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Postgraduate Dissertation

How the Greek Sovereign Debt Crisis has changed the Financial
Position of Listed Companies. A cross-sectional analysis

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Patras, Greece, June 2021

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Abstract

The Greek Sovereign Debt Crisis came in the aftermath of the global financial crisis in year 2008, was a shock to the Greek economy, and had longstanding economic, sociocultural and political effects. The goal of this study is to increase our understanding regarding the impact of these effects on the financial position of different market sector capitalization leading Greek listed companies. The conclusions of this study will be of interest to both academics and corporations, as we will be able to understand how these companies were affected and how they reacted. This will allow us to identify the fundamental accounting strategies and practices that helped capitalization market sector leaders not only to survive but also to either achieve or maintain a leading position.

Keywords

F_Score, Joseph Piotroski, Macroeconomic environment, Greek Sovereign Debt Crisis, Financial Analysis, Ratios.

Πως άλλαξε την οικονομική θέση των εισηγμένων εταιρειών η Ελληνική κρίση χρέους. Μία διαστρωματική ανάλυση

Παναγιώτης Γκόντης

Περίληψη

Η Ελληνική κρίση χρέους ήταν επακόλουθο της παγκόσμιας χρηματοπιστωτικής κρίσης του 2008, προκαλώντας ένα σοκ στην ελληνική οικονομία με μακροχρόνιες οικονομικές, κοινωνικοπολιτισμικές και πολιτικές επιπτώσεις. Ο στόχος αυτής της μελέτης είναι να αυξήσει την κατανόηση μας σχετικά με τον αντίκτυπο αυτών των επιπτώσεων στην οικονομική θέση εισηγμένων εταιρειών με ηγετική θέση στην κεφαλαιοποίηση διάφορων κλάδων αγοράς. Τα συμπεράσματα αυτής της μελέτης θα αποτελούν ενδιαφέρον τόσο ακαδημαϊκό όσο και εταιρικό, καθώς θα μπορέσουμε να κατανοήσουμε πως επηρεάστηκαν οι εταιρείες και πως αντέδρασαν. Αυτό θα μας επιτρέψει να εντοπίσουμε τις θεμελιώδεις λογιστικές στρατηγικές και πρακτικές που βοήθησαν τις εταιρείες με ηγετική θέση στην κεφαλαιοποίηση στον κλάδο αγοράς τους όχι μόνο να επιβιώσουν αλλά και είτε να αποκτήσουν ή να διατηρήσουν ηγετική θέση.

Λέξεις – Κλειδιά

F_Score, Joseph Piotroski, Μακροοικονομικό Περιβάλλον, Ελληνική Κρίση Χρέους, Χρηματοοικονομική Ανάλυση, Αριθμοδείκτες.

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List of Abbreviations & Acronyms

CFO	Cash flow of operations
CPI	Consumer Price Index
EU	European Union
GDP	Gross Domestic Product
HICP	Harmonized Index of Consumer Prices
Ltd	Limited Company
NGEU	Next Generation EU
ROA	Return on Assets
S.A.	Societe Anonyme, a Public Limited Company

1. Introduction

The Greek Sovereign Debt Crisis came in the aftermath of the global financial crisis in year 2008, was a shock to the Greek economy, and had longstanding economic, sociocultural and political effects. The goal of this study is to increase our understanding regarding the impact of these effects on the financial position of different market sector capitalization leading Greek listed companies. The conclusions of this study will be of interest to both academics and corporations, as we will be able to understand how these companies were affected and how they reacted. This will allow us to identify the fundamental accounting strategies and practices that helped capitalization market sector leaders not only to survive but also to either achieve or maintain a leading position.

The methodology used in this thesis to examine and evaluate the financial position of the chosen firms is the same that Joseph D. Piotroski used and defined in his paper: ‘‘Value investing: The use of Historical Financial Statement Information to Separate Winners from Losers’’. Specifically nine fundamental binary signals were used to estimate 3 sectors of a firm’s financial situation: profitability, financial leverage & liquidity and operating efficiency. The sum of the nine fundamental binary signals composes the aggregated signal measure F_Score, which is the indicator of the total quality, health and robustness of a company’s financial situation. The data that were utilized to calculate the aggregate F_Score and its component signals were extracted from the financial statements of the companies that are obliged to publish every year and acquired from the official site of Athens Stock Exchange and the official sites of each company.

The following chapter of this research examines the evolution of Greece’s macroeconomic environment during the researched years of 2005 – 2020 where an overall outline of the main economic events and results that took place in this timescale is presented and an analysis of the evolution of key macroeconomic measures is included. The 3rd chapter presents the overall principles which were used to choose among the different market sectors of Athens Stock Exchange. Moreover a generic description follows which contains main information and attributes of the chosen capitalization leading Greek listed companies within the aforementioned market sector that each company belongs. In addition, in the 4th chapter is contained an extensive description and the analysis of the methodology and the specific tools that are used in the assessment of the financial position of the chosen companies. Also a presentation of the type and set of data that are utilized in

this dissertation is carried out. In the 5th chapter the empirical research is carried out where the aforementioned methodology is implemented using data from the financial statements of the chosen companies and the basic results are presented. Finally, the last but not least 6th chapter contains the inferences of the research and some proposals regarding possible further research.

2. Evolution of Greece's macroeconomic environment in years 2005-2020

The great turmoil of the financial market of United States in year 2007 gave its place in a universal and outstanding financial crisis in year 2008 which was the biggest after the economic depression in the decade of 1930, with adverse consequences for the global economic development and trade (bank of Greece annual report, 2008). It caused a sharp increase of basic commodities prices and led in a reduction of the economic growth of most of the advanced economies of the world. When in the middle of the September of 2008 a big USA investment bank bankrupted the financial crisis was peaked, where a further rapid deterioration of international economic conditions, an overall decrease of the trust in the financial system and a sharp decline of the individual and business prospects in the whole world were observed. Although there were taken very crucial and unparalleled actions by the governments, central banks and international organizations in order to limit down the systemic risks and financial stability to be reclaimed, the financial crisis and its effects in the real economy were expanded in almost every country of the world (bank of Greece annual report, 2008).

The aftermath of the global financial crisis severely and crucially affected not only the Greek economy in multiple dimensions and levels, but also the state, the institutions and the whole society (bank of Greece annual report, 2009). The Greek economy faced a deep crisis, with main characteristics of very big and continuous budget deficits, enormous government debt, a constant erosion of the country's position regarding its competitiveness and an unprecedented and unequaled deficiency of reliability and credibility. These fundamental problems were predated the global crisis of 2008. The inveterate and accumulated inabilities and distortions were augmented by the global crisis

which accelerated the downfall of the Greek economy (bank of Greece annual report, 2009). These inveterate macroeconomic imbalances, weren't addressed when there were convenient conditions, but instead broadened due to timid and inappropriate policies.

During the first years of the research Greece's gross national savings, public and private together, were barely exceeding 7% of GDP in 2008 and 5% in 2009, amounts that were inadequate to finance even the investments needed to renew the reduction of the fixed assets due to depreciations and amortizations (bank of Greece annual report, 2009). The inferior national savings were caused mainly from large budget deficits, but also to the rapid raise of the private consumption that took place, which was intensified by fiscal abatement. In years 2004 to 2008, private consumption was increased annually around 3,8%, while in the euro region the equivalent value was 1,5%. Moreover for many years the private consumption was equivalent to 72% of Greece GDP, compared to 57% in the euro region. These inadequate savings couldn't finance Greece's public debt with domestic capital, leading to the augmentation of the current account balance deficit for a number of years and enlargement of external debt (bank of Greece annual report, 2009). Consequently, the problem of the budget deficit was twisted with the problem of the deficit of the current account balance and the public debt and the 'twin' deficits emerged as the leading source that fed a dangerous vicious circle.

The characteristics of the recession that Greece faced – and especially the decisive role that played the decline in consumer demand (along with the reduction of fix asset investment) – emphasized the crucial weaknesses of the Greek economy, which were reflected in the distorted growth model that had prevailed in previous decades (bank of Greece annual report, 2010). The specific model was focused on domestic consumption, public and private, which was fueled by lending to the state and households. The business sector was unable to take full advantage of the opportunities given by the entrance in euro region, while the improved expectations of households due to incorporation and the expansion of the public sector had enhanced over-consumption. It resulted in negative national savings from 2002 until 2010 and continual convey of resources from the entrepreneurial to the hypertrophic, low efficiency and effectiveness public sector (bank of Greece annual report, 2010). This model satisfied the present consumption against the future and was grounded on the illusion that sustainable growth could stem from the public sector. The increased consumption was characterized by a strong tendency towards

imported goods, which encouraged and supported a ‘shallow’ domestic entrepreneurship, which was orientated in the distribution sector and the final consumer. However as the factors that fueled consumption was overturned, it was inevitable that this form of business activity to be affected accordingly (bank of Greece annual report, 2010).

The above chronic economic imbalances in the external and internal sectors of the Greek economy led in the implementation of three consecutive and bold economic adjustment programs in years 2010, 2012 and 2015, with mutual traits of correcting imbalances and implementing structural reforms to reinforce the endurance of the economy to future disturbances (bank of Greece annual report, 2018). A sustainable growth has been achieved until year 2019 which is a result of a long and extremely painful economic adjustment effort. An impressive and unprecedented progress in international history was achieved (bank of Greece annual report, 2017). Specifically the country has succeeded:

- An unparalleled fiscal adaptation and the attainment of high and sustainable primary surpluses.
- The full restitution of competitiveness in terms of relative labor costs per unit of product and its improvement in terms of relative prices. Notably noting that this was succeeded across a sore procedure of internal devaluation that took place with a considerable reduction of nominal wages mainly in the private sector.
- The elimination of the twin deficits, the excessive budget deficit and a significant reduction of the current account balance deficit (bank of Greece annual report, 2018).
- At the same time, a bold program of substantial structural reforms, privatization and modernization of the economy is being implemented in sectors as the insurance and healthcare systems, the labor and commodity markets, the entrepreneurial environment, the state administration, the tax system and the financial structure.
- The restructuring and reorganization of the banking sector, the enhancement of the capital adequacy of banks and the effective management of the high stock of non-performing loans (bank of Greece annual report, 2018).

The positive outcomes of the heavy-going and long-term adaptation effort are: securing the fiscal balance, considerably increasing the extroversion of the Greek economy and transforming it in favor of export-oriented tradable goods and services and preserving

financial stability. However, despite the progress achieved, the crisis has brought significant costs to the economy in terms of product and employment and a significant reduction in household wealth (bank of Greece annual report, 2017). Between 2008 and 2016, the state has lost more than 25% of its GDP at constant prices and unemployment rose by almost 16%. Moreover, per capita GDP in purchasing power parities was at just 68% of the EU average in 2016, up from 93% in 2008. Simultaneously, a large wave of immigration of highly qualified Greeks took place, a brain drain, depriving Greek society and economy of a productive part, with uncountable demographic, economic and social consequences (bank of Greece annual report, 2017).

In the new decade of 2020, the Greek economy has rectified crucial macroeconomic and fiscal disproportions that generated the economic crisis and is striving to expedate its stride unto a viable development orbit (bank of Greece annual report, 2019). On its route it has to encounter a great deal of crucial dares, mainly as a consequence of the sovereign debt crisis and extraneous threats. The dissemination of the coronavirus creating Covid-19 illness and the intensification of the refugee-migration complication are affecting decisively short-term performance expectations and provisionally constituting crucial barriers towards normalcy (bank of Greece annual report, 2020). Moreover the outbreak of the pandemic in early 2020 was a historic turning point for the global economy. The countries were shaken by a double, unexpected and acute crisis, health and economic. Values, rights and constants were tested. Assurances about how societies and economies work, as well as how economic policy is directed, have been revised. The world community has suffered significant human losses. It faced the worst, in peacetime, economic recession of the last 100 years, as world GDP recorded, according to the latest estimates, a historic decline of 3,5% (bank of Greece annual report, 2020).

The Greek economy, as a service economy mainly, where tourism and retail trade constitute a large share, was damaged harder than other EU countries by the shocks in foreign and domestic demand, which were caused by consecutive restrictive actions and rising economic uncertainty. The magnitude of the recession in 2020 is about 8,2% (bank of Greece annual report, 2020). Small and micro-enterprises are mostly affected, mainly of family nature, which their ability to adapt and access bank lending is limited. However, despite the enormous and inevitable losses, due to the kind of disruption and structure of the economy, the Greek economy showed extraordinary resilience and functional

adaptability to the new reality. The pandemic crisis reversed the course of the mild recovery of the Greek economy since 2017 and set as an instant priority the protection of public health and the containment of large economic losses in terms of income and employment (bank of Greece annual report, 2020). The aim of the policy was to avoid the risk of converting a recession into a long-term economic crisis. A high degree of uncertainty characterizes the current situation, affecting the activity of companies and crucially affects the growth rate. However, economic activity is forecasted to recover later this year and continue to grow at a faster pace in 2022. Possible extension of the restrictive actions and geopolitical tensions can slow the recovery. The acceleration of national vaccinations and the faster absorption of Next Generation EU (NGEU) funds, amounting to 750 billion euros, are the two major factors that will determine the trajectory of the recovery (bank of Greece annual report, 2020).

2.1 Evolution of Greece's crucial macroeconomic environment measures in years 2005-2020

2.1.1 Gross Domestic Product – GDP and its basic components

Table 2.1.1. in millions	Gross Domestic Product	Percentage change	Final Consumption Expenditure	Percentage change	Gross capital formation	Percentage change	Exports of goods and services	Percentage change	Imports of goods and services	Percentage change
Year										
2005	219.867,78 €	0,6%	185.598,60 €	3,5%	47.092,55 €	-10,4%	46.378,33 €	3,7%	60.258,60 €	1,0%
2006	232.295,66 €	5,7%	192.494,97 €	3,7%	58.338,20 €	24,1%	48.796,47 €	4,9%	68.278,88 €	13,4%
2007	239.900,44 €	3,3%	200.947,88 €	4,4%	63.314,94 €	9,2%	53.977,87 €	10,9%	78.861,63 €	15,6%
2008	239.096,36 €	-0,3%	205.291,59 €	2,2%	57.481,39 €	-9,2%	55.851,97 €	3,6%	79.903,28 €	1,7%
2009	228.813,46 €	-4,3%	203.646,64 €	-0,8%	42.028,67 €	-26,9%	45.508,62 €	-18,2%	63.639,85 €	-20,3%
2010 ^B	216.276,68 €	-5,5%	191.591,67 €	-5,9%	37.500,57 €	-10,8%	47.721,19 €	4,9%	61.456,58 €	-3,4%
2011	194.326,08 €	-10,2%	175.805,92 €	-8,1%	25.561,86 €	-31,3%	48.025,62 €	1,2%	55.558,57 €	-9,5%
2012	180.563,22 €	-7,1%	163.598,43 €	-7,0%	20.215,79 €	-19,9%	48.968,23 €	2,4%	52.496,07 €	-5,5%
2013	175.612,59 €	-2,8%	156.621,05 €	-4,3%	19.550,49 €	-3,3%	49.843,19 €	1,0%	50.783,83 €	-3,2%
2014	176.838,62 €	0,7%	156.404,53 €	-0,1%	20.425,77 €	5,9%	53.953,94 €	8,5%	54.209,89 €	6,7%
2015	176.110,22 €	-0,4%	156.611,75 €	0,1%	21.302,19 €	3,3%	56.661,36 €	5,4%	58.465,36 €	8,1%
2016	175.247,54 €	-0,5%	155.903,19 €	-0,4%	22.643,23 €	6,9%	56.426,47 €	-0,7%	59.725,65 €	2,3%
2017	177.492,15 €	1,2%	158.143,20 €	1,4%	22.215,17 €	0,2%	61.229,11 €	8,5%	64.129,67 €	7,4%
2018	180.259,21 €	1,6%	159.392,80 €	0,8%	23.256,59 €	4,1%	66.808,38 €	9,5%	69.251,80 €	8,0%
2019	183.606,04 €	1,8%	162.153,25 €	1,7%	22.636,52 €	-4,0%	70.044,73 €	4,6%	71.295,88 €	3,0%
2020	168.462,70 €	-8,1%	156.630,07 €	-3,3%	23.753,40 €	10,1%	54.864,55 €	-18,8%	66.439,36 €	-6,8%

Table 2.1.1 Gross Domestic Product – GDP and its basic components. Source: Hellenic Statistical Authority (ELSTAT), Quarterly GDP - Non Seasonally adjusted, Chain-linked volumes, reference year 2015 (1st Quarter 1995 – 4th Quarter 2020)

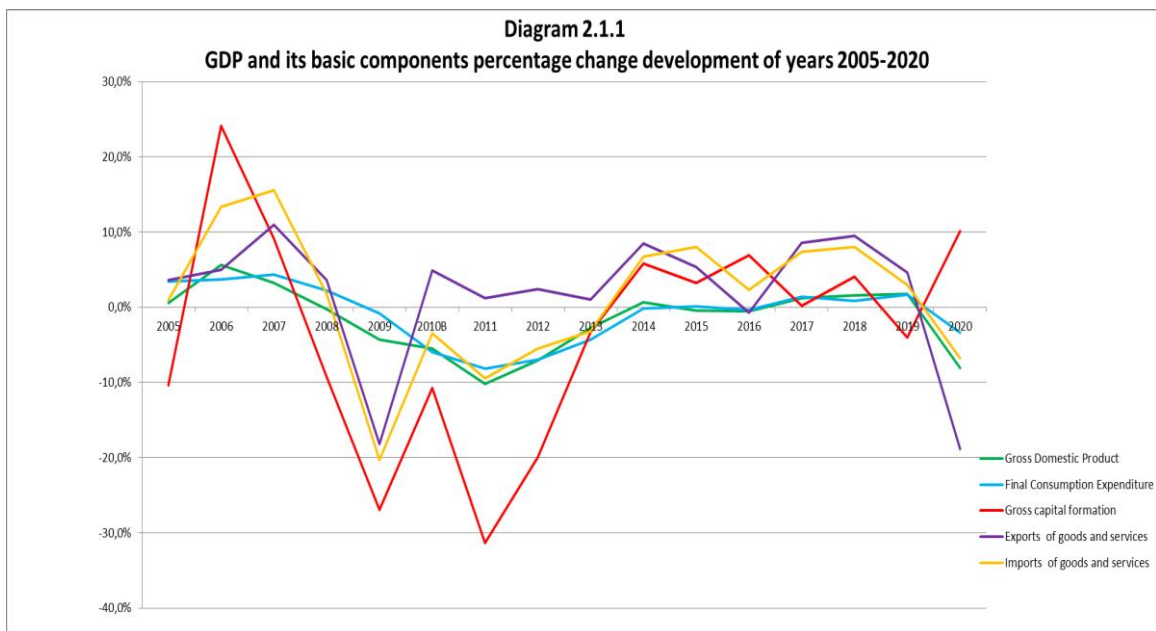


Diagram 2.1.1 GDP and its basic components percentage change development of years 2005-2020

In table 2.1.1 are presented basic components of gross domestic product, according to Hellenic Statistical Authority timeline of Quartely GDP data which are non-seasonally adjusted, have as reference year 2015, from 1st quarter of 1995 to 4th quarter of 2020.

The data for 2010 and afterwards have been revised with 2015 as base year. The rest years' revision is in progress and there is a break in year 2010 in the series between the two groups of data, the revised and unrevised. As a result the percentage changes of year 2010 are uneven as it is between revised and unrevised data and are presented only to have an overall display of percentage change development. However, the numbers are very close to the percentage changes of the previous revised data which had as base year that of 2010.

It is observed that GDP's percentage improvement decrease's in year 2007 and in year 2008 a GDP percentage loss of -0,8% takes place. Until year 2016 the GDP is constantly decreasing. The biggest negative GDP percentage loss occurs in year 2011, -10,2%. There is a unstable improvement in year 2014 with 0,7% GDP percentage improvement but for the next two years GDP percentage loss continues. Afterwards for three consecutive years, 2017-2019, GDP percentage improvement is observed but in 2020 a big loss of -8,1% takes place due to the fact of the covid-19 pandemic.

The final consumption expenditure percentage change as shown in Diagram 2.1.1 in most of the years is somewhat close to the percentage change of the GDP but there are years with divergence. The first three researched years there is a percentage increase and afterwards starts decreasing and in year 2009 begins the percentage loss of consumption until 2016 where an improvement and percentage increase takes place. The biggest negative final consumption expenditure percentage loss, -8,1%, takes place in year 2011 the same as GDP. In year 2020 as every other component of GDP, consumption too is affected from pandemic covid-19 and a percentage loss of -3,3% is observed.

The gross capital formation has the biggest variability, the biggest loss as more than the half of the value that had in the first years has vanished during the researched years and has the most extreme values than every other component of GDP as shown in Diagram 2.1.1. It starts with a substantial percentage loss but the next year it has the biggest percentage improvement, 24,1%, of any other GDP component. From year 2008 a massive percentage loss starts until 2013 where more than 70% percent of each value has been vanished which correspond in more than 43 billion euros as shown in table 2.1.1. Afterwards gross capital formation mainly improves slowly though, covering cumulatively from year 2014 till nowadays around 4 billion euros of its total loss. Gross

capital formation was the only GDP component which not only didn't suffer loss in year 2020 but also it achieved a 10,1% percentage increase.

During the years 2008 and 2016 where GDP has suffered great losses and most of its components, exports of goods and services is the only component that not only regained every loss but improved and increased around 14billion euros or about 25% as shown in table 2.1.1. The first years had a percentage increase where in year 2008 had its peak around 55billion euros. Although in year 2009 it suffers a big percentage loss of 18,2% which though progressively regained the following years and exceeded in year 2015. In year 2019 exports achieved more than 70 billion euros, its highest peak of all researched years. In year 2020 as almost every GDP component it suffered a loss of 18,8%.

On the contrary imports of goods and services followed the course of most of the GDP components, losing around 8,5 billion euros in the researched years. The first years as most components had a percentage increased reaching at almost 80 billion euros in year 2008. Next year it suffers a great percentage loss around 20,3% as shown in table 2.1.1. A continuous loss until year 2013 takes place, where imports were decreased around 20billion euros. Afterwards imports regained around 20billion euro of the 29 that lost during the recession. In year 2020 a 6,8% percentage decrease took place.

2.1.2 Employment & Unemployment

Table 2.1.2 Population (in thousands) of 15 years and over by employment status: 2001-2020, by year

SOURCE: EL.STAT, LABOUR FORCE SURVEY

Years	Grand Total	Labour Force						Total Inactive
		Total Active	Proportion percentage(%) as to the population	Employed	Proportion percentage(%) as to the labour force	Unemployed	Proportion percentage(%) as to the labour force	
2005	9332,4	4937,1	52,9	4443,6	90,0	493,6	10,0	4395,3
2006	9374,1	4975,7	53,1	4527,5	91,0	448,2	9,0	4398,4
2007	9412,3	4982,4	52,9	4564,1	91,6	418,4	8,4	4430,0
2008	9435,1	4998,3	53,0	4610,5	92,25	387,9	7,75	4436,8
2009	9431,1	5040,7	53,4	4556,0	90,4	484,7	9,6	4390,4
2010	9399,4	5029,1	53,5	4389,8	87,3	639,4	12,7	4370,3
2011	9372,9	4936,2	52,7	4054,4	82,15	881,8	17,85	4436,7
2012	9344,8	4890,1	52,3	3695,0	75,6	1195,1	24,4	4454,7
2013	9309,5	4843,6	52,1	3513,2	72,5	1330,4	27,5	4466,0
2014	9282,1	4810,7	51,8	3536,3	73,5	1274,4	26,5	4471,5
2015	9246,6	4807,7	52,0	3610,7	75,1	1197,0	24,9	4438,9
2016	9212,8	4804,5	52,1	3673,6	76,5	1130,9	23,5	4408,3
2017	9176,9	4779,8	52,1	3752,7	78,55	1027,1	21,45	4397,2
2018	9140,2	4743,0	51,9	3828,0	80,7	915,0	19,3	4397,1
2019	9103,5	4729,9	52,0	3911,0	82,7	818,9	17,3	4373,6
2020	9079,0	4630,5	51,0	3875,5	83,7	755,0	16,3	4448,5

Table 2.1.2 Population 15+ (employment status (Greece, total)) (1st Quarter 2001 - 4th Quarter 2020).

Source: Hellenic Statistical Authority (ELSTAT), Labour force (Quarterly data) / 4th Quarter 2020

The employment's highest value is at year 2008 where there were approximately 4.610.500 employed people which corresponds to 92,3% of the labour force. Correspondingly unemployment lowest values is at the same year where there were approximately 387.900 unemployed people which corresponds to 7,8% of the labour force. Afterwards there is a deterioration where employment decreases more than 1,1 million and unemployment increases almost 1 million. At year 2013 there were approximately 3.513.200 employed people or 72,5% and 1.330.400 unemployed ones or 27,5%. From that point and afterwards, till nowadays a stable reduction of unemployment has taken place as in year 2020 there were approximately 755.00 unemployed people or 16,3%. The grand total population has been decreased approximately 250.000 people in the researched years. The active population has a decrease approximately 410.000 people as in year 2009 it had approximately 5.040.700 and in year 2020 it had 4.630.500. The inactive population at the researched years has a somewhat stable fluctuation around 4.410.000 people.

2.1.3 Inflation

Table 2.1.3 Inflation				
Years	Consumer Price Index (CPI)		Harmonized Index of Consumer Prices (HICP)	
	Index (2009=100)	Annual (%) changes	Index (2015=100)	Annual (%) changes
2005	89,3	3,5	84,3	3,5
2006	92,2	3,2	87,1	3,3
2007	94,9	2,9	89,7	3,0
2008	98,8	4,2	93,5	4,2
2009	100,0	1,2	94,8	1,3
2010	104,7	4,7	99,3	4,7
2011	108,2	3,3	102,4	3,1
2012	109,8	1,5	103,4	1,0
2013	108,8	-0,9	102,5	-0,9
2014	107,4	-1,3	101,1	-1,4
2015	105,5	-1,7	100,0	-1,1
2016	104,6	-0,8	100,0	0,0
2017	105,8	1,1	101,2	1,1
2018	106,5	0,6	101,9	0,8
2019	106,8	0,3	102,5	0,5
2020	105,4	-1,2	101,2	-1,3

Table 2.1.3 Inflation. Source: Hellenic Statistical Authority (ELSTAT) and Bank of Greece calculations.

Consumer Price Index – CPI and Harmonized Index of Consumer Prices – HICP of Greece as presented in Table 2.1.3 annual percentage changes, are in many years almost identical but some deviations exist. Until the year 2008 both CPI and HICP indexes annual percentages changes on average are approximately at 3,5%. At years 2009 and 2010 a sudden decrease and increase respectively of the percentages improvement are observed for both indexes. For the next two years the percentages improvements are slowing and in year 2013, a deflation is observed as both CPI and HICP percentages changes are -0,9%. The deflation of CPI is continuing until 2016 and of HICP until 2015. A bigger deviation of CPI's and HICP's percentage change coincident is observed in years 2015 and 2016. From years 2017 to 2019 positive percentage changes are observed for both indexes and in year 2020 again a deflation is observed.

2.1.4 Current Account Balance

Table 2.1.4		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
I	CURRENT ACCOUNT (I.A + I.B + I.C + I.D)	-17.673,1	-25.024,4	-35.342,5	-36.566,2	-29.322,9	-22.648,9	-17.829,7	-6.646,7	-2.588,2	-1.317,8	-1.438,4	-3.050,0	-3.406,2	-5.232,2	-2.725,5	-11.144,2
	GOODS AND SERVICES (I.A + I.B)	-15.097,4	-21.215,0	-27.647,9	-28.681,8	-21.631,3	-15.174,5	-9.796,2	-6.512,6	-3.928,1	-2.385,3	-1.084,8	-1.662,7	-1.790,2	-3.184,7	-1.717,4	-11.249,7
I.A	GOODS (I.A.1 - I.A.2)	-29.364,9	-35.205,1	-42.787,7	-44.363,4	-33.136,0	-27.270,9	-23.391,4	-20.351,7	-19.672,9	-20.630,1	-17.666,1	-17.960,3	-19.833,9	-22.489,1	-22.833,3	-18.528,1
I.A.1	Exports	15.160,6	17.705,9	20.624,2	21.921,4	17.721,0	20.220,7	23.026,7	26.426,6	26.187,4	26.150,3	24.805,1	24.613,2	28.040,5	32.372,8	32.433,6	28.904,4
I.A.2	Imports	44.525,5	52.911,0	63.412,0	66.284,7	50.857,0	47.491,6	46.418,0	46.778,2	45.860,3	46.780,3	42.471,2	42.573,5	47.874,4	54.861,9	55.266,9	47.432,5
I.B	SERVICES (I.B.1 - I.B.2)	14.267,5	13.990,1	15.139,9	15.681,5	11.504,7	12.096,4	13.595,2	13.839,1	15.744,8	18.244,8	16.581,3	16.297,6	18.043,7	19.304,4	21.115,9	7.278,3
I.B.1	Receipts	27.322,3	28.419,3	31.417,7	34.150,2	27.099,0	28.541,9	28.636,2	27.561,1	28.045,8	31.051,4	31.650,0	29.795,0	33.661,3	37.159,3	40.162,6	22.711,3
I.B.2	Payments	13.054,9	14.429,2	16.277,8	18.468,7	15.594,3	16.445,5	15.041,0	13.722,0	12.301,0	12.806,6	15.068,7	13.497,5	15.617,6	17.854,9	19.046,8	15.433,0
I.C	PRIMARY INCOME (I.C.1 - I.C.2)	-2.652,7	-4.233,5	-6.588,7	-7.541,6	-6.740,2	-5.711,1	-6.525,9	820,0	-456,4	1.402,1	153,7	-798,9	-1.057,3	-1.726,4	-1.591,6	-455,6
I.C.1	Receipts	6.735,1	6.875,7	7.829,4	9.082,3	6.928,9	6.401,9	5.764,5	6.615,9	6.458,7	8.458,6	7.539,9	6.217,5	6.184,1	6.058,5	6.202,9	6.459,1
I.C.2	Payments	9.387,8	11.109,2	14.418,1	16.623,9	13.669,1	12.113,0	12.290,4	5.795,9	6.915,0	7.056,5	7.386,2	7.016,5	7.241,3	7.784,9	7.794,5	6.914,7
I.D	SECONDARY INCOME (I.D.1 - I.D.2)	77,0	424,0	-1.106,0	-342,8	-951,4	-1.763,3	-1.507,6	-954,2	1.796,3	-334,6	-507,3	-588,4	-558,7	-321,1	583,5	561,2
I.D.1	Receipts	3.414,8	3.500,6	3.337,2	3.373,6	2.734,8	2.263,7	1.993,8	2.342,5	4.652,8	2.550,7	1.946,5	1.838,0	1.949,9	2.177,6	3.827,9	4.064,5
I.D.2	Payments	3.337,8	3.076,6	4.443,2	3.716,4	3.686,2	4.027,0	3.501,4	3.296,7	2.856,5	2.885,4	2.453,8	2.426,4	2.508,6	2.498,8	3.244,5	3.503,4

Source: Bank of Greece, Amounts in million of euros

Table 2.1.4 Current Account Balance. Source: Bank of Greece.

The current account balance of Greece has a deficit in every researched year. The main deficit's origin is from the balance of Goods. A substantial increase of the current account's balance deficit takes place during years 2006 to 2010 and especially in years 2007 and 2008. More specifically, the observation of the components of the balances points out that the deficit of the balance of goods increased a lot as the growth rate of the imports was increasing very fast in regard of that of the exports. Also the deficit of the balance of primary income increased as the growth rate of payments was increasing faster than that of the receipts. Moreover the balance of the secondary income from a surplus turned into a deficit in year 2007 until 2012. In year 2012 a sudden reduction of the deficit is observed as it was reduced approximately for 11 billion euros, the biggest reduction of the researched years. The reduction was a result of diminishing the deficit of the balance of primary income and turning it into a surplus but also from the reduction of the deficit of the balance of goods, approximately a 3 billion euros reduction mainly stemming from a corresponding increase of the exports. More specifically the payments of the balance of primary income were reduced approximately 6,5 billion euros and the receipts were almost increased approximately 0,9 billion euros. Afterwards and until 2015 the deficit of the balance of current account is further decreasing, with an improvement of the surplus of the balance of services and the deficit of the balance of goods, but also and an unstable

improvement of the balances of primary and secondary income. From 2016 to 2018 the deficit of the balance of goods is increasing again. This increase is mainly caused from a progressive increase in the deficit of the balance of goods and services due to an increase of imports and the return in a deficit of the balance of the primary income which too progressively increases. In year 2019 a decrease of the deficit is observed as there is an improvement of the surplus of the balance of services and the deficit of the balance of secondary income turn into a surplus. Lastly in year 2020 a big increase of the deficit is observed as the surplus of the balance of services is almost decreased by 14billion of euros.

3. Generic Outline of the chosen companies

The companies that are chosen and utilized in the research are fulfilling the following principles. Firstly it had to be listed in the Athens stock exchange, the Greek capital market. Secondly the market sector it had to include at least five companies, and lastly the chosen company was the one with the highest market capitalization in October 2020 within the market sector. Below are listed the chosen market sectors and the corresponding companies of each sector with the highest market capitalization that are used in the research.

1. Computer Services: Quest Holdings S.A.
2. Construction: Gek Terna S.A. Holdings Real Estate Constructions
3. Food Products: KRI-KRI Milk Industry S.A.
4. Industrial Suppliers: Elton International Trading Company S.A
5. Iron & Steel: Elastron S.A. – Steel Service Centers
6. Textile Products: El. D. Mouzakis S.A.

3.1 Quest Holdings S.A.

Quest Holdings S.A. was established in 1981 as Info- Quest Ltd., it is the parent company of Quest Group, a group of Greek companies, and it is listed in the Athens Stock Exchange from 1998 (The group at a glance, official website). The vision of the company is to be leading in its market, with creating innovative value through entrepreneurial

supremacy. Quest is making business in five sectors operation, information technology products (Wholesale and retail), information and communication technology services, Financial & electronic payments, Green Energy – Renewable Sources and courier & postal services. It has presence in Greece, Southeastern Mediterranean and Europe. Its consolidated annual turnover in 2019 exceeds 721 million euros and a capital base – equity bigger than 143 million euros. Its workforce is bigger than 2256 professionals. It serves every major market segment, consumer markets, business markets (both private and public) and international markets (more than 30 different countries).

3.2 Gek Terna S.A. Holdings Real Estate Constructions

Gek Terna S.A. is among the biggest Greek group companies. It is over half a century old and its main parts are GEK and TERNA which were created in 1969 and 1972 respectively (The share, official website). They were both listed in Athens stock exchange in 1994. In 2008 they were merged and created its current form of Gek Terna Group. Gek Terna is a business leader in sectors of infrastructure, energy creation, supply & trade from thermal sources and RES, concessions, real estate development and management and waste management (at a glance, official website). Its corporate purpose is to achieve a sustainable growth, reinforce its dominant position of original businesses but also expand in new activities and new international markets. Its turnover in 2019 was 1.156 million euros and an uncompleted remainder of signed and to be signed contracts, worth of 3 billion euros. It has developed presence in 16 countries located in Europe, USA and the Middle East. Its workforce is around 3.500 employees extending in every country that has presence. Last but not least Get Terna has started and finished extensive investment projects equal of 2,5 billion euros during the last years where Greek economy severely hit by the unparalleled economic crisis and recession, leading to becoming one of the most crucial and established domestic investors.

3.3 KRI-KRI Milk Industry S.A.

KRI – KRI S.A. was established in 1954, 67 years ago as a small pastry shop. Nowadays is among the most active industries of dairy products, mainly Greek yogurts and ice-creams, with an aim of further reinforcing its growth perspectives (Our history, official

website). Its vision is to enhance and advance its nutritive legacy to all over the world, driven from affection and esteem to people and the natural world. The company is exporting in the whole world and in 30 countries. It has been listed in Athens Stock exchange in 2003.

3.4 Elton International Trading Company S.A.

Elton S.A. was established in 1981 by a conversion of the pre-existing company. It is the dominant company in chemical ingredients distribution market and industrial solution supplier (Profile, official site). Elton is active in countries of south-eastern Europe, Ukraine, Cyprus and Turkey where in every country that has presence, it operates and owns distribution centers. It has been listed in the Athens Stock Exchange in 2000. Its vision is to maintain and enhance its dominant position in the market that operates and offering in its clients and shareholders the best possible results. It emphasize a lot in its workforce as it is stating that it is its driving force and the core of its philosophy. It aims in attracting, developing and retaining the best talents.

3.5 Elastron S.A. – Steel Service Centers

Elastron S.A. was established in 1958 (Company profile, official website). Its core sectors of operation are processing and merchandizing steel commodities, large steel structures and cladding systems. It has a leading position in its sector as it is one of the most outstanding companies, financially strong. Its long-lasting experience, more than half a century, is a key trait of the company foundation and growth. It has been listed in the Athens Stock Exchange since 1990. Two major markets of the company are the manufacturing and energy sectors which are booming in south east European countries and the increasing demand of the shipbuilding market.

3.6 El. D. Mouzakis S.A.

El. D. Mouzakis S.A. was founded in 1968. It is one of the biggest textile companies in Europe, with approximately a workforce of 250 people (Founder & Philosophy, official website). A major role in the succession of the company is the internal cohesion, seamless

collaboration and the persistence of high quality at every organizational level. The company main activities are the production of high quality sewing and embroidery threads of all types, made of cotton, polyester and composites. Moreover it generated fully processed cotton yarns intended for hand knitting, knitting machine, textile and lace. The company is exporting in vary extended international market. It has presence in Western Europe, North America, North Africa and Middle East and lately has expanded in countries of Balkan Peninsula, central and Eastern Europe and former soviet republics. It has been listed in Athens Stock Exchange since 1991.

4. Outline of the methodology and tools used in the assessment of the financial position of the researched companies

The methodology used in this thesis to examine and evaluate the financial position of the chosen firms is the same that Joseph D. Piotroski used and defined in his paper: “Value investing: The use of Historical Financial Statement Information to Separate Winners from Losers” which was published in Journal of Accounting Research in 2000 volume 38. A plain accounting fundamental analysis, based in specified context measures which are utilizing data from a company’s historical financial statements, is applied to efficiently differentiate companies between those with robust perspectives and those with poor perspectives (Piotroski, 2000). An analysis which uses nine cardinal signals which cover three areas of the company’s financial state: profitability, financial leverage & liquidity and operating efficiency. It is commonly acceptable that these financial signals are convenient to execute and explain. Moreover their utilization is widely appealed for the estimation of the total quality and power of a company’s financial position where they also constitute a statistical resume for a company’s performance (Piotroski, 2000). The signals are pointed out from professional and scholar articles and constitute an extension of previous research regarding the discrimination between robust companies and fragile companies. It is not the best procedure of evaluating the performance of a company, as may factor analysis be, but it is easily implementable and robust. The specific methodology is called F_Score and is composed from the total aggregation of the nine crucial binary signals where an index variable for each signal is one (1) if the signal is positive and zero (0) if it is negative (Piotroski, 2000).

4.1 Financial Performance signals

4.1.1 Profitability Signals

The results of the current profitability and cash flow that are realized, supply data regarding the company's efficiency to produce capital domestically (Piotroski, 2000). Four variables are utilized to compute these performance-associated characteristics: ROA, CFO, Δ ROA and ACCRUAL. ROA and CFO are determined as net income preceding extraordinary items and cash flow of operations, correspondingly, divided by total assets at the beginning of the year. If the company's ROA and CFO are positive then the index variables F_ROA and F_CFO are determined to be equivalent to one, in any different situation are zero.

Δ ROA is determined as the present year's ROA minus the previous year's ROA. If Δ ROA is positive then the index variable F_ Δ ROA is equivalent to one, in any different situation is zero. The correlation among profits and cash flow amounts are examined as Sloan (1996) proves that profits lead from positive accrual adaptations, i.e. earnings are bigger than cash flow from operations, is a negative sign about upcoming profitability and returns (Piotroski, 2000). The variable ACCRUAL is determined as the present year's net income before extraordinary items minus cash flow from operations, divided by total assets at the beginning of the year. If CFO is bigger than ROA, then the index variable F_ACCRUAL is one, in any different situation is zero.

4.1.2 Leverage, Liquidity and Source of Funds Signals

Three variables are formulated to estimate the alterations in capital structure and the company's competence in taking care of subsequent debt service commitments: Δ LEVER, Δ LIQUID and EQ_OFFER (Piotroski, 2000). Δ LEVER captivate alterations in company's long term debt levels. An increase in a company's financial leverage indicates a weakness to create adequate capital domestically and a deterioration of the company's financial pliability. It is calculated as the alteration through time of long term debt divided by the average of total assets where a raise in financial leverage is considered as a bad signal, and a reduction as good one. F_ Δ LEVER is determined as one if current year's company's leverage ratio is smaller than the previous year and zero if it is bigger.

Δ LIQUID counts the alteration of a company's current ratio of present year with the previous one, where current ratio is determined as current assets divided to current liabilities at the end of the fiscal year (Piotroski, 2000). It is considered that a positive Δ LIQUID shows an enhancement of liquidity and the company's capacity to meet current debt commitments. $F_ \Delta$ LIQUID is one if Δ LIQUID is positive, in any different situation is zero.

EQ_OFFER is determined as one if the company did not edit common equity in the present year which constitute a positive signal about the company's financial risk, in any different situation is zero which constitutes a negative signal about the company's financial risk.

4.1.3 Operating Efficiency Signals

The rest two variables are formulated to estimate the alterations in the effectiveness of the company's activities: Δ MARGIN and Δ TURN (Piotroski, 2000). These signals are significant as they indicate two crucial elements underlying a disintegration of return on assets.

Δ MARGIN is determined as the company's present gross margin ratio minus the previous year's one (Piotroski, 2000). Gross margin ratio is the ratio of gross margin divided by total sales. An enhancement in margin denotes a possible enhancement in factor expenditures, a decrease in inventory expenditures, or an increase in the price of the company's commodity. $F_ \Delta$ MARGIN is one if present's year gross margin ratio is bigger than that of the previous year, in any other situation is zero.

Δ TURN is determined as the company's present year's asset turnover ratio minus the previous year's (Piotroski, 2000). Asset turnover ratio is the ratio of total sales divided by the total assets at the beginning of the year. An enhancement in asset turnover denotes bigger productivity from the assets. That kind of enhancement can derive from more effective activities, a smaller amount of assets that produce the same amounts of sales, or a raise in sales, which might also denote that the state of the market for the company's products is enhanced. $F_ \Delta$ TURN is one if present's year asset turnover ratio is bigger than that of the previous year, in any other situation is zero.

4.1.4 Composite Score

As stated in the beginning, aggregate signal F_SCORE is determined as the total sum of the aforementioned nine discrete binary signals: $F_SCORE = F_ROA + F_ΔROA + F_CFO + F_ACCRUAL + F_ΔMARGIN + F_ΔTURN + F_ΔLEVER + F_ΔLIQUID + EQ_OFFER$. The scale of F_SCORE can be from 0 to 9, where a small F_SCORE constitute a company with a small number of positive signals, on the contrary a big F_SCORE has most of the signals positive.

4.2 Type and Set of Data that used in the dissertation

4.2.1 Data of the empirical research

The data that were used in the main research of the dissertation were taken from the financial statements that each listed company is obliged to publish every year. More specifically data that are accounting fundamentals as it was stated in the previous Section 4.1 were extracted from the balance sheet, the income statement, the cash flow statement and from the notes on the financial statements of every company for every year of the research. The period of time that is researched in the dissertation is from 2005 up to 2020. Mainly the sources of data were acquired through the financial statements that are published in the official site of Athens Stock Exchange and in the official sites of each company. The software that was used for processing the specific data and compute the Aggregated F_SCORE was Microsoft excel.

4.2.2 General data of the whole research

Specific data were also used in the 2nd chapter of the dissertation concerning the description and the setting of the macroeconomic environment of Greece between the years 2005 and 2020 that the dissertation examines and is focused. The data were extracted from the annual reports of the governor of bank of Greece, an unbiased, inclusive and detailed examination of the evolvement and perspectives of the Greek economy that is published every year in the official site of bank of Greece. Moreover data were also collected from the section statistics of the official site of bank of Greece. Finally data were also collected from the independent Hellenic Statistical Authority (ELSTAT) that are published in its official site.

5. Empirical Research

Table 5 Evolution through time of the average F_Score and its nine binary component signals of all companies															
Profitability Signals	YEAR														Average
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
F_ROA	1,00	0,67	0,67	0,67	0,33	0,33	0,33	0,33	0,50	0,33	1,00	0,83	1,00	0,83	0,63
F_CFO	0,67	0,67	0,50	0,83	0,83	0,83	0,67	0,83	1,00	0,67	1,00	0,67	1,00	1,00	0,80
F_ΔROA	0,83	0,67	0,33	0,50	0,50	0,17	0,33	0,67	0,17	0,50	0,83	0,67	0,50	0,50	0,51
F_ACCRUAL	0,67	0,50	0,50	0,83	0,83	0,67	0,83	0,83	0,67	0,50	0,83	0,50	0,50	0,50	0,65
Leverage, Liquidity and Source of Funds Signals															
F_ALEVER	0,50	0,50	0,33	0,50	0,33	0,67	0,50	0,67	0,50	0,17	0,67	0,50	0,33	0,50	0,48
F_ΔLIQUID	0,50	0,67	0,33	0,83	0,50	0,33	0,50	0,50	0,33	0,50	0,83	0,17	0,67	0,33	0,50
F_EQ_OFFER	0,83	0,67	0,67	1,00	0,67	1,00	1,00	0,67	1,00	0,83	0,67	1,00	1,00	1,00	0,86
Operating Efficiency Signals															
F_ΔMARGIN	0,33	0,33	0,33	0,33	0,50	0,33	0,17	0,50	0,17	0,67	1,00	0,50	0,33	0,50	0,43
F_ΔTURN	0,50	0,67	0,50	0,00	0,67	0,33	0,50	0,67	0,50	0,83	0,33	0,67	0,33	0,67	0,51
Composite F_Score	5,83	5,33	4,17	5,50	5,17	4,67	4,83	5,67	4,83	5,00	7,17	5,50	5,67	5,83	5,37

Table 5 Evolution through time of the average F_Score and its nine binary component signals of all companies

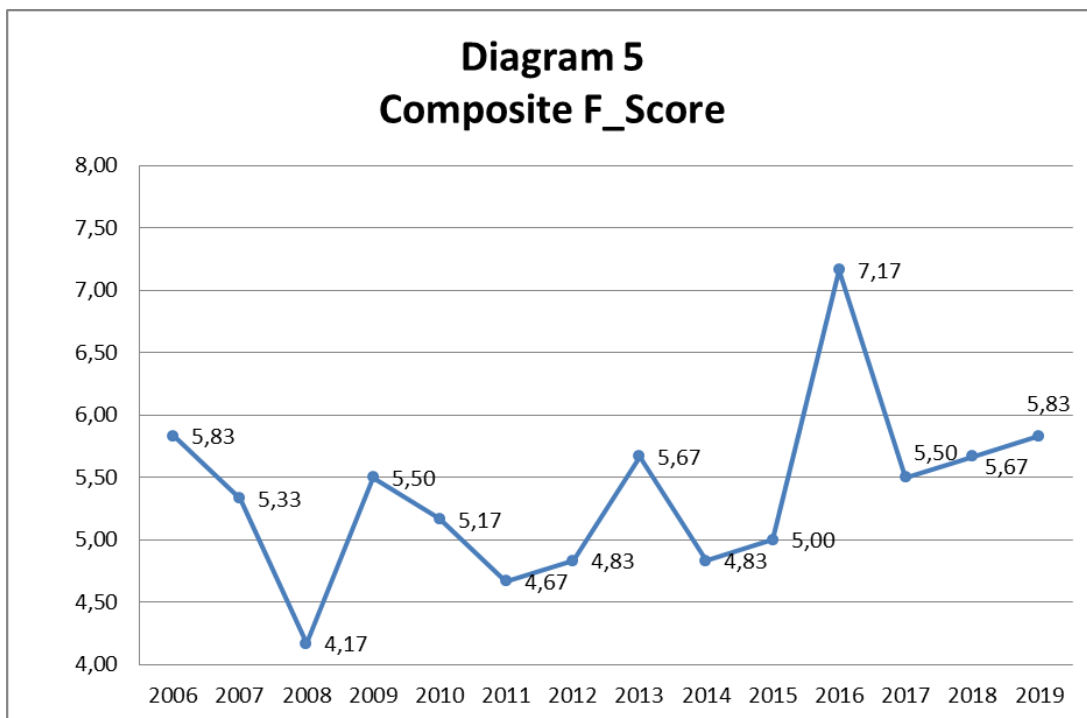


Diagram 5 Composite F_Score evolution in the researched years 2005 – 2020

Evolution through time of average F_Score

In Table 5 the evolution of the average F_Score signal per year of the sample as a whole through years 2006 to 2019 is depicted. Also in Diagram 5 a visualized evolution through time of F_Score is depicted too. The average value of all years is 5,37 above the median 4,5 of the F_score signal's scale. From year 2007 a deterioration of the value of average F_score signal is observed where a downward fluctuation begins and in fiscal year 2008

hits the lowest value, that of 4,17. Until 2015 only two times, on years 2009 and 2013, the value exceeded the average value of all years 5,37. On 2016 it reaches and exceeds the value of 2006 which was the highest value till then. Also from 2016 and afterwards a slow but continuous improvement of F_Score average is observed as for the last four years it is above all years average value. In 2017 there is a decrease of the average value but it still remains higher than all years' average. Gradually F_Score average reaches in 2019 the value of 2006, 5,83.

5.1 Evolution through time of every average binary signal component of F_Score

5.1.1 Profitability Signals

It is observed from Table 5 that while all companies in year 2006 had positive F_ROA, afterwards one by one starts presenting an inability to generate profits until year 2016 where we observe a steady recovery and almost every company start again generating profits for four consecutive years. This weakness is confirmed through the signal of F_ΔROA which at the beginning has the same negative route where the capabilities of most of the companies to enhance profit generation performance deteriorate as years pass. From year 2015 till nowadays we observe an improvement where three to four out of six companies have improved their ability of enhancing profit performance through time although it is a fragile improvement as two to three companies shows a prolonged weakness to improve their ability. On the other hand, as it shown in Table 5, the capability of generating positive cash flows from operations, $F_CFO > 0$, is enhanced through time for almost all of the companies which is a positive signal for the abilities of the companies to enhance the generation of capital domestically. Until year 2016 the same stands for the variable F_ACCRUAL where it is observed an increase in the number of companies that their variable CFO outperforms ROA showing a positive signal for upcoming profitability and returns. Although in last years and mainly the last three it is observed a decrease in the number of companies that achieve positive results regarding the variable F_ACCRUAL indicating a deterioration in the upcoming profitability and returns. Finally a proportional evolution with that of F_ΔROA variable is observed in the last five years.

5.1.2 Leverage, Liquidity and Source of Funds Signals

F_ΔLEVER signal's evolution through time, as depicted in Table 5 is somewhat steady where the number of companies that resort to external funding each year is fluctuating between two to four companies with an average of three companies per year. F_ΔLIQUID signal's evolution and fluctuation through time is more or less the same as F_ΔLEVER's signal with a bigger fluctuation though, where on average about 3 out of 6 companies per year improve their liquidity and the others don't. On the contrary F_EQ_OFFER signal's evolution is improved through time as in the first years one to two companies resorted in issuance of common equity where on average only one out of 6 companies resort. The last three years none of the companies issued any common equity. To conclude, on average the competence of taking care of subsequent debt service commitments of the companies' remained almost unchanged, whereas an improvement in capital structure is observed, as the number of companies issuing common equity has decreased as depicted and in Table 5.

5.1.3 Operating Efficiency Signals

F_ΔMARGIN shows, as depicted on Table 5, on average an improvement through time and more specifically it starts with a fragile improvement in 2010, where half of the companies achieve an improvement in gross margin ratio in regard with previous year's gross margin. The improvement is becoming more stable from year 2013 and afterwards where on average half of the companies are showing positive signals. F_ΔTURN signal shows an improvement through time but smaller in regard of the improvement of F_ΔMARGIN signal. A bigger instability of F_ΔMARGIN is observed from year to year but the average value is better. A remarkable note is that of the negative value of year 2009 where none of the companies achieved an improvement of asset turnover ratio in regard with previous year's asset turnover ratio. To sum up, it is observed from the Table 5, that in the last years of the research the companies have improved slightly their productions costs and they are utilizing more efficiently their assets in regard with their revenues.

5.2 Evolution through time of F_Score and its components per company

Table 5.2 Average Composite F_Score and its binary component signals per company							
	QUEST S.A.	GEK TERNA S.A.	MOUZAKIS S.A.	ELASTRON S.A.	ELTON S.A.	KRI-KRI SA	Average
Profitability Signal							
F_ROA	0,50	0,50	0,36	0,43	1,00	1,00	0,63
F_CFO	0,79	1,00	0,50	0,64	0,86	1,00	0,80
F_ΔROA	0,50	0,57	0,57	0,50	0,36	0,57	0,51
F_ACCRUAL	0,93	0,79	0,57	0,57	0,21	0,86	0,65
Leverage, Liquidity and Source of Funds Signal							
F_ΔLEVER	0,57	0,29	0,43	0,43	0,64	0,50	0,48
F_ΔLIQUID	0,43	0,57	0,57	0,57	0,50	0,36	0,50
EQ_OFFER	0,93	0,71	1,00	0,86	0,93	0,71	0,86
Operating Efficiency Signal							
F_ΔMARGIN	0,64	0,36	0,57	0,43	0,29	0,29	0,43
F_ΔTURN	0,50	0,43	0,21	0,64	0,64	0,64	0,51
Composite F_Score	5,79	5,21	4,79	5,07	5,43	5,93	5,37

Table 5.2 Average Composite F_Score and its binary component signals per company

5.2.1 KRI – KRI Milk Industry S.A.

Table 5.2.1 Evolution through time of F_Score and its nine binary component signals for KRI-KRI S.A.															
Profitability Signals	YEAR														
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
F_ROA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,00
F_CFO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,00
F_ΔROA	1	1	0	1	0	0	1	0	0	0	1	1	1	1	0,57
F_ACCRUAL	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0,86
Leverage, Liquidity and Source of Funds Signals															
F_ΔLEVER	1	0	0	1	1	0	1	0	1	0	1	1	0	0	0,50
F_ΔLIQUID	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0,36
F_EQ_OFFER	0	1	0	1	0	1	1	0	1	1	1	1	1	1	0,71
Operating Efficiency Signals															
F_ΔMARGIN	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0,29
F_ΔTURN	0	1	1	0	1	1	1	1	0	0	0	1	1	1	0,64
Composite F_Score	5	6	4	7	5	6	8	4	4	6	8	7	8	5	5,93

Table 5.2.1 Evolution through time of F_Score and its nine binary component signals for KRI – KRI S.A.

Composite F_Score

KRI – KRI S.A. has the biggest average F_Score value, 5,93 of the companies of the sample as depicted in Table 5.2. There has been a fluctuated improvement during the years of the research in company's F_Score with only a steep reduction taking place in years 2013 and 2014 but it had a fast improvement for four consecutive years with again a steep reduction in 2019. Investigating the components of F_Score a more thorough analysis can be done.

Profitability Signals

KRI-KRI S.A. in all years showed an effective and efficient capability of producing capital domestically as F_ROA and F_CFO signals are positive for every year of the research, as shown in Table 5.2.1. A decrease of the capability of improving profit generation performance is observed, as F_ΔROA is negative for most of the years between 2008 and 2015 with only positive signs in 2009 and 2012. Though, from 2016 till 2019 the company is showing an improvement in the capability of improving profit generation performance. Last but not least the company's F_ACCRUAL is showing a very good performance in regard of future profitability and returns as all years is positive except two negative signs, in years 2014 and 2019. To conclude all KRI-KRI profitability signals are above the average of the sample of the companies showing a very effective and efficient ability to produce positive future cash flows, profits and capital through internal operations.

Leverage, Liquidity and Source of Funds Signals

KRI-KRI S.A. financial leverage main attribute could be said to have a lasting fluctuation through time where half of the signals are positive and the other half are negative, as shown in Table 5.2.1. KRI –KRI's Leverage signal average value 0,5 is vaguely better of the sample's average value 0,48 as depicted in Table 5.2. In addition KRI-KRI S.A. has the worst average value of F_ΔLIQUID in regard with the rest companies of the sample although we observe an improvement from year 2011 and it gets' closer to the sample average value through time as if we consider an average from year 2011 excluding five consecutive negative signal signs from 2006 to 2010 we can see that the average value is rising to 0,56 above samples average. The same stands about EQ_OFFER as KRI-KRI's specific signal is below sample's average value but if we consider again from 2011 we observe an improvement 0,89 slightly better than the sample's average. To conclude KRI-KRI's performance in this group of fundamental signals mainly lacks in regard with sample's average performance but an improvement has been observed from 2011 and afterwards indicating positive future prospects in regard with the company's capital structure and its competence to correspond to future debt service commitments.

Operating Efficiency Signals

KRI-KRI's F_ΔMARGIN average value signal is one of the lowest of the sample as observed in Table 5.2. A slight improvement is observed from year 2015 but it fluctuates

and it cannot be considered as stable. It shows that KRI-KRI has an inability regarding production costs and its products price. On the other hand KRI-KRI's $F_ΔTURN$ shows an effective efficiency as its average value is one of the highest regarding the sample. It shows a fluctuation but the positive signs prevail, as shown in Table 5.2.1, pointing a satisfactory competence and efficiency in regard to its activities, its productivity and its sales.

Summing it up KRI-KRI's overall performance is the most satisfying from the sample where an improvement is observed in the last years, indicating positive prospects about the future performance of the company.

5.2.2 Quest Holdings S.A.

Table 5.2.2 Evolution through time of F_Score and its nine binary component signals for Quest Holdings S.A.															
Profitability Signals	YEAR														
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
F_ROA	1	0	0	1	0	0	0	0	1	0	1	1	1	1	0,50
F_CFO	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0,79
F_ΔROA	1	0	0	1	0	1	0	1	1	0	1	0	1	0	0,50
F_ACCRUAL	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0,93
Leverage, Liquidity and Source of Funds Signals															
F_ΔLEVER	1	1	0	0	0	0	1	1	0	0	1	1	1	1	0,57
F_ΔLIQUID	1	0	0	1	1	1	0	0	1	0	1	0	0	0	0,43
F_EQ_OFFER	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0,93
Operating Efficiency Signals															
F_ΔMARGIN	0	1	0	1	1	1	1	1	0	0	1	1	0	1	0,64
F_ΔTURN	0	1	0	0	0	0	0	1	1	1	0	1	1	1	0,50
Composite F_Score															
Composite F_Score	5	5	2	7	5	6	5	7	7	4	7	7	7	7	5,79

Table 5.2.2 Evolution through time of F_Score and its nine binary component signals for Quest Holdings S.A.

Composite F_Score

The average F_Score of Quest Holdings S.A. during the years 2006-2019 is 5,79 and it is the 2nd highest from the sample as Table 5.2 points out. The overall performance of Quest's F_Score through time is positive as it rises as years pass with two steep reduction taking place in years 2008 and 2015. Though, the company in the following years of the steep reductions has a sharp increase showing a significant endurance and performance. Investigating the components of F_Score a more thorough analysis can be done.

Profitability Signals

Half of the years of research Quest had negative profits and the other half had positive, as shown in Table 5.2.2. Fortunately the majority of the positive profit signals are in recent years, with positive F_ROA signal for four consecutive years. Although a gap between the

performance of the average value of the company and that of the sample is observed the recent years' positive outcome is promising. The condition of $F_{\Delta ROA}$ is common with F_{ROA} , showing though a more intense fluctuation. The average value of the company's signal is almost the same with the average value of the sample. On the contrary the other variables signals are more promising. F_{CFO} after the first three consecutive years with negative results shows a very satisfying performance where there is a permanent positive signal for 11 consecutive years, depicting a strong capability of creating capital from internal operations. Last but not least the company has the highest average value of $F_{ACCRUAL}$ from the sample of the companies and it is a lot above the sample average with one negative signal in the first year where for the rest years of the research there is a stable and constant positive signal. This indicates a very strong capability in regard with company's future profitability and returns.

Leverage, Liquidity and Source of Funds Signals

Quest has improved in the recent years its financial leverage, as shown in Table 5.2.2, in contrast with the deterioration that occurred mainly during a period that starts in year 2008 until 2015. In that period only two consecutive years had positive Leverage signals in years 2012 and 2013. The rest years the financial leverage signals were all negative. Quest's performance regarding the average value of $F_{\Delta LEVER}$ signal, 0,57, is above the sample's average value 0,48. The company's liquidity performance is weak and it has the 2nd worst performance from the sample, below the sample's average value. Moreover in recent years the performance of $F_{\Delta LIQUID}$ is deteriorating, indicating a weak capability in regard of servicing current debt commitments. Last but not least EQ_OFFER signal is very positive as there is only one negative signal in the whole research period showing a capability of generating adequate capital internally for servicing future commitments. The average company's value is 0,93 above the sample average of 0,86.

Operating efficiency Signals

Quest has the highest average value of $F_{\Delta MARGIN}$ signal of the sample indicating a satisfying capacity regarding company productions costs and products price, as shown in Table 5.2. There is a fluctuation observed but mainly the signal performance through time is positive. It is well above the average of the sample too. $F_{\Delta TURN}$ signal although it isn't performing as good as $F_{\Delta MARGIN}$ but it showing a satisfying performance

especially from year 2013 till nowadays indicating an improvement of company's productivity. The average value of the company's signal is almost the same with the average value of the sample.

5.2.3 Elton International Trading Company S.A.

Table 5.2.3 Evolution through time of F_Score and its nine binary component signals for Elton S.A.															
Profitability Signals	YEAR														
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
F_ROA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,00
F_CFO	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0,86
F_ΔROA	0	1	1	0	1	0	0	1	0	0	0	1	0	0	0,36
F_ACCRUAL	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0,21
Leverage, Liquidity and Source of Funds Signals															
F_ΔLEVER	0	0	1	1	1	1	1	1	1	1	0	0	0	1	0,64
F_ΔLIQUID	0	1	1	1	0	0	1	1	0	0	1	0	1	0	0,50
F_EQ_OFFER	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0,93
Operating Efficiency Signals															
F_ΔMARGIN	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0,29
F_ΔTURN	1	1	1	0	1	0	1	1	0	1	0	1	0	1	0,64
Composite F_Score	5	5	8	6	6	4	7	7	4	5	5	5	4	5	5,43

Table 5.2.3 Evolution through time of F_Score and its nine binary component signals for Elton International Trading Company S.A.

Composite F_Score

The average F_Score of Elton S.A. is 5,43. Mainly the performance of the company for the first half of the researched years is very satisfying regarding the overall performance of the sample but in year 2014 a steep reduction takes place and afterwards a deterioration of the performance of F_Score has been stabilized till nowadays. Investigating the components of F_Score a more thorough analysis can be done.

Profitability Signals

The company has a very positive trend in the whole research for producing positive cash flows and profits, as shown in Table 5.2.3, indicating a strong competence to produce positive future profits and cash flows. The F_ROA signal is positive from all the years of the research and the F_CFO signal is positive for most of the years with only two sparse distributed negative signs in years 2007 and 2017. However there are many negative signals concerning F_ΔROA and F_ΔACCRUAL, especially the 2nd signal respectively, as it has a constant negative signal sign for the last seven consecutive years, indicating big doubts about the company's future profitability and its returns. In both signals Elton S.A.

has the worst average results from the whole sample, as shown in Table 5.2, indicating disturbing and long-lasting inabilities.

Leverage, Liquidity and Source of Funds Singals

The $F_{\Delta LEVER}$ signal of Elton has the highest average value of the whole sample, 0,64 indicating a competence of financial flexibility. Although the consecutive negative signals of years 2016 to 2018, as shown in Table 5.2.3, somewhat tarnish the achievement. $F_{\Delta LIQUID}$ signal shows a stable fluctuation where half signals are positive and half are negative, with the same average value with the sample's average. EQ_OFFER signal is very satisfying as there is only one negative signal in year 2007. It can be stated that the effectiveness of this category's results can somewhat counterbalance the negative results of the last two signals of the profitability category, $F_{\Delta ROA}$ and $F_{\Delta ACCRUAL}$, considering the financials risks.

Operating Efficiency Signals

$F_{\Delta MARGIN}$ signal is one of the lowest of the sample as most of the years is negative, as shown in Table 5.2.3, with 7 consecutive years being negative from year 2009 until 2015. There has been an improvement for two years but the last two are negative too, indicating a continual deterioration of production costs and products prices. On the other hand $F_{\Delta TURN}$ signal is one of the highest of the sample although a fluctuation is observed. Nonetheless the signal's result indicates an improving productivity and increased efficiency of activities in the researched years.

5.2.4 Gek Terna S.A. Holdings Real Estate Constructions

Table 5.2.4 Evolution through time of F_Score and its nine binary component signals for Gek Terna S.A.															
Profitability Signals	YEAR														
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average
F_ROA	1	1	0	1	0	0	0	0	0	0	1	1	1	1	0,50
F_CFO	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,00
F_ΔROA	1	1	0	1	0	0	0	1	0	1	1	1	0	1	0,57
F_ACCRUAL	1	0	1	0	1	1	1	1	1	1	1	0	1	1	0,79
Leverage, Liquidity and Source of Funds Signals															
F_ΔLEVER	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0,29
F_ΔLIQUID	1	1	0	1	0	0	0	1	0	1	1	0	1	1	0,57
F_EQ_OFFER	1	1	0	1	1	1	1	0	1	0	0	1	1	1	0,71
Operating Efficiency Signals															
F_ΔMARGIN	0	0	0	0	0	1	0	0	0	1	1	1	0	1	0,36
F_ΔTURN	1	1	0	0	0	1	0	0	1	1	1	0	0	0	0,43
Composite F_Score	7	7	3	5	3	6	3	4	5	6	7	5	5	7	5,21

Table 5.2.4 Evolution through time of F_Score and its nine binary component signals for Gek Terna S.A. Holdings Real Estate Constructions

Composite F_Score

The average F_Score of Gek Terna S.A. is 5,21. It had a downward fluctuation performance from year 2008 until 2012 but afterwards its performance slowly changed in an upward fluctuation. The specific performance indicates a somewhat stabilized improvement and an ability of enduring and adapting in extreme conditions. Investigating the components of F_Score a more thorough analysis can be done.

Profitability Signals

The company has an overall satisfying condition considering its current profits and cash flows, as shown in Table 5.2.4. It had negative signals regarding profit realizations, $F_{ROA} < 0$, for six consecutive years from 2010 until 2015, showing though afterwards a continuous improvement with four consecutive years of positive signals. Its profits generation performance shows a fluctuated improvement and possibly has been stabilized from the negative signals of $F_{\Delta ROA}$ in years 2010 to 2012 as from that year till nowadays there are five positive signals and only two negative. In addition its cash flow realizations are positive in every year of the research, $F_{CFO} > 0$, which is also one of the highest average signal value of all companies as Table 5.2 points out. The signal $F_{ACCRUAL}$ is also showing an improvement through years, where there are only three negative signals in the researched years indicating that the company has a strong and efficient competence regarding future profitability and returns.

Leverage, Liquidity and Source of Funds Signals

F_ΔLEVER signal of the company has the lowest average value of all companies, as shown in Table 5.2. The financial leverage is the highest among the companies of the sample and most of the signals are negative in the researched years. On the other hand F_ΔLIQUID and EQ_OFFER signals are positive in most of the researched years. F_ΔLIQUID has the same three consecutive years of negative signals as F_ΔROA, from 2010 until 2012, but afterwards there is a substantial improvement with only two negative signals till nowadays, as shown in Table 5.2.4. EQ_OFFER signal has even more positive trend with only four negative signals during the researched years.

Operating Efficiency Signals

The operating Efficiency signals of the company are mainly negative indicating a bad performance for the company. Although F_ΔMARGIN has one less positive signal than F_ΔTURN, it displays though a satisfying improvement in company's production costs and products prices, as the last four out of five years of the research has positive signals. On the contrary F_ΔTURN signals of the last three years are negative, displaying a deterioration of the company's productivity and operating efficiency in regard with the previous years' performance as shown in Table 5.2.4.

5.2.5 Elastron S.A. – Steel Service Centers

Table 5.2.5 Evolution through time of F_Score and its nine binary component signals for Elastron S.A.															
Profitability Signals	YEAR														Average
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
F_ROA	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0,43
F_CFO	0	1	0	1	1	1	0	1	1	0	1	0	1	1	0,64
F_ΔROA	1	1	0	0	1	0	0	1	0	1	1	1	0	0	0,50
F_ACCRUAL	0	0	0	1	1	1	1	1	1	0	1	0	0	1	0,57
Leverage, Liquidity and Source of Funds Signals															
F_ΔLEVER	1	1	0	1	0	1	0	1	0	0	1	0	0	0	0,43
F_ΔLIQUID	0	1	0	1	1	0	1	1	1	1	0	0	1	0	0,57
F_EQ_OFFER	1	0	1	1	0	1	1	1	1	1	1	1	1	1	0,86
Operating Efficiency Signals															
F_ΔMARGIN	1	0	0	0	1	0	0	1	1	1	1	0	0	0	0,43
F_ΔTURN	1	0	1	0	1	0	0	1	1	1	1	1	0	1	0,64
Composite F_Score															
Composite F_Score	6	5	3	5	6	4	3	8	6	5	8	4	4	4	5,07

Table 5.2.5 Evolution through time of F_Score and its nine binary component signals for Elastron S.A. – Steel Service Centers

Composite F_Score

The average F_Score of Elastron S.A. is 5,07 as stated at Table 5.2.5. Its performance is of high volatility where both extreme low and high values are observed in the researched

years where an overall slight improvement of performance seems to prevail. It starts with deterioration the first years till 2012, but afterwards a sharp improvement takes place for four consecutive years, 2013 until 2016, but eventually a steep deterioration takes place again for the last three consecutive years. Investigating the components of F_Score a more thorough analysis can be done.

Profitability Signals

A deterioration of profits generation takes place at year 2009 as F_ROA has the first out of seven consecutive negative signals until 2015, as depicted in Table 5.2.5. Afterwards an improvement takes place for the next three years but deterioration in last year indicates an instability regarding future profitability. Its profit generation performance, $F_{\Delta ROA} > 0$, is somewhat in better condition than F_ROA signal as a prolonged deterioration isn't observed but there is an intense volatility through the researched years with mixed perspectives about future profitability. F_CFO shows a small improvement through time but again the volatility is present but a positive tendency is observed. F_ACCRUAL signal has a substantial improvement for six consecutive years, from 2009 until 2014, but afterwards it deteriorates as three out of 5 latest signals are negative. To conclude all company's signals average value of this category is below the average value of the sample as depicted in Table 5.2.

Leverage, Liquidity and Source of Funds Signals

F_ΔLEVER signal's trend in researched years follows a deteriorating fluctuation where it gets worse especially the last six years as it has five negative signals, as shown in Table 5.2.5. The average, 0,43, is lower but close to the sample's average value of 0,48. F_ΔLIQUID signal's trend is showing a small and unstable improvement as its average value of 0,57 is bigger than the sample's average value of 0,5. However the last four years it shows a negative trend with three negative signals. Despite that, the previous years improvement, from 2006 up to 2015, was very satisfying indicating that the company's competence to meet current debt commitments is till now satisfying but unstable, it depends on the future outcome of the signal. EQ_OFFER signal's performance is very positive as only two of the whole researched years are negative, in years 2007 and 2010.

Operating Efficiency Signals

F_ΔMARGIN signal's trend is somewhat ambiguous as it has shown a good performance and improvement till 2016 but afterwards it deteriorates as the last three years the signal is negative indicating an increase in production costs and a possible decrease in products prices, as shown in Table 5.2.5. On the other hand F_ΔTURN signals are mainly positive especially for the last seven years, indicating a strong performance and improvement in company's productivity and activities. F_ΔTURN average value 0,64 is one of the highest of the whole sample as the average sample's value is 0,51, as depicted in Table 5.2.

5.2.6 El. D. Mouzakis S.A.

Table 5.2.6 Evolution through time of F_Score and its nine binary component signals for El. D. Mouzakis S.A.															
Profitability Signals	YEAR														Average
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
F_ROA	1	0	1	0	0	0	0	0	0	0	1	0	1	1	0,36
F_CFO	1	1	0	0	0	0	0	0	1	0	1	1	1	1	0,50
F_ΔROA	1	0	1	0	1	0	1	0	0	1	1	0	1	1	0,57
F_ACCRUAL	1	1	0	1	1	0	0	1	1	0	1	1	0	0	0,57
Leverage, Liquidity and Source of Funds Signals															
F_ΔLEVER	0	0	0	0	0	1	0	1	0	0	1	1	1	1	0,43
F_ΔLIQUID	1	1	1	1	1	0	0	0	0	0	1	1	0	1	0,57
F_EQ_OFFER	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,00
Operating Efficiency Signals															
F_ΔMARGIN	1	0	1	0	1	0	0	1	0	1	1	0	1	1	0,57
F_ΔTURN	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0,21
Composite F_Score	7	4	5	3	6	2	3	4	3	4	8	5	6	7	4,79

Table 5.2.6 Evolution through time of F_Score and its nine binary component signals for El. D. Mouzakis S.A.

Composite F_Score

The average F_Score of Mouzakis S.A. is 4,79, the lowest of all the sample, as shown in Table 5.2. The company's performance for the first ten years of the research is deteriorating until the year 2016 but afterwards a strong improvement of the company's performance is observed, setting positive prospects for the company's future. Investigating the components of F_Score a more thorough analysis can be done.

Profitability Signals

The company's F_ROA signal average value of 0,36 is the lowest in the sample. Most of the researched years are negative signals with an unstable improvement taking place in the last four years where there are three positive signals, as shown in Table 5.2.6. On the other hand the F_ΔROA signal has an upward fluctuation improvement which is somewhat stable as the last five years it had four positive signals and has one of the highest average

value, 0,57, of the whole sample. Although F_CFO deteriorates in the first nine years, the rest six years a substantial improvement takes place as there are five positive signals. F_ΔACCRUAL has a fluctuation in all researched years between positive and negative signals, with an average value of 0,57, below the samples average value of 0,64.

Leverage, Liquidity and Source of Funds Signals

F_ΔLEVER signal is showing an improvement as the last four years are all positive. However the previous years had mostly negative signals indicating a continuous increase in company's financial leverage, as shown in Table 5.2.6. F_ΔLIQUID signal is showing an improvement the last four years as there are three positive signals. Its average value of 0,57 is one of the highest of all the companies of the sample. EQ_OFFER signal is the highest of the entire sample as every signal of the researched years is positive with not a single issuance of common equity.

Operating Efficiency Signals

F_ΔMARGIN signal average value is the 2nd highest of the sample, as shown in Table 5.2. It has an upward fluctuated improvement in the researched years where the last four years has three positive signals. On the other hand F_ΔTURN has the lowest average value of the entire sample giving a very poor performance during the researched years. There are only three positive signals in the whole research and the rest are all negative where the last four years a continuous deterioration is taking place as all signals are negative.

6. Conclusions

6.1 Conclusions regarding the results of the research of the evolution of Greece's macroeconomic environment in contrast with the evolution through time of the average composite F_Score

By elaborating and contrasting the evolution of the economic environment of the Greek economy and the results of the empirical and cross-sectional research of sector capitalization leading Greek listed companies during the years of 2005 – 2020, useful observations and information are extracted. Firstly both the Greek economy and the

companies were damaged from the sovereign debt crisis and the recession that followed, with some common traits but with deviations too. They both managed to improve some of their fundamental characteristics but some other characteristics were deteriorated. In brief, the Greek economy managed to eliminate the twin deficits, to become more stable financially and substantially increase its' extroversion as pointed out in Chapter 2. On the other hand the crisis deteriorated the Greek economy in terms of product and employment and also decreased the household wealth. Regarding the Composite average F_Score of the companies it is observed that most of the average binary component signals of F_Score have improved through time especially in the last years of the research, where only two signals have shown a deterioration, F_ACCRUAL and F_LIQUID, as shown in Table 5.

The damage for the Greek economy was bigger and deeper than that, that the companies suffered. This can be easily observed by comparing the Diagram 2.1.1 of the evolution of the GDP (which is a crucial if not the main macroeconomic measure) of the Greek economy with the Diagram 5 of the evolution of the average composite F_Score of the companies during the researched years. The recession of the Greek economy was deeper and was prolonged in regard with that of the companies. Moreover the recovery rate of the Greek economy was slower and weaker too in regard with that of the companies. The companies showed a bigger and a better resilience and performance during the Greek sovereign debt crisis. They had almost achieved several times the highest return that had before the crisis, more specifically the value of 5,83 that had in 2006. Also, in 2016 they outperformed it. It seems that the companies have managed to return in their preceding performance. This cannot be stated for the Greek economy as in year 2019 the performance of the GDP was still falling short in regard with the highest return that was achieved in 2007 of 239,9 billions of euros. Absolute conclusions in order to be totally accurate cannot be made from that comparison because the F_Score signal measure is different with the macroeconomic measure of Gross domestic product, but they both constitute measures of overall performance outlook where some generic tendencies and conclusions can be drawn. Further and more in depth and detail research is needed for safer and better conclusions to be extracted, though.

6.1.1 Conclusions regarding the evolution through time of the average performance of the component signals' of composite F_Score measure

The performance of the companies is far from the lowest score classification, 0 or 1, but they are far from the highest score classification too, 8 or 9, which are set by Joseph Piotroski in his paper. They are closer to the highest score but their performance has to be improved a lot in order to achieve the highest score classification. Five out of nine binary component signals of F_Score as shown in Table 5 have an average of 0,5 or lower, which are the component signals of the Companies with the lowest values and need to be improved in order for the average Composite F_Score to approach the highest score class. An average of 0,5 and lower indicates that at least half of the companies of the sample and at least in half of the researched years they had negative signals. The signals are: F_ΔROA of Profitability signals, F_ΔLEVER and F_ΔLIQUID of the Leverage, Liquidity and Source of Funds Signals and both signals of the category of Operating efficiency signals, F_ΔMARGIN and F_ΔTURN.

The low average of F_ΔROA signal, as shown in Table 5, indicates that the companies' abilities regarding the improvement of profit generation performance are moderate, as half of the companies in the half of the researched years had a worst profit generation performance in regard with the prior year performance. F_ΔLEVER's and F_ΔLIQUID's low average, which both belong in the same financial signal category, indicate that almost half of the companies in the half of the researched years had increased the financial leverage and the liquidity was deteriorated respectively. These indications points out that the companies' financial pliability and capacity to meet current debt commitments are deteriorated and they have moderate abilities to create sufficient capital domestically. Last but not least F_ΔMARGIN's and F_ΔTURN's low average, which constitute the Operating efficiency signal category, indicate that almost half of the companies in the half of the researched years had deteriorated their performance in regard with prior's year performance of the factor and inventory expenditures, the prices of companies' products, the productivity from the assets, the effectiveness of activities, the amounts of sales - the state of the market for the companies products.

On the contrary the rest four average component signals of average Composite F_Score have shown a better performance, satisfyingly above mean 0,5 of the scale, with two of them, F_CFO and EQ_OFFER, showing a very good performance almost achieving the highest score category. These high average values illustrate a positive trend and an

efficient ability to create capital domestically through functional activities, to effectively service future commitments and highlight that these companies are facing a robust financial state regarding the issuance of common equity. F_ROA and F_ACCRUAL have a lower average value but they still are satisfyingly higher than the mean of 0,5 of the scale. Moreover F_CFO, EQ_OFFER and especially F_ROA in the last years of the research have shown a very eminent improvement indicating a possible trend of very positive future signals, regarding generation of profits and cash flows domestically and the financial risk of minimized issuance of common equity.

Synopsis

Summing it up, despite that the average F_Score of the companies isn't in the highest score classification, the aforementioned results where some component signals had high average performance while others had smaller average performance, can be considered as the ways that the specific companies were affected and reacted during and after the Greek sovereign debt crisis. As it has been stated in this thesis, the nine fundamental component signals measure three crucial sectors of a company's financial performance: the Profitability, the financial leverage & liquidity, the sources of funds and the operating efficiency. Moreover the specific performance – results depict the overall strategies and practices which were the key that assisted the companies not only to survive but also to either achieve or maintain a capitalization leading position in their market sector in Athens Stock Exchange.

6.2 Conclusions regarding the empirical research of the evolution through time of F_Score and its components per company

6.2.1 KRI – KRI Milk Industry S.A.

KRI – KRI S.A. as mentioned in the empirical research has the highest average composite F_Score value of the companies. It is improved during the researched years where a worrying fluctuation is observed during years 2008 and 2014. Nonetheless in the last five years it has a positive fluctuated improvement indicating a strong ability and endurance to overcome difficulties.

Three out of four profitability signals, F_ROA and F_CFO have an excellent performance and F_ACCRUAL has a very good performance throughout the whole research which indicates strong profitability capabilities regarding the creation of capital internally and positive cash flows through functional activities. Moreover the positive trend and the high average value of F_ACCRUAL indicate that profits aren't driven by positive accrual adjustments (that is that profits are bigger compared to cash flow from operations), a very good signal about future profitability and returns. F_ΔROA shows a moderate condition regarding the improvement of profit generation performance through time, where in years 2010 to 2015 had prolonged deterioration. In the last years though, it seems that an improvement has taken place as it has for the last four consecutive years' positive signals. Regarding the leverage, liquidity and source of funds signals KRI – KRI has a weaker performance regarding the previous signal category. F_ΔLIQUID signal performance has been improved a lot after 2011 as in the first five years the signals were all negative. It can be said that KRI – KRI has a moderate ability to meet future debt commitments. The financial leverage of KRI – KRI as shown from the variable F_ΔLEVER has a better performance from F_ΔLIQUID but still half of the signals of the research are negative indicating a moderate condition regarding the company's financial pliability and its constraints. Lastly the overall good performance of EQ_OFFER signal indicates an ability to create sufficient internal capital in order to meet future obligations.

In the last category signal of operating efficiency the results are ambiguous. On the one hand F_ΔMARGIN has the most negative signals of every other component signal of KRI – KRI, a very poor performance which indicates a deterioration of factor expenditures, an increase in inventory expenditures and a decrease of the price of the company's products. In the last years a fluctuated improvement is observed. On the other hand F_ΔTURN has an adequate overall performance which indicates a better productivity from total assets, enhanced activities as a smaller amount of assets creates the same amounts of sales and/or an improvement of sales as the state in the market for the company's products may have been improved.

6.2.2 Quest Holdings S.A.

Quest S.A. as mentioned in the empirical research has the 2nd highest average composite F_Score value of the companies. It has a fluctuated improvement almost from the beginning of the research where the last half years the improvement becomes almost,

totally stable and pretty higher than its overall average value. Its composite F_Score results indicate that Quest S.A. has strong abilities to not only overcome difficulties but to adapt and enhance its operations.

The profitability signals category performance is totally split. F_CFO and F_ACCRUAL have an outstanding performance most of the years, but F_ROA and F_ΔROA have a moderate performance as only half of the years of the research signals are positive. Quest S.A. shows an efficient capability to create positive cash flows internally through functional activities but its ability to generate positive earnings isn't so good. Although a promising and adequate performance in the last years indicates that through time Quest enhances its ability to generate positive earnings. In addition Quest's F_ACCRUAL variable performance, demonstrates an exceptional ability where in almost every year of the research creates profits which aren't driven by positive accrual adjustments, operating cash flows are bigger than profits, a very positive signal about future profitability and returns. F_ΔROA shows a constant fluctuation in all researched years indicating a moderate competence of the company regarding the improvement of profit generation performance through time.

The performance of Quest S.A. in the second category of signals that of leverage, liquidity and source of funds is somewhat common with the first one. F_ΔLEVER has an adequate performance where most of the researched years Quest managed to decrease its financial leverage, especially in the last four consecutive years. An increase of leverage is observed through years 2008 to 2015 but Quest preserves an adequate financial flexibility with manageable constraints. On the other hand Quest F_ΔLIQUID signal has the worst performance of all the rest component signals of F_Score presenting possibly an inability to meet future debt commitments. Lastly EQ_OFFER signal performance is almost perfect where only in one year of the whole research Quest resorted in issuance of common equity indicating a very effective ability in creating sufficient internal capital in order to meet future debt commitments where it can be said that somewhat EQ_OFFER neutralizes the weakness of Quest liquidity.

Quest in operating efficiency category signal has an adequate performance. F_ΔMARGIN signal has an effective performance with an observed fluctuation. Quest has a satisfying performance in improving factor expenditures, decreasing inventory expenditures and/or increase in the price of its products. F_ΔTURN signal has a moderate performance where half of the years of the research achieved an improvement regarding the productivity of

total assets, an enhancement of activities as a smaller amount of assets created the same amounts of sales and/or an improvement of sales as the state in the market for Quest products may have been improved.

6.2.3 Elton International Trading Company S.A.

Elton average composite F_Score value has a fluctuation in the whole research. Specifically it shows an improvement in years 2008 to 2013 but afterwards it loses it and the F_Score value starts a downward fluctuation almost at the same levels with the value that had in the early years of the research. Nonetheless Elton preserves an ability to overcome its difficulties and adapt its operation as its average composite F_Score value is adequate.

On the one hand Elton in the first two signals, F_ROA and F_CFO outperforms with a very efficient performance but on the other hand the rest two signals, F_ΔROA and F_ACCRUAL have a very negative signal trend indicating a persistent inability. Specifically F_ROA has an excellent performance as it doesn't have any negative signal and F_CFO has an outstanding performance with only two negative signals demonstrating an effective and efficient capacity to generate funds domestically with positive earnings and cash flows through functional activities. F_ΔROA negative performance indicates an inability regarding the improvement of profit generation performance. Moreover F_ACCRUAL's negative performance too, indicates that profits are driven by positive accrual adjustments, a very negative signal about future profitability and returns.

The performance of Elton S.A. in the second category of signals that of leverage, liquidity and source of funds is much better than the performance in the previous one. F_ΔLEVER has an adequate performance in most of the year of the research where the financial leverage was mostly decreasing through years, a very positive signal that indicates an ability to create sufficient capital domestically and low constraints in the company's financial flexibility. Although an increase in the financial leverage in the three out of four last years is a worrying signal but the overall outstanding performance of the previous years is reassuring till nowadays about the financial leverage of the company. F_ΔLIQUID signal has a moderate average performance where only in half of the years the signals are positive. It has a constant fluctuation throughout the researched years and its ability to meet current debt commitments is moderate. EQ_OFFER signal performance is exceptional as only in the second year of the research Elton resorted in issuance of

common equity indicating a very effective ability in creating sufficient internal capital in order to meet future debt commitments.

In the last category signal of operating efficiency the results are ambiguous. $F_{\Delta \text{MARGIN}}$ most signals are negative in the research, a negative trend that indicates a very poor performance where a deterioration of factor expenditures, an increase in inventory expenditures and a decrease of the price of the company's products took place. On the other hand $F_{\Delta \text{TURN}}$ has an adequate but fluctuated overall performance which indicates a better productivity from total assets, enhanced activities as a smaller amount of assets creates the same amounts of sales and/or an improvement of sales as the state in the market for the company's products may have been improved.

6.2.4 Gek Terna S.A. Holdings Real Estate Constructions

Gek Terna S.A. average composite F_{Score} faced a deep downward fluctuation from 2008 to 2012. Afterwards though, it made a remarkable comeback showing a very effective and efficient ability of endurance and resilience to very difficult conditions as its composite F_{Score} almost returned to its foremost value.

The profitability signals performances are almost split. F_{CFO} has an excellent performance where all signals of the research are positive and F_{ACCRUAL} has a very efficient performance with only 3 negative signals. F_{ROA} and $F_{\Delta \text{ROA}}$ have a moderate performance as almost in half of the years of the research their signals are positive. Gek Terna S.A. shows an outstanding capability to create positive cash flows internally through functional activities but its ability to generate positive earnings isn't adequate as F_{ROA} signal performance indicates. Although a good and promising performance in the last years indicates that through time Gek Terna enhances its ability to generate positive earnings. Gek Terna's F_{ACCRUAL} signal performance, demonstrates an outstanding ability where in most of the researched years creates profits which aren't driven by positive accrual adjustments, operating cash flows are bigger than profits, a very positive signal about future profitability and returns. $F_{\Delta \text{ROA}}$ signal performance has been improved in the last five years and can be said to be adequate indicating a somewhat satisfying competence of the company regarding the improvement of profit generation performance through time.

The performance of Gek Terna in the leverage, liquidity and source of funds category signals is weaker in contrast with its performance in the previous category. $F_{\Delta \text{LEVER}}$

signal performance is the worst among all component signals of the company as it has most of the years negative signals, especially in the last five years where there are all negative. Gek Terna has a very big financial leverage which indicates that its financial pliability has many constraints. The liquidity of the company from year 2008 to 2014 was bad as it had only two positive signals but afterwards a significant improvement took place. Gek Terna's ability to meet future debt commitments can be said to be adequate. The performance of EQ_OFFER signal is very good indicating an effective ability to create internal capital and meet future obligations.

Gek Terna has a negative performance in the operating efficiency category signals. F_ΔMARGIN's most signals are negative but in the last five years an outstanding improvement is noted in improving factor expenditures, decreasing inventory expenditures and in the company's products prices. F_ΔTURN though has a weaker performance as it has most of the signals negative and also in the last three consecutive years a continuous deterioration is observed in the productivity of total assets, as more assets are needed in order to create the same amounts of sales.

6.2.5 Elastron S.A. – Steel Service Centers

Elastron's average composite F_Score value has improved in the researched years where an intense fluctuation is a main characteristic. In years 2011 and 2012 it deteriorates considerably but afterwards, for four years it has a substantial improvement. Eventually its latest values deteriorates again but it can be said that Elastron despite some weaknesses it demonstrates a substantial endurance and resilience through time.

Three out of four profitability signals, F_CFO, F_ΔROA and F_ACCRUAL have at least half of their signals positive in the research but on the other hand F_ROA's most signals are negative. In particular F_ROA has a totally negative period in 2009 to 2015 where every signal is negative. Afterwards an improvement is observed but conclusively Elastron demonstrates an inability to generate positive earnings. Hopefully F_CFO signal performance demonstrates an adequate and efficient capacity to generate positive cash flows through functional activities, a positive trend and a good signal about future cash flows. The performance of F_ΔROA signal indicates a moderate ability to improve the profit generation performance through time. Lastly F_ACCRUAL has improved a lot its initial performance, especially in year 2009 to 2014 where every signal is being positive. It

demonstrates an adequate competence to create profits which aren't driven but positive accrual adjustments, a positive signal about future profitability and returns.

The performance of Elastron in the leverage, liquidity and source of funds category signals is a little better in contrast with its performance in the previous category. F_ΔLEVER signal performance has deteriorated in the researched years, it has in most of the researched years' negative signals, especially in the last six years where there is only one positive signal. Elastron's financial leverage is big, indicating that its financial pliability has enough constraints. The overall performance of the F_ΔLIQUID signal is adequate, where in years 2009 to 2015 is exceptional as it has only one negative signal. Afterwards deterioration takes place but it can be said that so far Elastron has an adequate ability to meet future debt commitments. The performance of EQ_OFFER signal has been improved in the researched years and it can be said to be outstanding as it has only two negative signals in the first five years of the research and none afterwards. Elastron demonstrate an effective and efficient ability to create internal capital and meet future obligations.

Elastron's performance in operating efficiency category signal is ambiguous. Most of the signals of F_ΔMARGIN variable are negative in the years of the research. There is only one period of time 2013 to 2016 where all signals are positive. During the research Elastron shows an inability to decrease its factor expenditures and inventory expenditures and/or increase the price of its products. On the contrary F_ΔTURN signal performance has been improved exceptionally from 2013 till the end of the research where in this time period it has only one negative signal. Elastron demonstrates a substantial ability in improving the productivity of its total assets, in enhancing its activities as a smaller amount of assets creates the same amounts of sales and/or in improving sales as the state in the market for Elastron products may have been improved.

6.2.6 El. D. Mouzakis S.A.

El. D. Mouzakis S.A. average composite F_Score had a deep and constant deterioration after the first signal of the research till 2015. Afterwards an outstanding and rapid improvement takes place demonstrating a very efficient and effective ability of not only enduring difficult conditions but also surpassing its former performance.

Three out of four profitability signals, F_CFO, F_ΔROA and F_ACCRUAL have at least half of their signals positive in the research but F_ROA signals are mainly negative. In particular F_ROA has a totally negative period in 2009 to 2015 where every signal is negative. Afterwards substantial improvement is observed as the three out of four signals are positive but Mouzakis ability to generate positive earnings needs to be further improved in order to be at least moderate. F_CFO signal performance demonstrates an adequate capacity to generate positive cash flows through functional activities, where despite its deterioration from 2008 to 2013 where every signal was negative, it has demonstrated afterwards a positive trend where the last five out of six signals are positive, a satisfying and positive signal about future cash flows. The performance of F_ΔROA signal indicates an adequate and enhanced ability of improving profit generation performance through time as in the last five years it had four positive signals. Lastly F_ACCRUAL signal performance can be said to be somewhat stable through time, where despite its' constant fluctuation it demonstrates an adequate competence to create profits which aren't driven but positive accrual adjustments, a positive signal about future profitability and returns.

The performance of Mouzakis in the leverage, liquidity and source of funds category signals is better in contrast with its performance in the previous category. F_ΔLEVER signal performance has been improved in the researched years, where despite that most of its' signals are negative with a totally negative performance in the first five years of the research it has demonstrated a substantial performance to decrease its financial leverage, especially in the last four years as every signal is positive. Mouzakis financial pliability has been substantially improved through time by decreasing its constraints. The overall performance of the F_ΔLIQUID signal is adequate, but it has some extreme trends. In the first five years all signals were positive and in the next five all signals were negative. Afterwards its performance has been improved again and it can be said that Mouzakis can adequately meet its future debt commitments. The performance of EQ_OFFER signal is flawless as every signal of the research is positive. Mouzakis has a very efficient and effective ability to create internal capital and meet future obligations.

In the last category signal of operating efficiency the results are ambiguous. F_ΔMARGIN signal of Mouzakis has been improved through time demonstrating a satisfying ability in decreasing its factor and inventory expenditures and increasing the company's products. On the other hand F_ΔTURN signal has the lowest average value of all the other

component signals where it has only three positive signals in the whole research. An indication of Mouzakis permanent inability to improve productivity from total assets, enhance its activities where a smaller amount of assets will create the same amounts of sales and/or to improve its sales by improving the state in the market for the company's products.

Synopsis

Recapitulating, it is obvious that the companies have common traits but deviations too in regard with the ways that the researched areas of financial condition were affected by the Greek sovereign debt crisis and the companies corresponding reactions. Certainly the differences in the strategies and practices that were followed and implemented can be somewhat explained by the differences and special features that each company and each business sector contains. These strategies and practices are depicted by the specific and aforementioned analyzed performances and results of each company's composite F_Score and each fundamental component signal. Despite the results, the companies are maintaining a capitalization leading position in their market sector in Athens Stock Exchange. An outcome that indicates an overall conclusion that every company's chosen performance was successful to not only survive the Greek sovereign debt crisis but also triumph regarding the aforementioned capitalization leading positions, despite the different combinations and the different approaches and performances that each company followed and implemented.

6.3 Propositions regarding possible future research

A possible future research can be focused in more depth regarding the characteristics of Greek listed Companies by perhaps enhancing different researched characteristics such as the size of companies, the number of the companies and the sectors, the stock prices and returns, book to market ratios and generally a more systematic and similar approach with that, that Joseph Piotroski used in his paper of: "Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers".

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