARMING S.A.	273	Agriculture, Forestry and Fishing
102	GRS398161000	GEKE S.A.	7011	Services
103	GRS137003000	GEN. COMMERCIAL & IND.	5072	Wholesale Trade
104	GRS255213001	GENER S.A.	1541	Construction
105	GRS363333006	GERMANOS IND. & COM. CO S.A.	4812	Transportation, Communications, Electric, Gas and Sanitary service
106	GRS204003008	GR. SARANTIS S.A.	2841	Manufacturing
107	GRS386113005	GREGORYS MICROGEVMATA S.A.	5812	Retail Trade
108	GRS350263000	HAIDEMENOS S.A.	2621	Manufacturing
109	GRS281101006	HALKOR S.A (FORMER VECTOR)	3351	Manufacturing
110	GRS420003006	HELLAS ONLINE S.A.	4813	Transportation, Communications, Electric, Gas and Sanitary service
111	GRS256061003	HELLATEX S.A. SYNTHETIC YARNS	2221	Manufacturing
112	GRS221103005	HELLENIC CABLES HOLDINGS S.A.	3357	Manufacturing
113	GRS219003001	HELLENIC FABRICS S.A.	2211	Manufacturing
114	GRS394283006	HELLENIC FISHFARMING S.A.	2092	Manufacturing
115	GRS298343005	HELLENIC PETROLEUM S.A.	2911	Manufacturing
116	GRS181111006	HELLENIC SUGAR INDUSTRY S.A.	2063	Manufacturing
117	GRS260333000	HELLENIC TELECOM. ORGANISATION	4813	Transportation, Communications, Electric, Gas and Sanitary service
118	GRS073083008	HERACLES GEN. CEMENT S.A.	3241	Manufacturing
119	GRS149501009	HIPPOTOUR S.A.	291	Agriculture, Forestry and Fishing
120	GRS474003001	I. KLOUKINAS - I. LAPPAS S.A.	5641	Retail Trade

#	ISIN	NAME	SIC CODE 1	INDUSTRY
121	GRS379233000	IASO S.A.	8069	Services
122	GRS148003015	IDEAL GROUP S.A.	4813	Transportation, Communications, Electric, Gas and Sanitary service
123	GRS377503008	IKONA-IHOS S.A.	5722	Retail Trade
124	GRS372003004	IKTINOS HELLAS S.A.	1411	Mining
125	GRS475003018	ILYDA S.A.	7372	Services
126	GRS369003017	IMAKO MEDIA S.A.	2721	Manufacturing
127	GRS267053007	IMPERIO ARGO GROUP S.A.	4214	Transportation, Communications, Electric, Gas and Sanitary service
128	GRS208303008	INFORM P. LYKOS S.A.	2759	Manufacturing
129	GRS376313003	INFORMER S.A.	7372	Services
130	GRS468003009	INTERFISH S.A.	921	Agriculture, Forestry and Fishing
131	GRS247183007	INTERTECH S.A.	5734	Retail Trade
132	GRS131003006	INTERWOOD-XYLEMPORIA A.T.E.N.E.	5031	Wholesale Trade
133	GRS432003010	INTRACOM CONSTRUCTIONS S.A.	1623	Construction
134	GRS087103008	INTRACOM S.A. HOLDINGS	4813	Transportation, Communications, Electric, Gas and Sanitary service
135	GRS343313003	INTRALOT S.A.	7371	Services
136	GRS127003002	IONIAN HOTEL S.A.	7011	Services
137	GRS213213002	J. & P. - AVAX S.A.	1542	Construction
138	GRS110111002	J. BOUTARIS & SON HOLDING S.A.	2084	Manufacturing
139	GRS282183003	JUMBO S.A.	5712	Retail Trade
140	GRS315003004	KARAMOLEGOS BAKERY INDUSTRY S.A.	2051	Manufacturing
141	GRS399163005	KARATZIS S.A.	3086	Manufacturing
142	GRS120131008	KARELIA TOBACCO COMPANY S.A.	2111	Manufacturing
143	GRS365263003	KATHIMERINI PUBLISHING S.A.	2711	Manufacturing
144	GRS378503007	KEGO S.A.	211	Agriculture, Forestry and Fishing
145	GRS070083001	KEKROPS S.A.	1531	Construction
146	GRS071003008	KERAMIA-ALLATINI S.A. REAL EST. MAN. & H. CO	3253	Manufacturing
147	GRS295003008	KIRIACOULIS SHIPPING S.A.	4493	Transportation, Communications, Electric, Gas and Sanitary service
148	GRS324253004	KLEEMAN HELLAS S.A.	3534	Manufacturing
149	GRS384003000	KORDELLOS CH. BROS S.A.	5051	Wholesale Trade
150	GRS494003007	KORRES NATURAL PRODUCTS	2844	Manufacturing
151	GRS354003006	KOSTAS LAZARIDIS S.A.	2084	Manufacturing
152	GRS224003004	KRE.KA S.A.	751	Agriculture, Forestry and Fishing
153	GRS371113002	KRETA FARM S.A.	751	Agriculture, Forestry and Fishing
154	GRS469003024	KRI-KRI MILK INDUSTRY S.A.	2026	Manufacturing
155	GRS507003002	KRITON ARTOS S.A.	2052	Manufacturing
156	GRS306293002	LAMBRAKIS PRESS ORGANISATION	2721	Manufacturing
157	GRS245213004	LAMDA DEVELOPMENT S.A.	1542	Construction
158	GRS128003001	LAMPSA HOTEL S.A.	7011	Services
159	GRS047063003	LANAKAM S.A.	5137	Wholesale Trade
160	GRS292003001	LAN-NET S.A.	4813	Transportation, Communications, Electric, Gas and Sanitary service
161	GRS246073001	LAVIPHARM S.A.	2833	Manufacturing

#	ISIN	NAME	SIC CODE 1	INDUSTRY
162	GRS362263006	LIBERIS PUBLICATIONS S.A.	2721	Manufacturing
163	GRS446003014	LIVANI PUBLISHING ORGANIZATION S.A.	2731	Manufacturing
164	GRS461003006	LOGISMOS INFORMATION SYSTEMS S.A.	7371	Services
165	GRS117123000	LOULIS MILLS S.A.	2041	Manufacturing
166	GRS198503005	M.I. MAILLIS S.A.	2671	Manufacturing
167	GRS471003012	MARAC ELECTRONICS S.A.	3663	Manufacturing
168	GRS314003005	MARFIN INVESTMENT GROUP S.A.	2037	Manufacturing
169	GRS243003019	MARITIME COMPANY OF LESVOS S.A.	2491	Manufacturing
170	GRS374003002	MATHIOS REFRACTORY S.A.	3255	Manufacturing
171	GRS424003002	MEDICON HELLAS S.A.	3845	Manufacturing
172	GRS500003009	MEDITERRA S.A.	5145	Wholesale Trade
173	GRK014011008	MERMEREN KOMBINAT A.D. PRILEP (GDR)	1411	Mining
174	GRS211213004	MESOCHORITI BROS CORPORATION	1611	Construction
175	GRS091103002	METKA INDUSTRIAL - CONSTRUCTION S.A.	1623	Construction
176	GRS319103008	MEVACO S.A.	3542	Manufacturing
177	GRS153213004	MICHANIKI S.A.	1542	Construction
178	GRS351003009	MICROLAND COMPUTERS S.A.	5734	Retail Trade
179	GRS237061007	MINERVA KNITWEAR	2341	Manufacturing
180	GRS296273006	MINOAN LINES S.A.	4481	Transportation, Communications, Electric, Gas and Sanitary service
181	GRS422003004	MLS MULTIMEDIA S.A.	7372	Services
182	GRS210003026	MOCHLOS S.A.	1542	Construction
183	GRS488003005	MOTODYNAMICS S.A.	5571	Retail Trade
184	GRS426003000	MOTOR OIL REFINERIES S.A.	2911	Manufacturing
185	GRS133003004	MULTIRAMA S.A.	5734	Retail Trade
186	GRS393503008	MYTILINEOS HOLDINGS S.A.	1623	Construction
187	GRS090101007	N. LEVEDERIS S.A.	3312	Manufacturing
188	GRS375183001	N. VARVERIS-MODA BAGNO S.A.	5712	Retail Trade
189	GRS265061002	NAFPAKTOS TEXTILE INDUSTRY S.A.	2281	Manufacturing
190	GRS387503006	NAKAS MUSIC	5736	Retail Trade
191	GRS463003012	NEOCHIMIKI S.A.	2899	Manufacturing
192	GRS349103002	NEORION HOLDINGS S.A.	3731	Manufacturing
193	GRS457003002	NEWSPHONE HELLAS S.A. AUDIOTEX	4813	Transportation, Communications, Electric, Gas and Sanitary service
194	GRS079103008	NEXANS HELLAS S.A.	3357	Manufacturing
195	GRS234003002	NIREFS S.A.	273	Agriculture, Forestry and Fishing
196	GRS266003003	NOTOS COM HOLDINGS S.A.	5137	Wholesale Trade
197	GRS107003006	NUTRIART S.A.	5145	Wholesale Trade
198	GRS327113007	OLYMPIC CATERING S.A.	4581	Transportation, Communications, Electric, Gas and Sanitary service
199	GRS419003009	OPAP S.A.	7999	Services
200	GRS506003003	OPTRONICS TECHNOLOGIES S.A.	3357	Manufacturing
201	GRS111003000	P.G. NIKAS S.A.	2013	Manufacturing
202	GRS470003013	P.P.A. S.A.	4491	Transportation, Communications, Electric, Gas and Sanitary service

#	ISIN	NAME	SIC CODE 1	INDUSTRY
203	GRS317003010	PANTECHNIKI S.A.	1622	Construction
204	GRS405003005	PAPERPACK S.A.	2657	Manufacturing
205	GRS065003006	PAPOUTSANIS S.A.	2841	Manufacturing
206	GRS123143000	PARNASSOS ENTERPRISES S.A.	4493	Transportation, Communications, Electric, Gas and Sanitary service
207	GRS381313006	PC SYSTEMS S.A.	7373	Services
208	GRS370003006	PEGASUS PUBLISHING S.A.	2721	Manufacturing
209	GRS505003004	PERFORMANCE TECHNOLOGIES IT SOLUTIONS S.A.	7371	Services
210	GRS299003004	PERSEUS S.A.	273	Agriculture, Forestry and Fishing
211	GRS345503007	PETROS PETROPOULOS	5013	Wholesale Trade
212	GRS066003003	PETZETAKIS S.A.	3084	Manufacturing
213	GRS095001004	PIPEWORKS GIRAKIAN PROFIL S.A.	3312	Manufacturing
214	GRS320313000	PLAISIO COMPUTERS S.A.	5734	Retail Trade
215	GRS434003000	PPC S.A.	4911	Transportation, Communications, Electric, Gas and Sanitary service
216	GRS472003011	PROFILE SYSTEMS & SOFTWARE S.A.	7372	Services
217	GRS184003002	PROODEFTIKH TECHNICAL COMPANY S.A.	1611	Construction
218	GRS396003006	QUALITY AND RELIABILITY S.A.	7372	Services
219	GRS310003009	QUEST HOLDINGS S.A.	7371	Services
220	GRS430003004	RAINBOW S.A.	5045	Wholesale Trade
221	GRS338163009	REGENCY ENTERTAINMENT S.A.	7011	Services
222	GRS473003002	REVOIL S.A.	5541	Retail Trade
223	GRS168003002	RIDENCO S.A.	5651	Retail Trade
224	GRS169003001	RILKEN S.A.	2844	Manufacturing
225	GRS228003000	S&B INDUSTRIAL MINERALS S.A.	1099	Mining
226	GRS156203002	SATO OFFICE AND HOUSEWARE SUPPLIES S.A.	2512	Manufacturing
227	GRS045003001	SELECTED TEXTILE S.A.	2281	Manufacturing
228	GRS132003005	SELMAN PROPERTY S.A.	2436	Manufacturing
229	GRS201003019	SELONDA AQUACULTURE S.A.	273	Agriculture, Forestry and Fishing
230	GRS279003008	SFAKIANAKIS S.A.	5012	Wholesale Trade
231	GRS097103006	SHEET STEEL S.A.	3316	Manufacturing
232	GRS283003002	SIDENOR HOLDING S.A.	3312	Manufacturing
233	GRS484003009	SIDMA S.A. STEEL PRODUCTS	3312	Manufacturing
234	GRS391003001	SINGULAR LOGIC S.A.	7379	Services
235	GRS402003008	SPACE HELLAS S.A.	7373	Services
236	GRS353103005	SPIDER METAL IND. N.PETSIOS & SONS S.A.	3499	Manufacturing
237	GRS476003017	SPRIDER STORES S.A.	5651	Retail Trade
238	GRS448003004	STELIOS KANAKIS S.A.	5145	Wholesale Trade
239	GRS403003007	TECHNICAL OLYMPIC S.A.	7011	Services
240	GRS360263008	TECHNICAL PUBLICATIONS S.A.	2721	Manufacturing
241	GRS312293004	TEGOPOULOS EDITIONS S.A.	2721	Manufacturing
242	GRS212293005	TELETIPOS S.A.	4833	Transportation, Communications, Electric, Gas and Sanitary service
243	GRS496003005	TERNA ENERGY S.A.	4911	Transportation, Communications, Electric, Gas and Sanitary service

#	ISIN	NAME	SIC CODE 1	INDUSTRY
244	GRS187213004	TERNA S.A.	1622	Construction
245	GRS297003006	TEXAPRET	2269	Manufacturing
246	GRS284183001	THE HOUSE OF AGRICULTURE SPIROU S.A.	2873	Manufacturing
247	GRS428003008	THESSALONIKA WATER & SEWERAGE S.A.	4941	Transportation, Communications, Electric, Gas and Sanitary service
248	GRS239003007	THRACE PLASTICS S.A.	2821	Manufacturing
249	GRS074083007	TITAN CEMENT COMPANY S.A.	3241	Manufacturing
250	GRS427003009	TPA S.A.	4491	Transportation, Communications, Electric, Gas and Sanitary service
251	GRS155003015	TROPEA HOLDING S.A.	4412	Transportation, Communications, Electric, Gas and Sanitary service
252	GRS084003003	UNIBIOS HOLDINGS S.A.	3589	Manufacturing
253	GRS356313007	UNISYSTEMS S.A.	7373	Services
254	GRS196003016	UNITED TEXTILES S.A.	2281	Manufacturing
255	GRS301003000	VARANGIS S.A.	5021	Wholesale Trade
256	GRS418003000	VARDAS S.A.	5621	Retail Trade
257	GRS344061007	VARVARESSOS S.A. EUROPEAN SPINNING MILLS	2281	Manufacturing
258	GRS511003006	VIDAVO HEALTH TECHNOLOGIES S.A.	7371	Services
259	BE0974271034	VIOHALCO S.A.	3354	Manufacturing
260	GRS085101004	VIOHALCO COPPER & AL S.A.	3354	Manufacturing
261	GRS124153008	VIS S.A.	2653	Manufacturing
262	GRS102003001	VIVARTIA HOLDING S.A.	2026	Manufacturing
263	GRS244003026	VIVERE ENTERTAINMENT TR & HOLDING S.A.	7999	Services
264	GRS407183003	VOGIATZOGLOU SYSTEMS S.A.	5023	Wholesale Trade
265	GRS059063008	WOOL INDUSTRY TRIA ALFA S.A.	2281	Manufacturing
266	GRS154183008	X. BERNUBI S.A.	5064	Wholesale Trade
267	GRS290063007	XATZIOANNOU	2341	Manufacturing
268	GRS249501008	YALCO - CONSTANTINOU S.A.	5064	Wholesale Trade
269	GRS146181003	ZAMPA S.A.	5064	Wholesale Trade