CENTRE OF PLANNING AND ECONOMIC RESEARCH (KEPE)

Studies **73**

ELENI A. KADITI

ANALYSIS OF THE GREEK FOOD SUPPLY CHAIN

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CENTRE OF PLANNING AND ECONOMIC RESEARCH

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PREFACE

The food market is constantly evolving, driven not only by changes in consumer preferences, but also by technology, linkages between members of the food supply chains, and prevailing policies and business environments. A very small number of major retailers is playing an increasing role in the globalisation of food systems, affecting competition in the distribution of food products, while food processing is characterised by one of the greatest degrees of transnationality, and foreign production by food multinationals is increasing. Farmers and processors are no longer the dominant actors of the food supply chain. The balance of power has shifted firmly in favour of an increasingly concentrated retail sector whose main focus is satisfying consumer expectations and demands.

This book is concerned with the Greek food supply chain and aims to investigate the impact of the trends and drivers of change on the food actors involved. An in-depth analysis of the food supply chain of Greece and the EU is presented, using a wide variety of material and providing a comparative approach. Moreover, it is empirically examined whether and to what extent sound institutions and the degree of regulation deter or attract foreign investment flows in the food industry sector, as well as whether ownership and increased competitive pressure affect food actors' market power.

It is hoped that the present book will be useful to policy makers, economists and, in general, to the actors interested and involved in the food supply chain, providing them a fuller picture of the structure of the agri-food industry and raising awareness of the competitiveness challenges and requirements of this industry.

Professor PANAGIOTIS G. KORLIRAS
Chairman of the Board & Scientific Director

Centre of Planning and
Economic Research (KEPE)
January 2012

The task of moving food from 'farm to fork' has become very complex and significant changes are observed in the way food is produced, distributed and consumed. In this study, a comprehensive analysis of recent developments in the Greek food supply chain is provided, including links with the elements involved in the food system, a qualitative assessment of their drivers and expected future changes, and the impact of foreign direct investments and consolidation on the market power of all actors involved (i.e. farmers, food processors, wholesalers, retailers and consumers). In addition, a methodological approach is elaborated to examine alternative development pathways of the food industry sector, taking into account the impact of foreign investments and the institutional environment in which firms operate. A general analysis of possible future developments of the Greek food supply chain is effectively developed to identify key determinants and constraints. The results of this in-depth analysis and the empirical exercise are afterwards synthesised, to draw appropriate policy recommendations.

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ELENI KADITI

January 2012

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LIST OF ABBREVIATIONS

CAP	Common Agricultural Policy
CC	Control of Corruption
CIAA	Confederation of the EU Food and Drink Industry
CMO	Common Organisation of the Market
EAGGF	European Agricultural Guidance & Guarantee Fund
EFSA	European Food Safety Agency
ESU	Economic Size Unit
FAOSTAT	Food and Agriculture Organisation Statistical Database
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GE	Government Effectiveness
GGE	General Government Efficiency
GM	Genetically Modified
GPM	Gross Profit Margin
IPR	Intellectual Property Rights
MNE	Multinational Enterprise
NACE	Nomenclature Générale des Activités Économiques
NSSG	National Statistical Service of Greece
PCM	Price Cost Margin
PDO	Protected Designations of Origin
PF	Political Stability and Freedom
PGI	Protected Geographical Indicators
PPS	Purchasing Power Standards
PV	Political Stability and Absence of Violence
RCA	Revealed Comparative Advantage
RL	Rule of Law
ROA	Returns on Assets
RQ	Regulatory Quality
R&D	Research and Development
SAPARD	Special Accession Program for Agriculture & Rural Development
SCP	Structure-Conduct-Performance Framework
SME	Small and Medium Enterprises
SPS	Single Payment Scheme
TI	Transparency International

TNC	Translational Company
TSG	Traditional Specialty Guaranteed
UAA	Utilised Agricultural Area
UNCTAD	United Nations Conference on Trade and Development
VA	Voice and Accountability
WDI	World Development Indicators
WGI	Worldwide Governance Indicators
WIIW	The Vienna Institute for International Economic Studies
WTO	World Trade Organisation

REGION ABBREVIATIONS

EU, i.e.	European Union: Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Spain (ES), Finland (FI), France (FR), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Lithuania (LT), Luxembourg (LU), Latvia (LV), Malta (MT), the Netherlands (NL), Portugal (PT), Poland (PL), Romania (RO), Sweden (SE), Slovenia (SI), Slovak Republic (SK), the United Kingdom (UK)
EC	European Community
EU-27	European Union (27 member states of 2007)
EU-15	European Union (15 member states before 2004)
EU-10	European Union (10 member states acceding 2004)
EU-25	European Union (25 member states: EU-15 and EU-10)
NMS	New Member States of the EU (2004 and 2007 enlargement)
CEE	Central and Eastern Europe
CIS	Commonwealth of Independent States
MERCOSUR	Mercado Común del Sur (Southern Common Market)
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Cooperation and Development
SEE	Southeastern Europe
AL	Albania
BiH	Bosnia & Herzegovina
HR	Croatia
MK	FYRO Macedonia
MD	Moldova
ME	Serbia & Montenegro
TR	Turkey
USA	United States

EXECUTIVE SUMMARY

Food production, distribution and consumption patterns have changed significantly over the last years in Greece and the European Union (EU) in general. Consumer demands require a wider variety of high value food products, driven mainly by increasing per capita income, demographic and socioeconomic shifts, and lifestyle changes; while food supply chains try to meet consumer demands in the most efficient and cost effective ways utilizing significant structural changes and technological advances. In addition, consumer spending on food products as a percentage of total expenditure is declining, the proportion of food consumed away from home is increasing, and growing concerns for health and food safety issues influence consumers' choices. At the same time, the task of moving food from 'farm to fork' has become very complex, involving a relatively fragmented sector where a few food processing multinationals and retailers compete in the global market.

As a result, urbanisation, industrialisation, globalisation, technological innovation, and social and demographic changes are just some of the factors that dramatically alter the way food, not just in Greece, is produced, distributed and consumed. The food industry sector is an intrinsic part of the food supply chain, which is influenced by a range of factors and therefore plays an important role within the food system (Figure 1). However, the balance of power within the food supply chain has shifted away from farmers, who had significant power in the past, towards food processors, who have greater influence over production. The trends and drivers of change have given significant power to retailers as well, who now exercise the greatest control, by dictating terms to farmers and food processors while also influencing consumers (Bové, 2010).

Considering the significant changes observed in the way food is produced, distributed and consumed over the last decades, a study on the development of the Greek food supply chain was commissioned by KEPE – the Centre of Planning and Economic Research – to investigate the impact of the trends and drivers of change on the food actors involved (i.e. farmers, food processors, wholesalers, retailers and consumers), giving particular emphasis to foreign direct investments (FDI). The study contributes to the existing literature along two dimensions: (i) statistical information on the food supply chain of Greece and

FIGURE 1
General overview of the food supply chain

the EU is presented, using a wide variety of material and providing a comparative approach; and (ii) an in-depth analysis of two main issues is undertaken, focusing on the following: as foreign investments are in the focus of most governments around the world in order to set a policy agenda which is successful in promoting FDI, it is necessary to understand their determinants. It is therefore examined whether and to what extent sound institutions and the degree of regulation deter or attract FDI flows in the food industry sector. The study further examines whether ownership and increased competitive pressure affect food retailers' market power, analysing whether all actors involved in the food supply chain comply with the pricing behaviour that exists under perfect competition.

The main findings of this study are summarised as follows. Starting with the primary sector, agricultural production in Greece exhibits an apparent decreasing trend over the last few years. Greek agriculture, despite its considerable size relative to the economy and its contribution to main macroeconomic indicators (such as GDP, employment and exports), is conformed to several natural, structural and demographic factors that seriously impede its performance and competitiveness. In brief, large mountainous and less-developed areas, scarcity of useful and fertile agricultural land, dry climate especially during irrigation periods, insufficient water resources, small size of agricultural holdings that disallows for economies of scale, high production costs, as well as the ageing and low education level of farmers are the sector's main disadvantages.

As a result, processed foods, as opposed to traditional agricultural commodities, are becoming increasingly important in the agri-food trade. Moreover, a key role in this process is played by a few major companies, as food manufacturing is characterised by one of the greatest degrees of transnationality, and foreign production by food multinationals is increasing. Nevertheless, the empirical analysis shows that the quality of the institutional environment significantly influences foreign capital. The government should, therefore, focus primarily on creating a good legal system, having relatively stable political and

economic conditions.

An important process of international expansion and organisational change is also taking place in the retail industry. There has been a significant increase in the scale of cross-border mergers and acquisitions of retailers; whereas a very small number of major retailers are playing an increasing role in the globalisation of food systems, affecting competition in the distribution of food products. The empirical results show that foreign investments and consolidation have a positive and significant impact on the market power of food processors and retailers. Food processors, agricultural producers and wholesalers have lower price-cost margins than retailers, which suggests that these actors price closer to marginal costs, being more concerned with maximising social welfare or that the former have higher costs than retailers. As a result, vertical integration of the food supply chain increases the synergies between agricultural products (inputs), processing, and retail, but overall competition within the different segments of the food supply remains strong.

In terms of food consumption, finally, consumers live currently in smaller households where more adults work, there is less time for meal preparations and a much greater proportion of expenditure is spent on food outside the home. A decrease in the proportion of expenditure allocated to food has occurred, while an increasing number of consumers are becoming more discerning in their food choices, taking into account qualitative aspects of food, such as the environmental characteristics, health, animal welfare, ethics, authenticity, locality, and safety.

INTRODUCTION

Profile of the Food Supply Chain

Food actors operate in an integrated food supply chain that is subject to considerable changes. A change in one of the different elements of the food supply chain inevitably affects the other elements. For instance, performance in the agricultural and retailing sectors as well as new trends in consumer preferences can affect food processors. Global changes may also exert pressure on all elements of the supply chain, but due to fragmentation, certain actors are more affected by shifts in power than others. In this framework, agriculture, food processing and retailing have always been of great importance to the Greek economy (Table 1).

TABLE 1
The food supply chain

	Agriculture		**Food processing**		**Wholesale**		**Retail sale**	
	2000	*2008*	*2000*	*2008*	*2000*	*2008*	*2000*	*2008*
% of total employment	15.2	10.0	2.5	2.5	5.6	7.3	11.2	11.8
% of total gross value added	6.0	3.3	2.7	3.3	7.3	9.6	4.8	6.5

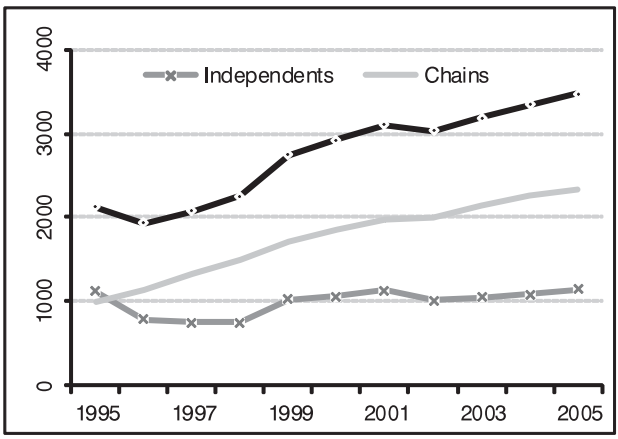
Source: Eurostat.

The agricultural sector has experienced an important restructuring over the last few years, leading to an increase in average farm sizes. The number of persons employed is relatively high, though the sector remains highly fragmented, while the share of farming in gross value added is declining. The food industry sector is ranked first in the manufacturing sector, as it accounts for about 25% in terms of turnover and total value added. The sector employs about 22% of the manufacturing labour force and processing firms account for more than 20% of total industrial firms. The food industry is a rather competitive sector, having as key characteristics its structure and size. About 200 large firms produce 85% of total output, while 16,000 small processors produce the remaining

output. Global processing firms (multinationals) invest primarily in new production methods, new products and logistics; whereas smaller firms located in rural areas focus mainly on traditional and organic food products. Finally, the retail and wholesale sectors account for a large portion of the economic activity relative to other services, as they contribute about 20% to total employment and 16% to the value added of the economy.

In particular, the food retailing sector has been defragmented over the last two decades, as global retailers have accelerated the growth of the hypermarkets at the expense of traditional and specialist retailers. Distinguishing food retailing between chains (firms with more than 10 stores) and independents, there are about 3,500 supermarkets in Greece; of which 2,325 belong to chains (Figure 2). The percentage of total sales captured by the top five chains has increased from 11% to 38% and 54% for the years 1993, 2000 and 2005, respectively. The number of small independent retailers remains relatively stable, though these retailers have been marginalised and act as convenience stores. Restrictive planning regulations that limit new hypermarket store openings have also stemmed their decline, though it is argued that such regulations have potentially allowed for monopolies to be created. In any case, for a market to be considered competitive, the top four firms must maintain less than a 40% market share. The food retail sector has clearly exceeded this benchmark.

FIGURE 2
Development of food retailing



Source: Panorama of Greek Supermarkets, various years.

Well-known multinationals, such as Nestlé, Coca-Cola, Vivartia, Campina Friesland, Pepsico, Cadbury, etc. have manufactured in Greece for decades, as major food processors have sought to expand their operations internationally. Naturally, the Greek market follows international trends in the field of retailing as well. Multinational chains have already established a very strong presence in the Greek market, while concentration has been rather high during the last decade. The share of total sales for five chains controlled by foreign interests is about 45% (i.e. Carrefour-Marinopoulos, AB-Vassilopoulos[1], Makro, Dia and Lidl). Europe's largest and the world's second largest retailer, Carrefour, has operated in Greece since 1999; and four out of the five largest European discount chains are also present (i.e. Dia since 1995, Lidl since 1999, Plus since 2006 and Aldi since 2008).

A sharp increase in the number of mergers and acquisitions has also been observed in the retail sector, as consolidation allows for improved efficiency gains and lower investment costs, in order to achieve profitability (Table 2). If cost savings from improved efficiency is passed on to consumers via lower prices, it is likely that consumers benefit from the restructuring of retailing. However, as already mentioned, the consolidation of food retailing has reached such a pitch that it has raised concerns about monopoly conditions. It seems that retailers have grown so powerful that they are able to dictate prices and terms to their suppliers who, with no alternative, have little choice but to com-

TABLE 2
Mergers and acquisitions in food retailing

Retailer	**Firms acquired (Year)**
Carrefour-Marinopoulos	Niki (2000); Continent Hellas (2000); Xynos (2005); OK! (2005)
AB-Vassilopoulos	Trofo (2000); Ena (2001)
Veropoulos	Panemporiki (2001); Trofino (2007)
Massoutis	Mpiska (1999); Alfa-Delta (2001); Maios (2006)
Atlantic	Galinos/Laoutaris (2001); Arista (2002)
Arvanitidis	Galaxias (2001); Enosi (2002); Lada (2003)
Market In	Alimenta Nova (2006)
Sklavenitis	Papageorgiou (2007)

Source: IOBE, 2005 & Panorama of Greek Supermarkets, various years.

[1] Foreign investments coming from Delhaize-Lion.

ply. Moreover, consolidation is expected to continue due to the resulting efficiency gains and maintenance of profitability, while competitive pressure is likely to increase further as the world's largest retailer, Wal-Mart, has already established an office in Athens to study the Greek market.

Overall, retailers have added new products as well as services (e.g. ready-meals departments, home delivery via online or telephonic orders, shop-in-shop arrangements selling electronic equipment or travel agencies, financial services via special credit cards, etc.), and have built larger stores in order to offer consumers 'one-stop shopping' convenience for more than 20,000 product lines. At the same time, certain chronic problems have been solved, such as the problem of shopping hours, along with the amendments to the labour regime, which facilitate part-time employment and the optimum arrangement of working hours. Nevertheless, retailers have incurred significant procurement, labour and capital investment costs.

Consequently, retailers' behaviour has been affected by the changing patterns of retail competition, leading to their so-called *defensive* and *strategic restructuring* (Grosfeld and Roland, 1997). As their immediate survival can be guaranteed taking measures such as reducing costs and scaling down unprofitable stores, the degree of gross job creation and destruction may indicate retailers' defensive restructuring. Their long-run viability can be further guaranteed via investment and innovation decisions. Strategic restructuring refers then to new technology, new products and services. Defensive restructuring is measured here by the real sales variable, that captures the extent to which retailers may have faced demand shocks. Having higher real sales, the need for defensive restructuring is presumably less stringent, as retailers can keep their position in the market without cutting costs. Strategic restructuring is measured by the net investment rate at the firm-level, defined as the growth rate in the book value of real intangible assets. The number of stores is also examined, as food retailers increase sales by opening new stores. Finally, retailers' profitability is compared with the one of processors, as it is generally argued that retailers' profits increase faster than processors' profits.

Table 3 presents the level of real sales, the growth rate of investment and the number of stores for the top ten retailers. Data shows that retailers controlled by foreign investors have increased their sales levels, whereas local retailers have experienced a lower increase in their sales, with the exception of Massoutis, whose growth rate of sales appears to be the highest among those reported. In terms of investments, two retailers controlled by foreign interests (Carrefour-Marinopoulos and Dia) have the highest growth rates in 2007,

TABLE 3
Food retailers' sales, investments and number of stores

	Sales, Mio €			Investment growth		Number of stores		
	2003	*2007*	*%'03-'07*	*2003*	*2007*	*2003*	*2006*	*%'03-'06*
*Carrefour-Marinopoulos**	1,458	1,899	0.30	..	1.48	162	228	0.41
*AB-Vassilopoulos**	789	1,141	0.45	-0.96	0.01	96	108	0.13
Sklavenitis	..	912	..	..	..	36	38	0.06
Veropoulos	536	647	0.21	-0.05	0.61	131	164	0.25
*Metro**	423	601	0.42	-0.52	-0.01	63	70	0.11
Atlantic	523	586	0.12	-0.28	-0.68	172	177	0.03
Massoutis	290	541	0.87	0.60	0.11	88	171	0.94
*Dia**	269	381	0.42	-0.19	1.07	278	395	0.42
Pente	283	381	0.35	-1.00	..	85	110	0.29
Arvanitidis	196	226	0.15	0.56	-1.00	118	125	0.06
TOTAL	6,288	9,443	0.50	1.23	1.70	2,133	2,449	15

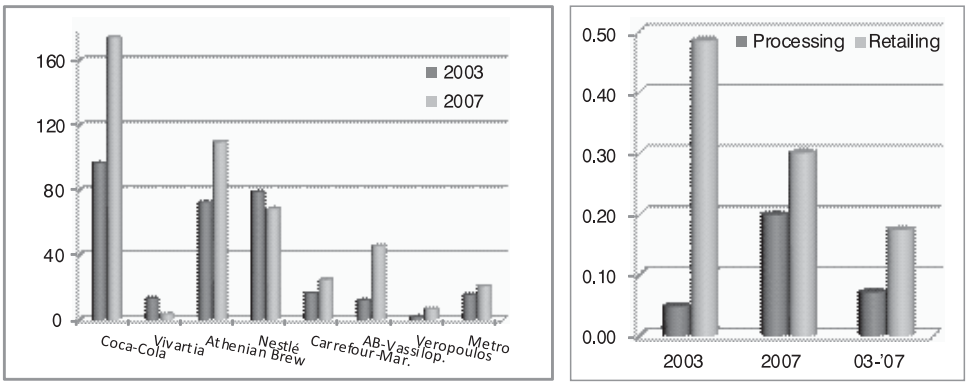
Note: * Retailers controlled by foreign interests.
Source: Amadeus & Panorama of Greek Supermarkets, various years.

whereas two local retailers (Arvanitidis and Atlantic) have experienced a reduction in their investment growth. Nevertheless, all top ten retailers have increased the number of their stores reflecting the level of sales growth.

Concerning profitability, it is expected that the average growth rate of profits in concentrated markets (i.e. retailing) will be higher than in less concentrated markets (i.e. food processing). However, higher profitability growth may not be due to market power, but to lower costs as concentrated markets entail larger, more efficient firms. Figure 3 further indicates that food retailers experience higher growth profitability than their suppliers. Some food processors have managed to increase their profits, though even large multinationals such as Vivartia and Nestlé have to face a reduction in their profitability over the examined period. It should be also noted that factors such as slotting allowances, retroactive discounts, exclusive rights, promotional expenses and display fees compose a significant share of retailers' profits, supporting the differences in food actors' profitability.

In this framework, food prices have increased whereas food expenditure relative to income has fallen. The level of price increases varies among products,

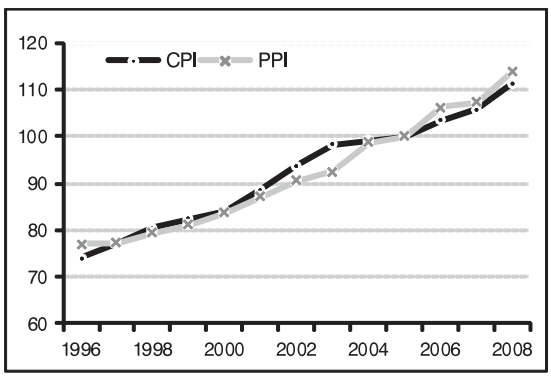
FIGURE 3
Food processors' and retailers' profitability, Mio € & growth rates



Source: Amadeus.

while the share of disposable income devoted to food products fell from 18% to 16.3% from 2003 to 2007. As shown in Figure 4, after 2005 producer food prices rose faster than consumer food prices, implying that producer price increases are currently fully transmitted to consumer food prices and that they are not partially absorbed by the food retail sector through a reduction in profit margins (that they have increased). It should, finally, be noted that significant price dispersion is observed among food retailers, whereas product quality is

FIGURE 4
Producer and harmonised consumer price indices



Source: Eurostat.

heterogeneous. Retailers may also provide the same product, but service levels vary considerably.[2]

These arguments frame the analysis of the present study. Taking into account the importance of the food actors in Greece and the changing structure of the food supply chain, the main objective of this study is to contribute to a better knowledge of its sectors in the Greek economy. Past and possible future developments of the Greek food producers, processors and retailers will be therefore analysed, identifying the driving factors of the development of the food system and assessing the impacts on production, structure, farmers and trade. As consumers' welfare is also affected by these factors, appropriate policy recommendations are provided. Considering, finally, the fact that Greece is a Member State of the EU, analysis also refers to the European food supply chain for reasons of comparison.

Defining the Food Supply Chain Actors

The food supply chain comprises agriculture and fishing, food and drink manufacturing, distribution and warehousing, wholesaling, retailing, food service and catering. In the present study, the primary sector denotes agricultural producers, who operate as food processors' suppliers. The agricultural sector's activities include crop production and the raising of livestock. Farmers' output can be used as inputs for the production of final food products, but farmers also sell directly to retailers, final consumers or alternative markets (e.g. biofuels). The food processing industry is very broad, but is defined here as the preparation of food and drink products ready for sale and consumption. It involves the sourcing of ingredients, processing, preservation and packaging. It also includes product research and design, taste testing and marketing. The food processing industry is made up of a number of product sub-sectors as follows:

- Cereal products (biscuits, bread and bakery products, breakfast cereals, cakes, desserts and cake mixes);
- Beverages (including tea, coffee, soft drinks, alcoholic beverages, fruit juices, mineral water and spring water);
- Confectionery and snacks;

[2] Food prices are difficult to compare from one retailer to the next, as special discounts, coupons and loyalty programs offer price discrimination opportunities.

- Fish and fish products;
- Fruit and vegetable processing (jams and preserves, herbs and spices, sauces and condiments and salads);
- Meat processing and meat products;
- Oils and fats, margarines and spreads; and
- Poultry and poultry products.

The industry also produces a variety of specialist products for a range of dietary requirements as well as lifestyle, religious, cultural and personal preferences (e.g. infant formula and weaning foods, organic products, meat-free meals, soya-based products, etc.).

In terms of food wholesalers, this refers to the wholesale of agricultural raw materials, live animals, food, beverages and tobacco. Finally, the distribution sector is the principal outlet for food products and, being the final link in the food supply chain, it interacts directly with final consumers. Food retailing is denoted by retail sale in non-specialised stores with food, beverages or tobacco predominating and retail sale of food, beverages and tobacco in specialised stores.

Overall, the data presented in this study covers the whole food supply chain as defined in the EU activity breakdown (NACE Rev. 2):

- (01) – Agriculture, i.e. crop and animal production, hunting and related service activities;
- (10 - 11) – Manufacture of food products and beverages;
- (46.2 - 46.3) – Wholesale of agricultural raw materials, live animals, food, beverages and tobacco; and
- (47.11 & 47.2) – Retail sale in non-specialised stores with food, beverages or tobacco predominating & Retail sale of food, beverages and tobacco in specialised stores.

General Objectives & Approach

The Greek food actors are competing in an increasingly global market. In what follows, a comprehensive analysis of recent developments in the Greek food supply chain is provided, including links with the elements involved in the food system, a qualitative assessment of their drivers and expected future changes, and the impact of foreign direct investments and consolidation on the market power of all actors. In addition, a methodological approach is elaborated to examine alternative development pathways of the food industry sector,

taking into account the impact of foreign investments and the institutional environment in which firms operate. A general analysis of possible future developments of the Greek food supply chain is therefore developed to identify key determinants and constraints. The results of this in-depth analysis and the empirical exercise are afterwards synthesised, to draw appropriate policy recommendations.

The study is divided into seven main sections. The first four chapters describe the main steps and aspects of the Greek food supply chain. Analysis starts with an overview of the main economic trends related to the primary sector, including information on the structure and performance of this sector. The relative importance of the food industry as well as its major manufacturers is also examined, providing additional information on the economic performance and size of the food processors. Moreover, information on food consumption as well as data on wholesalers and retailers involved in the food chain are illustrated. Emphasis is given particularly on foreign direct investments and the institutional environment of the Greek economy.

Chapter 5 analyses the main driving factors and their implications for the (Greek) food supply chain, which in itself consists of several parts. The first part focuses on the global market and trade liberalisation, followed by a part on foreign direct investments in the food supply chain, with a focus on the position of the Greek food actors in the Balkans and the EU in general. The implications of vertical integration are then discussed incorporating the impact on food suppliers. Societal changes like industrialisation, urbanisation, lifestyle change and income growth have a fundamental impact on food consumption and thus also on the Greek food system. The discussion of driving factors concludes with the legal framework set by regulations on food safety and the food industry.

The following chapter empirically examines alternative development pathways of the Greek food industry sector, taking into account the impact of foreign direct investments (FDI). As foreign investments are in the focus of most governments around the world, it is necessary to understand their determinants in order to set a policy agenda which is successful in promoting FDI. This chapter examines whether and to what extent sound institutions and the degree of regulation deter or attract FDI flows in four economies of Southeastern Europe. In a dynamic panel analysis, a broad set of institutional and regulatory variables that may affect the decision of foreign investors to undertake investment projects in this region is examined, using firm-level data. Analysis shows that the quality of the institutional environment significantly influences foreign

capital. Governments in this region should, therefore, focus primarily on creating a sound legal system, having relatively stable political and economic conditions.

Chapter 7 examines whether ownership and increased competitive pressure affect food retailers' market power, analysing whether all actors involved in the food supply chain deviate from the pricing behaviour that exists under perfect competition. A method proposed by Roeger (1995) is used to estimate price-cost margins, relaxing the assumptions of perfect competition and constant returns to scale. The obtained results show that foreign investments and consolidation have a positive and significant impact on the market power of food processors and retailers. Food processors, agricultural producers and wholesalers have lower price-cost margins than retailers, which suggests that these actors price closer to marginal costs, being more concerned with maximising social welfare or that the former have higher costs than retailers. The results are robust to various estimation techniques and specifications.

The final chapter provides a synthesis of the analysis and draws appropriate policy recommendations.

CHAPTER 1

PRIMARY FOOD PRODUCTION

1.1. The Agricultural Sector

1.1.1. Main Economic Agricultural Indicators

Over the last four decades, the contribution of Greek agriculture to the national gross domestic product (GDP) fell from 13% to less than 4%. Table 4 indicates that the percentage share of the agricultural production in GDP fell from an average of about 13% during the years 1970-1979 to 8.6% in the 1990s and, subsequently, to 3.3% in 2008. In the EU, the primary sector has experienced an important restructuring over the last few years, leading to a reduction in the overall number of holdings and an increase in average farm size. However, the sector remains highly fragmented, while the share of farming in gross value added is low and declining.

In particular, 3% of the population produces currently most of the food required, and there are about 13.5 Mio holdings in EU-27. This represents 4.7% of total employment for the EU and 17.5% on average for the new member

TABLE 4
Agriculture in the Greek economy

	1970-1979	1980-1989	1990-1999	2000-2005	2006	2007	2008
Agriculture, value added per worker (constant $2000)	5,038	6,515	8,160	9,089	8,099	7,411	8,027
Agriculture, value added (% of GDP)	12.84	11.44	8.61	5.79	4.06	3.79	3.29
Agriculture, value added ($ current)	3,171	5,969	9,260	9,013	9,615	10,468	10,410

Source: The World Bank, World Development Indicators (WDI), 2009.

states (NMS). In 2008, the primary sector reached around €370 Bio in the EU and accounted for 2.7% of GDP, ranging from 0.4% in Luxembourg, to about 3.3% in Greece and 7% in Bulgaria and Romania. Between 2000 and 2008, the share of the agricultural sector diminished by 3.2% in terms of employment and by 1.5% in terms of value-added. The number of holdings also decreased, ranging considerably among the member states. As a result, the importance of the agricultural sector is declining, while the diversification of the economy of rural areas to other sectors than agriculture is progressing.

The structure of the agricultural sector in Greece, in terms of employment, farm size, and production patterns, is weak due to socio-economic, but also natural and geo-physical, factors of the country (many mountainous areas). Fruit and vegetables, along with olive oil and wheat, traditional Mediterranean products which have been cultivated in Greece for centuries, constitute a large part of the national agricultural economy, expressed in terms of employment, production area, volume and value (Table 5).

TABLE 5
Share of products in agricultural production, 2008

	EU-27	**GR**		**EU-27**	**GR**
Wheat	7.1	4.8	*Seeds*	0.3	0.1
Rye	0.4	0.1	*Textile fibres*	0.2	3.5
Oats	0.5	0.2	*Hops*	0.1	0.0
Barley	2.9	0.7	*Potatoes*	2.7	2.8
Maize	2.7	4.5	*Cattle*	8.5	2.2
Rice	0.3	0.5	*Pigs*	8.9	2.4
Sugar beet	0.9	0.5	*Sheep and goats*	1.4	7.2
Tobacco	0.2	1.0	*Poultry*	4.7	1.5
Olive oil	1.3	8.2	*Milk*	14.2	10.6
Oilseeds	2.6	0.1	*Eggs*	2.0	1.3
Fresh fruit	4.2	9.4	*Agricultural services*	4.1	4.0
Fresh vegetables	8.0	15.9	*Other*	17.3	18.0
Wine and must	4.4	0.6	*Value in Mio €*	371,056	10,489

Source: Eurostat.

1.1.2. Agricultural Land

The area given over to agriculture in Greece constitutes about 8.5 Mio hectares (Ha) and the area covered by forests 3.7 Mio Ha, from a total of 13.2 Mio Ha (Table 6). Of the land used for agriculture, 3.8 Mio Ha are cultivable and 4.9 Mio Ha are pastureland. About 0.5 Mio Ha of the cultivable land are left fallow every year, whereas one third of the cultivable land is currently irrigated (Table 7). In 2007, the Utilised Agricultural Area (UAA) in the EU-27 represented 172 Mio Ha, of which about 60% were dedicated to arable crops, 30% to permanent pastures and 5% to permanent crops. In Europe, 9.8% of agricultural land is irrigated, whereas the majority of irrigated land is concentrated in the Mediterranean region. France, Greece, Italy, Portugal and Spain account for 9.15 Mio Ha, corresponding to 84% of the total area equipped for irrigation in the EU-27. In terms of the forest area, the highest and lowest shares are observed in Finland and Malta, respectively (74% and 0.9%).

TABLE 6
Land distribution

	Greece			EU-27		
	2000	**2005**	**2007**	**2000**	**2005**	**2007**
Agricultural land (% of land area)	66	65	64	46	45	44
Arable land (% of land area)	21	20	20	27	26	26
Forest area (% of land area)	28	28	29	32	33	33

Source: The World Bank, World Development Indicators (WDI), 2009.

TABLE 7
Agricultural area and number of holdings

		1,000 Ha			1,000 Holdings		
		2000	**2005**	**2007**	**2000**	**2005**	**2007**
Utilised Agr. Area	**GR**	3,583	3,984	4,076	811	828	854
	EU-27	..	171,996	172,485	..	14,189	13,449
Arable land	**GR**	1,965	2,057	2,119	431	409	417
	EU-27	..	104,717	104,341	..	10,192	9,582
Irrigated	**GR**	1,321	1,594	1,555	484	539	536

Source: Eurostat.

Factors such as geographical relief, lack of adequate spatial organisation of land use and adherence to traditional management models (inheritance and property) have resulted in small scattered holdings in Greece. Given an ageing population, who consider land not as a production asset but as generational, and considering that there was not any land property tax until recently, land is neither conceded nor unified. Moreover, 56% of cultivable land is located in areas of plain, while the remainder is in mountainous or semi-mountainous districts. Finally, 82.7% of the UAA is located in Less Favoured Areas (LFAs), of which 56.4% is in mountainous areas. The respective numbers for the EU are 55.4% and just 16.3%.

As a result, the UAA of the country covers only 30% of its total surface, and the average size of the holdings is about 5 Ha, while the respective number for the UK is 55.7 Ha, Denmark 53.7 Ha, and France 48.7 Ha. In particular, the number of agricultural holdings is estimated at about 850 thousand; from which 77% have a size of less than 5 Ha, while less than 1% have a size of more than 50 Ha. In the EU, the average size of holdings is about 12 Ha, varying from 1 Ha in Malta to 84 Ha in the Czech Republic. Nevertheless, it should be stressed that the number of large farms has been increasing in Greece at a higher rate than the smaller ones (Table 8).

Agricultural land in Greece is mostly exploited by the owners and to a lesser extent by lessees or tenants. In this last case, the owners usually rent out their property for just one farming period. Sometimes, but rarely, a rental contract can last up to 4 years. The agreement is oral or written (a private informal con-

TABLE 8
Number and size of holdings

Class size	2000		2005		2007		% change 2000-2007	
Ha	No of holdings	Ha	No of holdings	Ha	No of holdings	Ha	No of holdings	Ha
0-5	627,190	1,048,150	636,400	1,051,540	655,140	1,079,280	4.5%	3.0%
5-10	109,000	746,720	109,000	746,520	112,290	772,090	3.0%	3.4%
10-20	52,670	713,930	52,970	721,230	55,360	754,480	5.1%	5.7%
20-30	14,490	345,700	16,480	393,880	17,750	426,040	22.5%	23.2%
30-50	9,430	347,180	11,730	437,560	12,500	466,630	32.6%	34.4%
>=50	4,280	381,510	7,010	633,060	7,110	577,720	66.1%	51.4%

Source: Eurostat.

tract) and less often is based on an official contract. Rents are usually paid in advance, and they are not affected by the economic outcome of the year. Concerning agricultural land transactions, these are very limited and involve holdings located in plain areas, near towns and with certain prospects of future use as house sites. The market value and rents of agricultural land in Greece are indicated in the following table.

Overall, the share of cultivated agricultural area in Greece has declined mainly due to decreases in the production of cotton and tobacco, as well as of cereals, fibre crops, and oil crops. Currently, the most important crops in terms of areas are cereals, tree plantations, and industrial crops. In terms of holdings' specialisation, finally, about 16% are mixed holdings; while 84% are specialised.

TABLE 9
Market value and rents of agricultural land, €/Ha

Market value of agricultural land (parcels)								
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Irrigated land	11,870	11,930	12,050	11,950	11,420	12,600	12,100	12,024
Non-irrigated land	5,010	5,040	5,080	5,000	4,800	4,930	4,950	4,952
Rents for agricultural land								
Arable land	441	455	477	502	517	515	502	508

Source: Eurostat.

1.1.3. Labour Force in Agriculture

The basic feature of agriculture in the EU is family farming with 1 to 1.5 full-time workers, though there are differences between Member States. In Mediterranean countries and in most NMS, there are many holdings with less than 1 full-time worker; while in some regions, agricultural production is based on very large agricultural holdings organised in legal entities and mainly based on non-family labour force (e.g. in the Czech Republic and Eastern Germany).

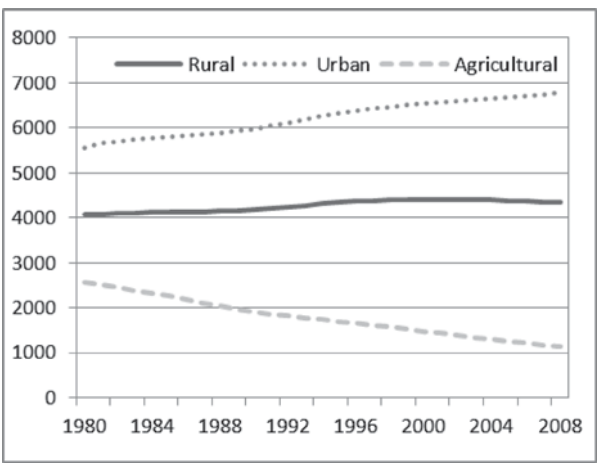
About 20% of farmers in the EU-27 have a basic- or full- training in agriculture, ranging from less than 1% in Malta to 71% in the Netherlands. Moreover, at an EU level, there is approximately 1 farmer younger than 35 years old for each 8 farmers older than 55 years. In the UK, Italy and Portugal, the proportion of young farmers is even lower, though in Greece the ratio of young to older

farmers is similar to the one in the EU. It should also be noted that 36% of European farmers had another gainful activity (mainly in tourism) than agriculture in 2005. This percentage was even higher than 50% in Slovenia, Sweden, Cyprus, Malta, Denmark and Germany.

Labour productivity of farming differs considerably across the EU, particularly between the old and the new Member States. The highest labour productivity is observed in Denmark and the Netherlands, and the lowest in Latvia, Bulgaria and Poland. However, over the last years, labour productivity increased more in the NMS than in the EU-15.

Agricultural population in Greece is the second highest among the Member States of the EU-15, after Portugal. In 2008, about 12% of total population worked for the agricultural sector, while the average share for the EU-27 was 4.7%. The highest shares for the NMS are observed in Poland and Lithuania (15.5% and 10.6%, respectively); whereas Slovenia has the lowest share of agricultural population (about 1%). However, the number of persons employed in this sector has declined considerably over the years in Greece, and the EU in general (Figure 5, Tables 10 and 11). In fact, the annual reduction in Greek agricultural employment is among the highest in the EU-15 over the examined period.

FIGURE 5
Population in Greece, 1,000



Source: FAOSTAT.

TABLE 10
Agricultural labour force, 1,000

Period	Active population in agriculture	Total labour force	Total population	% agr. emp./ total
1980-85	1,184	3,977	9,807	29.78
1986-90	1,021	4,113	10,056	24.84
1991-95	907	4,337	10,464	20.94
1996-00	858	4,777	10,855	17.97
2001-05	757	4,967	11,020	15.26
2006	705	5,113	11,087	13.79
2007	687	5,153	11,112	13.33
2008	667	5,180	11,137	12.88

Source: FAOSTAT.

TABLE 11
Total labour force input for agriculture

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
*GR**	99	98	97	95	94	102	101	100	97	95
*EU-27**	..	..	118	113	107	105	101	100	98	93
*GR***	599	594	586	578	571	620	613	607	591	575
*EU-27***	..	..	14,949	14,293	13,559	13,301	12,779	12,688	12,381	11,772

*: Labour force index (2005=100); **: 1,000 Annual Work Units.
Source: Eurostat.

The out-migration of young people, along with the in-migration of retirees in rural areas, has led to the significant ageing of rural populations. The majority of farmers are aged between 45-64 years, while about 35% is over 65 years (Table 12).

Agriculture also has the highest percentage of self-employment. Approximately 90% of farmers are self-employed – including the unpaid family members – while only 10% are salaried employees. The respective shares for the EU-25 are 65% and 35%. Furthermore, in 2007, 10.6% were full-time farmers and 89.4% were part-time, while the respective numbers for the EU-25 were about 20% and 80% (Table 13). Finally, 68% of Greek farmers have a second income.

TABLE 12
Structure of agricultural employment by age

	%			(1,000)		
Age Class	**2000**	**2005**	**2007**	**2000**	**2005**	**2007**
Less than 35 years	8.72	6.82	7.03	71.2	56.8	60.4
35-44 years	15.38	15.19	14.95	125.6	126.5	128.5
45-54 years	20.21	20.56	20.87	164.9	171.3	179.4
55-64 years	24.65	20.61	19.79	201.3	171.7	170.1
Above 65 years	31.04	36.82	37.36	253.5	306.7	321.2

Source: Eurostat.

Table 13
Structure of agricultural employment by work time

	%			(1,000)		
Time Class	**2000**	**2005**	**2007**	**2000**	**2005**	**2007**
Less than 25%	49.44	49.96	53.37	403.7	416.2	458.7
> 25 - < 50%	18.81	19.34	18.49	153.6	161.1	158.9
> 50 - < 75%	14.11	14.82	13.40	115.2	123.4	115.2
> 75 - < 100%	5.18	4.84	4.14	42.2	40.3	35.5
100%	12.46	11.04	10.60	101.8	92.0	91.1

Source: Eurostat.

1.1.4. Agricultural Production

Agriculture in Greece is predominantly crop production and the percentage of livestock production has been declining over the last decade. In fact, the livestock sector represents about one third of the total value of agricultural production, creating a state of affairs which does not meet domestic demand. In 2005, the value of production was about €12,000 Mio; from which 69.2% was crop production and 23.79% was animal production.

Moreover, the most important vegetables in terms of production are tomatoes, potatoes and asparagus. The most important fruits are grapes, peaches and nectarines, oranges, apples and watermelons. Vegetable production is primarily located in plain areas. The same principle applies also for citrus fruits.

Stone fruits are more extensively cultivated in mountainous areas (i.e. apples, pears, peaches, apricots, cherries). Olive trees grow in less fertile, stony ground, even in places where no other crop would thrive. As far as livestock production is concerned, there are about 630,000 cattle, 11.2 Mio sheep and goats, almost 1 Mio pigs, 30 Mio birds and 1.2 Mio beehives. In total, horticultural products dominate followed by meats of all kinds, cotton, olive oil, fruits and cereals. A picture of the volume of production is provided in Table 14.

TABLE 14
Agricultural production, tonnes

	Crops (1,000)			Livestock					
	Cereals	**Fruits**	**Vegetables**	**Cattle**	**Pigs**	**Sheep & Goats**	**Poultry**	**Milk (1,000)**	**Eggs**
1990-'95	5,066	4,139	4,116	75,040	139,097	140,934	154,355	1,881	119,044
1996-'00	4,742	4,030	4,298	69,291	136,612	140,658	117,714	1,992	115,909
2001-'05	4,876	3,767	4,116	66,677	114,845	135,226	143,371	2,052	108,702
2006	4,626	3,680	3,714	72,988	108,470	152,102	119,978	2,065	99,480
2007	4,542	3,410	3,615	76,170	101,867	148,637	117,892	2,043	97,268
2008	5,169	3,213	3,476	68,115	105,000	146,000	113,936	2,090	101,762

Source: FAOSTAT.

1.1.5. Inputs in the Agricultural Sector

Intermediate consumption represents the value of all goods and services used as inputs in the production process, excluding fixed assets recorded as fixed capital consumption. Various items enter intermediate consumption in agriculture, as, for example, seeds and planting stock; animal feeding-stuffs; fertilisers and soil improvers; plant protection products and pesticides; energy and lubricants; maintenance of materials and buildings; agricultural services and other goods and services. The first four items currently represent about 60% of the overall intermediate consumption in agriculture in the EU.

In particular, the value of intermediate consumption in agriculture of the EU showed over the examined period a considerable increase in expenditure on fertilisers and soil improvers, energy and animal feeding-stuffs. In Greek agriculture, less intensive inputs usage is observed in comparison to the European one. The value of inputs accounts for roughly half of the sector's gross value,

compared to more than 60% of the EU-27, on average.

Table 15 shows the value of intermediate consumption in agriculture for Greece and the EU-27. Animal feeding-stuff and energy consumption constitute around 60% of all inputs used in Greek agriculture followed by seeds and plants. Fertilisers' consumption represents another 5% of inputs, while their consumption has an upward trend over the last years. Table 16 provides information on three key agricultural means of production; the consumption of fertilisers and the number of in-use agricultural tractors and milking machines for

TABLE 15
Value of intermediate consumption in agriculture, Mio €

	2000-2005	2006	2007	2008
Greece				
Agricultural production	11,549	9,916	10,515	10,489
Intermediate consumption	4,134	4,169	4,506	4,946
Seeds & plants	281	246	314	328
Energy	744	944	903	1,105
Fertilisers	236	212	246	259
Plant protection	216	184	195	194
Veterinary inputs	79	82	85	83
Animal feed	1,324	1,378	1,667	1,865
Maintenance of materials	81	104	112	120
Maintenance of buildings	8	14	16	19
% share of inputs in final production	34.18	42.05	42.85	47.16
EU-27				
Agricultural production	319,203	318,453	349,639	371,057
Intermediate consumption	179,247	184,636	203,585	228,035
Seeds & plants	8,594	9,173	9,995	10,939
Energy	17,519	22,540	23,066	26,868
Fertilisers	11,613	12,562	14,075	19,769
Plant protection	8,772	8,638	9,294	10,417
Veterinary inputs	4,847	5,338	5,633	6,115
Animal feed	65,168	66,002	79,248	88,909
Maintenance of materials	10,913	11,539	11,930	12,462
Maintenance of buildings	3,460	3,905	4,054	4,166
% share of inputs in final production	53.31	57.98	58.23	61.46

Source: Eurostat.

TABLE 16
Number of tractors and milking machines, and fertiliser consumption

	1990-1995	1996-2000	2001-2005	2006	2007
Agricultural tractors	228,290	245,771	257,473	259,603	259,300
Milking machines	13,392	14,098	13,351	13,020	13,000
Fertiliser consumption (tonnes)	..	494,333	..	..	..

Source: FAOSTAT.

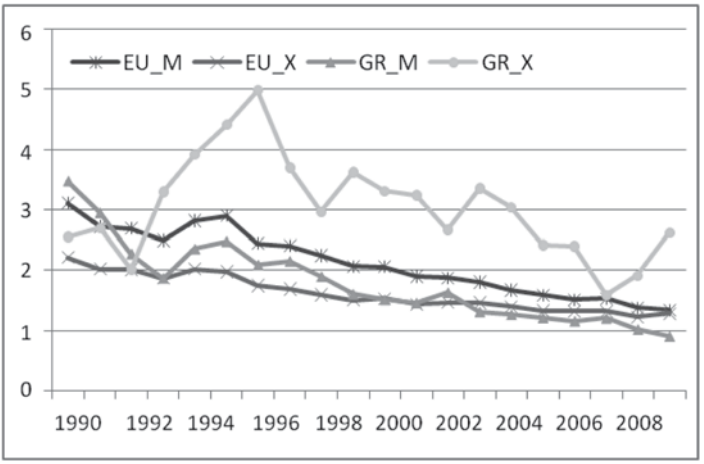
Greece. An increase in the number of machineries has occurred in the last years and, in particular, of tractors. Their number has increased by 17% and account today for a little less than one tractor per ten hectares of arable land. At the EU level, consumption of fertilisers decreased over this period, while the number of in-use tractors remained stable.

It should be further noted that the market of farm supply inputs in Greece is characterised by an oligopolistic structure. About 50 large and smaller firms control the input-market, especially regarding pesticides, fertilisers and feedstuffs, and the market is dominated by only a handful in each category. The dominant firms are price leaders and there is a certain degree of 'market failure', while the majority of agricultural inputs is imported (i.e. machinery, fertilisers, seeds, etc.). The market structure of agricultural inputs together with the dependency on imports is, therefore, reflected by relatively high prices paid for most farm inputs.

1.1.6. Agricultural Trade

Concerning trade flows for Greece, exports and imports of agricultural products and foods were in balance until the first years of the '80s. Afterwards, the trade balance moved into deficit that increases constantly. This situation was due to the inability of agricultural production to adjust to the evolving pattern of domestic consumption. Agricultural exports, mainly of plant products, are constantly increasing, but imports of dairy products and meat are increasing more rapidly. In 2007, exports of agricultural products amounted to $4.42 Bio, imports amounted to $7.93 Bio and thus the deficit to $3.51 Bio. Agricultural exports constitute on average about 3% of total exports over the examined period, while agricultural imports 2% of total imports. The respective figures for the EU-27 are similar, though the share of imports is slightly lower in Greece compared to the EU (Figure 6).

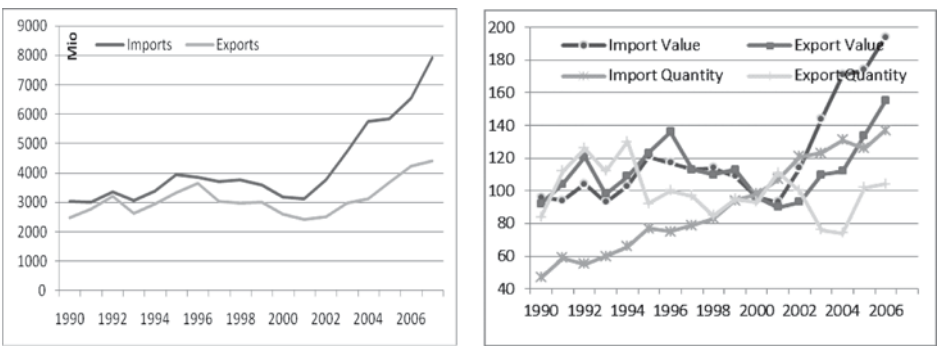
FIGURE 6
Agricultural trade flows as a percentage of total trade flows



Source: FAOSTAT.

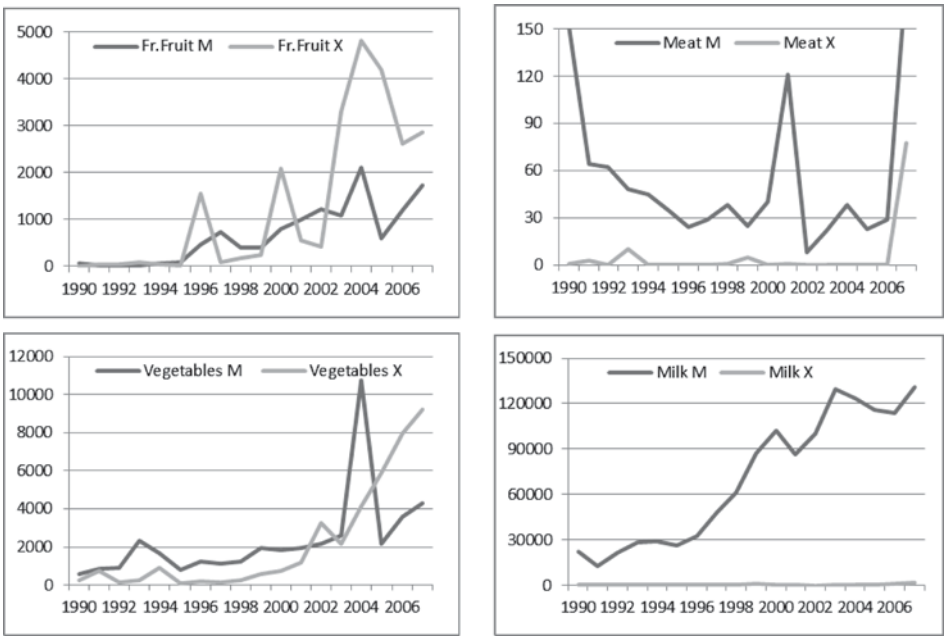
The value of agricultural trade flows and the respective indices for the value and quantity of both imports and exports are presented in Figure 7; whereas the external trade of main agricultural products is illustrated in Figure 8. Moreover, Figure 9 illustrates the trade flows of main agricultural products as a per-

FIGURE 7
Trade flows of agricultural products, value, 1,000 $



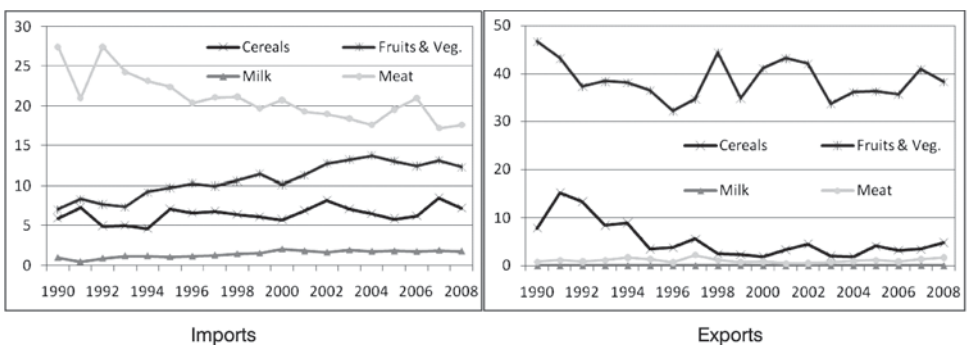
Source: FAOSTAT.

FIGURE 8
Trade flows of main agricultural products, tonnes



Source: FAOSTAT.

FIGURE 9
Trade flows of main agricultural products as percentage of total agricultural trade flows



Source: FAOSTAT.

centage to total agricultural trade. In general, Greece is in surplus where fruit and vegetables, tobacco, cotton and olive oil – clear Mediterranean products – are concerned, but is deficient in meat, dairy products (except of goat-cheese and feta-cheese), foodstuff, coffee, spices, animal feed, oilseeds and timber. It should also be noted that, after the accession of Greece to the European Community (EC) in 1981, there was a diversion of the Greek foreign market for agricultural products away from third countries towards the countries of the EC. Since the beginning of the '90s agricultural exports to the countries of Central and Eastern Europe (CEE) have also increased.

1.1.7. Profitability of the Primary Sector

The aforementioned features of the agricultural sector in Greece have led to the lack of investment, resulting in the absence of modernisation. As a result, the sector is fragmented and characterised by small- and medium- size farms with a relatively small production and poor international competitiveness. In fact, out of the total number only 0.23% have an average economic farm size larger than 100 ESU (Economic Size Unit), so that they can be considered economically efficient (Table 17).

Older farmers with small holdings are obviously not able to invest in new machinery and new cultural practices. The agricultural sector is, therefore, a labour intensive sector with low competitiveness due to high production costs and lack of proper quality standards. Not to mention that 83.8% of the farmers

TABLE 17
Structure of farms by ESU

No of holdings	1990	1995	2000	2005	2007	% 2007
< 2 ESU	364,380	273,210	285,430	299,500	292,140	33.96%
2 - < 4 ESU	182,920	163,460	162,930	175,160	178,980	20.81%
4 - < 8 ESU	173,480	177,120	168,020	160,810	171,900	19.98%
8 - < 16 ESU	97,320	128,380	130,460	114,440	124,860	14.52%
16 - < 40 ESU	29,500	53,520	62,340	71,000	76,120	8.85%
40 - < 100 ESU	2,180	6,110	7,310	11,570	14,210	1.65%
>= 100 ESU	360	610	580	1,100	1,940	0.23%

Source: Eurostat.

have primary or no education; while only 5.4% of the farmers have basic or full agricultural training. Farmers therefore need to be educated and informed of new production methods and socio-economic conditions, so as to accept new methods of farm management and contribute to the production of new, high-value products based on changing demand.

Agricultural cooperatives were developed as a tool of the farmers to improve competitiveness, and strengthen their bargaining position against food processors and retailers. There are about 7,200 agricultural cooperatives functioning at present in Greece, with 120 unions, 19 central unions of cooperatives, and about 750,000 members. The Pan-Hellenic Confederation of Unions of Agricultural Cooperatives is the governing organisation; it has a coordinating and advisory role but is not engaged in commercial activities. Many cooperatives have however faced severe financial problems in the past and their share in the marketing of agricultural produce has dropped significantly, affecting farmers' competitiveness.

Overall, the volume of production is rather stable over the last decade, real prices are increasing, though the reduction of the workforce did not permit the stabilisation of the level of per capita income (Table 18).

TABLE 18
Development of agricultural income over the 2000-2007 period

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
GR	127.0	123.8	113.9	109.9	100.9	100.0	95.7	99.2
EU-27	119.6	128.4	110.9	112.4	120.2	100.0	101.9	109.6

Source: Eurostat.

Table 19 also presents the top-20 agricultural companies ranked by their total assets in 2007 and illustrates the low level of profits in the sector. Nevertheless, a crude indication of the profitability and the attractiveness of the agricultural sector can be drawn by comparing the evolution of input and output prices. Table 20 shows that every year the overall output price index is higher than the input price index.

TABLE 19
The top-20 companies in agriculture, 2007, Mio €

Rank	Company	Turnover		Pre-tax profits	
		2006	2007	2006	2007
1	*Leaf Tobacco A. Michailides S.A.*	43.1	90.5	8.38	19.79
2	*Spirou A.E.B.E. House of Agriculture*	13.3	13.7	1.35	-0.30
3	*SEKE S.A.*	40.9	47.2	0.08	-2.29
4	*Union of Agric. Coop. of Larissa Tyrnavos Agia*	63.8	36.9	0.38	0.12
5	*Socotab Hellas C.I.S.A.*	60.6	67.8	0.06	-0.33
6	*Kafantaris - Papakostas S.A.*	18.8	9.1	0.01	-1.73
7	*Gleoudis, N. "Kavex" S.A.*	29.4	31.1	-2.15	0.22
8	*Papadopoulos, E.D., S.A.*	21.7	26.2	-0.65	1.32
9	*Karagiorgou, N., Bros S.A.*	55.4	39.9	2.37	-1.26
10	*Scourtis, P., S.A.*	10.5	14.3	0.81	0.90
11	*Kappa-Sigma Cotton S.A.*	31.9	19.6	0.94	-0.78
12	*Levcot S.A.*	14.5	14.8	1.05	0.64
13	*Fessas S.A.*	4.3	1.3	-2.17	-1.77
14	*Violar S.A.*	19.6	33.3	0.83	0.51
15	*Mitsopoulos Farm S.A.*	11.6	12.6	0.07	0.10
16	*Leventakis, G., Tex S.A.*	1.8	1.0	-0.93	-1.20
17	*Thessalia Farm S.A.*	1.6	1.4	-0.70	-1.08
18	*Ippotour S.A.*	6.0	7.1	-3.56	-3.28
19	*Golden West Seed Hellas S.A.*	4.3	6.6	-0.73	-1.22
20	*Teto-Farm S.A.*	5.2	4.8	0.48	0.08
	Total	**458.2**	**479.3**	**5.92**	**8.26**
	Top-20 share	**47.8**	**50.7**	**47.96**	**..**

Note: Ranked by Total Assets.
Source: ICAP, Greek Financial Directory, 2009.

TABLE 20
Average indices of agricultural input & output prices, 2005=100

	2000	2001	2002	2003	2004	2005	2006	2007
Input price index	97.2	96.1	95.5	95.7	98.8	100.0	100.5	103.9
Output price index	98.3	97.7	101.2	106.8	101.2	100.0	104.1	111.7

Source: Eurostat.

1.2. Sustainable Agriculture and Rural Development Policies

1.2.1. Sustainable Agricultural Production

The CAP (Common Agricultural Policy) reforms and international commitments [especially of the World Trade Organisation (WTO) agreement] enhance the sustainability of the EU farming system. The need to comply with essential food safety and environmental requirements was mainly strengthened by the introduction of cross-compliance in agricultural policy with the 2003 CAP reform.

This resulted particularly in the promotion of modern production methods such as organic farming, integrated production, conservation agriculture and agriculture under quality certification. In addition, there is evidence of product differentiation and brand creation, as many small farmers have sought to create value added and competitive advantage by capitalising on consumer demand trends through quality production and labelling, as well as labels of origin.

Various new farm methods have been therefore developed in Greece to promote sustainable agricultural production. For instance, organic farming has developed as a fast growing new market segment with an average annual growth rate of 60.98% over the years 2000-2005 (the highest in the EU-15). In 2005, 288,737 Ha were organic land (7.25% of UAA), while in the EU-27 more than 6 Mio Ha were under organic farming (3.65% of UAA). During the same year, the number of organic farms was 16,399 in total. A decade ago, in 1996, the areas under organic cultivation amounted to 5,300 Ha and the number of producers thus engaged was 2,000. The most important organic production are olives (47.5%), wheat (23%), vineyard (6.1%), and citrus-fruits (3.8%). Table 21 shows that even though organic production was insignificant until recently, there is evidence of dynamic development in the sector.

Organic production started also in Greece due to the potential of exports. Many producers, however, do not seem to fully understand the system or are not always willing to 'play the rules of the game' and avoid it. To a large extent this may be attributed to the lack of educational efforts and technical support. Over the last years, a number of food retailers have also become involved in organic goods trade. Future development looks prominent if consumers are well-informed, and the certification system works efficiently.

In general, a parallel development occurs as agricultural raw materials are an important component of processed food products. The EU food industry needs supplies from the agricultural sector that correspond to specific quality

TABLE 21
Organic production in Greece

	2002	2003	2004	2005	2006	2007
Animals, Heads						
Cattle	7,760	14,219	14,776	22,900	22,292	25,104
Sheep	56,374	108,996	133,619	218,293	259,275	431,434
Goats	66,472	187,079	215,291	298,336	305,222	402,367
Pigs	1,288	3,678	27,792	126,003	110,096	196,291
Poultry	46,553	176,214	74,160	144,098	133,852	159,323
Beehives	2,221	4,789	3,719	6,710	8,426	9,557
Other	0	20	58	..	..	..
Crops, Ha						
Total	77,120	244,457	249,508	288,737	302,264	279,895
Number of registered operators	6,299	6,642	9,885	16,399	24,654	24,729

Source: Eurostat.

criteria, are of sufficient quantity and are adequately priced. Depending on the sector and the product, the cost of agricultural inputs compared to total production costs ranges from 30% up to 80%, with many products beyond 50%. Hence, the price paid for purchasing raw materials can considerably influence the product's competitiveness. In fact, EU-based food companies pay higher prices than their competitors outside the EU for several of their agricultural inputs, such as dairy, maize, sugar, beef and rice.

It should be also noted that following periods of abundant supply in the past, there is no certainty as to the primary sector's future ability to supply the food industries at appropriate quantities and prices. Non-food uses, including energy uses, have already increased demand for EU agricultural products. Considering the targets set by the EU Directive of 5.75% of fossil fuel replacement in the transport sector by 2010 and the important non-food growth potential, demand is likely to increase exponentially and may increase competition between the food and non-food uses of limited arable land. EU policies must, therefore, set the framework for a competitive, market-oriented and sustainable agricultural sector.

In Greece, bio-energy projects are an emerging sector as bio-fuels are ready to be produced (biodiesel in Kilkis, Volos, Patra, Lamia, while sugar will

be used for the production of bio-ethanol). In 2005, production of renewable energy from agriculture is just 2.7 kToe, and none of the UAA is devoted to energy and biomass crops. However, it is expected that biomass use for energy purposes, and especially the integration of energy-dedicated crops to local agricultural systems could result in significant socio-economic restructuring of the agricultural sector at both national and regional levels, maintaining farmers' present levels of earnings, or providing them with additional sources of income, maintaining jobs in rural areas, etc.

Although there are sufficient quantities of residues in the country, certain parameters should be taken into account before planning a strategy for exploiting this energy, as, for example, the fact that small-scale farming increases harvesting and transportation costs; whereas environmental risks are raised by the removal of the residues from the field.

In terms of the environment, finally, agricultural activities in general do not lead to degradation given that the consumption of certain agricultural inputs still remains at low levels. Nevertheless, certain problems have begun to manifest themselves at the local level. Acute problems are caused by the forest fires and fires in agricultural areas, and by erosion of the soil. In some parts of the country, land is gradually turning into wasteland (mountainous and insular areas such as small islands), whereas in other parts intensive agriculture is generating problems, such as pollution of natural resources and ecosystems destruction (especially in Central Greece). Not to mention that 81% of water usage in the country is absorbed by agriculture.

As sustainability is reached when environmental soundness, economic viability and social justice are equitably balanced among all actors involved, and as the EU has agreed to reduce all subsidies and refunds for the agri-food sector by 2013, alternative instruments of government intervention are needed that will improve the competitiveness of this sector.

1.2.2. Agricultural and Rural Development Policies

In terms of rural development, three major objectives have been set as follows: (i) increasing the competitiveness of the agricultural and forestry sector; (ii) improving the environment and countryside through support for land management; and (iii) enhancing the quality of life in rural areas and promoting diversification of economic activities.

For these to be accomplished a series of measures can be implemented by

Member States in their Rural Development Programs. The only compulsory measure concerns the agri-environment. Nevertheless, various measures were largely implemented in Greece as, for example, 'Less-Favoured Areas', 'Aforestation', 'Training', 'Other forestry measures', 'Investments in agricultural holdings', Early retirement', 'Improving processing and marketing of agricultural products', and 'Diversification of agricultural activities'. The EU total financial plan for all Rural Development financial instruments amounted to approximately €64.4 Bio over the period 2000-2006. The Guarantee section of the EAGGF (European Agricultural Guidance and Guarantee Fund) provides for 60% of the budget, and the Guidance section share represents 35% and the remaining 5% is spent under SAPARD measures (Special Accession Program for Agriculture and Rural Development).

In brief, farmers in Greece are affected by the EU rural and agricultural policies as agriculture is fully regulated by the CAP. Over the last years considerable changes were made in the EU price and subsidies policies, as a result of the 2000 and Fischler CAP reforms, while the new Common Organisation of the Market (CMO) for olive oil, tobacco and cotton changed drastically the way farmers are supported by the EU. The CAP has essentially moved away from supporting commodity prices to supporting producers' income and rural development, aiming at ensuring that sustainable production takes place in the Union. Intervention prices are set at low levels so that they are used in times of real crisis, whereas direct payments in combination with cross-compliance contribute to providing basic public goods delivered through sustainable farming.

In July 2004, Greece decided to introduce the single payment scheme in terms of the new CAP effective January 1, 2006, applying the historical model. Thus, the single payment scheme replaced the subsidies given for the production of all goods included in the arable crops regime, as well as for grain legumes, protein crops, rice (58%), dried fodder (50%), cotton (65%), olive oil, tobacco, beef, goat and sheep meat, and milk. The regimes of sugar-beet and banana followed in 2007, as well as horticultural crops in 2008. Finally, the vines regime was included in 2009. As the objective of policy makers was to secure farmers' income that depends on market prices and not on the single payments, the highest possible rates of decoupled payments were applied, due to fear that land would be gradually abandoned or deserted in particular regions. Apart from the decoupled subsidies, various coupled payments are still implemented in Greece, including specific quality premium for durum wheat, crop

specific payment for rice, area payment for nuts, aid for energy crops, dairy premium, aid for cotton, aid for dried fodder, and seed aid. A farmer receiving direct payments should respect the statutory management requirements and the good agricultural and environmental condition; whereas the entitlements' value is reduced by 10%, so that the amount kept is used for the promotion of quality, trade and the environment. A system of progressive reduction of direct payments has also been introduced on a compulsory basis for the years 2005 to 2012, and this amount remains in Greece at the expense of rural development.

Within this new framework, there is fear that a gradual abandonment of farms and countryside will occur in Greece, while the remaining farmers will be less involved in their business and have smaller incomes because of the reduced subsidies. A gradual but steady shift of the employment of the remaining farmers from agriculture to tourism is also expected in particular areas and mainly in some small Greek islands. To avoid this, national rural development policies aim to decrease transport costs, promote traditional products on the basis of international high quality standards, and encourage new production methods (e.g. organic production) and sustainable multi-activity (e.g. agro-tourism). These lead to environmental protection, product differentiation and improvement of quality of life for the rural population. For the period 2000-2006, the implementation of four important programs in the rural sector to catalyse the sustainable development of the Greek countryside. The financial support for these programs appears in Table 22. The sourcing of the funds since the year 2000 is primarily from public origin, 69% being provided by the EU. The remaining originated from private sources.

The share of the total amount available in the financial plans of the Rural Development funds for Greece was 5.9% for the programming period 2000-2006. Its structure of expenditure was mostly for the early retirement and the agri-environment schemes; however, its rate of execution was the lowest among the Member States of the EU-15.

Overall, agriculture remains the most heavily subsidised sector, while the amount of support has been reduced over the last years (Figure 10). Cotton, wheat, olive oil and tobacco are the most heavily protected products comprising nearly 80% of total budgetary transfers (Table 23). Nevertheless, subsidies were reduced by 3% in 2005, 4% in 2006, and 5% from 2007 onwards. Finally, subsidies since 2006 take the form of a Single Payment Scheme (SPS), which is independent of the type and amount of production, and are connected to the

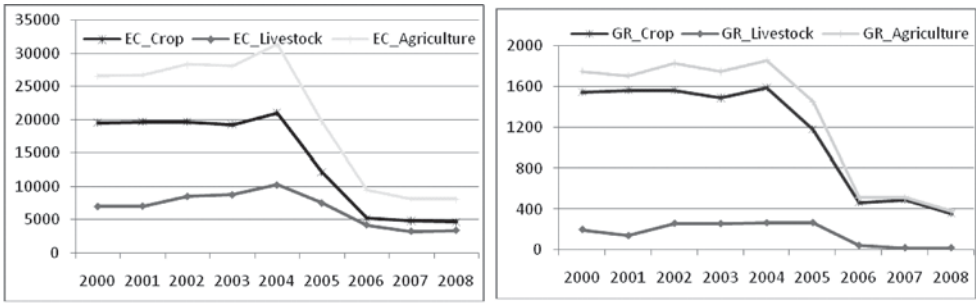
TABLE 22
Financial support for rural development in Greece, 2000-2006, Mio €

Program	Total public expenditure	From which EU contribution
Rural development programs (RDP Guarantee)	1,150	342
Compensatory allowances	955	286
Agri-environmental measures	400	299
Aforestation of agr. land	165	57
Evaluation	15	7
Total RDP (EAGGF-Guarantee)	2,686	993
Objective 1 (EAGGF-Guidance)	3,140	2,260
Leader +	251	182
TOTAL	**6,078**	**3,436**

Source: European Commission (EC), 2007.

subsidies received over the period 2000-2002. Farmers should also protect the environment, animal welfare and food safety to be eligible.

FIGURE 10
Agricultural support, Mio €



Source: Eurostat.

TABLE 23
Share of subsidies for various agricultural products

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Cereals	27.46	29.17	27.05	27.84	26.14	32.99	14.46	15.55	21.02
Industrial crops	22.31	22.09	20.42	20.30	19.51	24.24	39.23	41.22	56.10
Vegetables & horticulture	0.00	1.89	1.62	1.89	2.20	2.09	4.84	5.46	2.68
Fruits	8.36	8.90	8.13	9.09	8.86	10.12	30.22	29.61	9.11
Olive oil	30.38	29.73	28.53	26.13	28.94	12.12	2.79	4.08	5.56
CROP	88.51	91.77	85.75	85.24	85.66	81.55	91.53	95.91	94.47
LIVESTOCK	11.49	8.23	14.25	14.76	14.34	18.45	8.47	4.09	5.52

Source: Eurostat.

CHAPTER 2

FOOD PROCESSING

2.1. The Food Industry Sector

The EU has become the world's largest producer of all foodstuffs, and the European food industry sector is considered as the largest manufacturing sector that transforms the majority of the agricultural raw materials produced in the EU. Moreover, the European food industry is the leading exporting and employment sector with a positive trade balance. According to the CIAA (Confederation of the EU Food and Drink Industry), the food industry is one of the major pillars of the European economy. The sector produces safe and high quality products; whereas Europe's cultural diversity and its tradition are the foundation of the EU food industry and a key asset for further development.

On an international comparison, the EU food industry produces in value terms significantly more than any other country (almost a quarter more than the USA). Even in terms of employment, the EU employs in its food sector more than twice as many people as the USA. This is despite the fact that the food production share of total manufacturing in the EU (14%) is significantly lower than that of other countries (the highest share is in New Zealand, with 43%) and is only marginally higher than that of the USA (13%) (Table 24). It comes then as no surprise that the food industry's contribution to GDP in the EU is relatively low (2%).

Since 2001, the European food industry grew by merely 15%, while the counterparts in Brazil and China grew by 68 and 178%, respectively. The labour productivity growth of the EU sector shows a positive trend (6.2% growth in 2007), though growth in the aforementioned economies remains higher (9% and 12%, respectively). In addition, the EU value added growth has begun to stabilise over the last few years (+2% in 2007), contrary to the growth rates for the Brazilian and Chinese sectors, which reached 14% and 22%, respectively, for the years 2006-2007. As a result, the EU trade surplus decreased

TABLE 24
International comparative table of food industries, 2008

	Production € Bio	% of total manufacturing	Number of employees, 1,000	Labour productivity
Australia	49.1	17.0	206	238
Brazil	103.9	17.5	1,412	74
Canada	55.8	13.5	231	242
China	345.0	12.9	7,068	49
EU	**965.0**	**14.0**	**4,400**	**220**
Japan	220.0	10.0	1,400	157
Mexico	32.0	23.9	310	103
New Zealand	15.9	23.4	63	252
USA	481.5	12.4	1,691	..

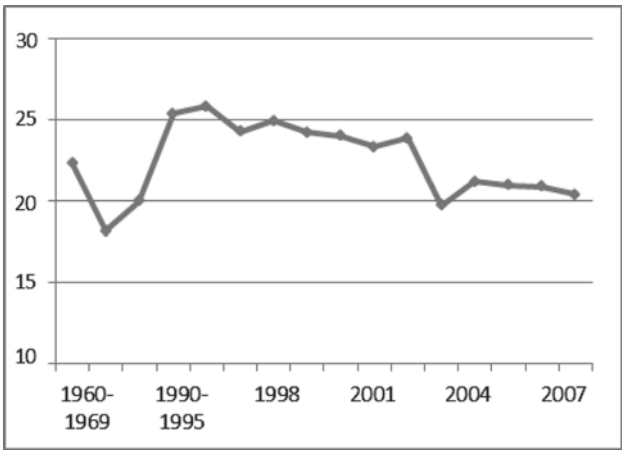
Source: CIAA.

significantly in 2007 compared to the previous year (-46%) to the benefit of the emerging economies, which become important players at the global level.

In brief, the share of the European food industry in the manufacturing sector in terms of turnover, value added and employment registered slight variations of around one percentage point. Over the last decade, this sector has had limited but stable annual growth both in terms of production (1.8%) and value added (1.1%).

In Greece, the gross value added of the food industry sector reached €3,425 Mio in 2007, with an average annual growth rate of 5.61% over the last five years. Figure 11 provides information on this sector's share of value added in the Greek manufacturing sector, indicating a rather stable trend over the last decade. In terms of labour productivity, it is relatively low; i.e. €38.9 thousand for every person employed in the sector; while the share of employment in this industry is about 21.61% and the share of firms operating is around 20% for the year 2007. Moreover, about 90 thousand people are employed in the Greek food industry, though the average annual growth of employment in this sector is increasing by 2.89% over the period 2003 to 2007.

FIGURE 11
The food industry sector's share of value added in the Greek manufacturing sector



Source: The World Bank, WDI, 2009 and Eurostat.

2.1.1. Food Processors

Despite the large number of small companies, the food industry, globally and in Europe, is increasingly dominated by a small number of very big players. The top-20 food manufacturers worldwide compose a list dominated by USA companies such as Cargill, PepsiCo and Mars. But Europe too has its giant food manufacturers (Table 25). Unilever, Danone and Heineken figure in the top-20, a list that includes also Nestlé, which by some measures has become the world's largest food processor. Numerous other firms in the 'other food' products sector (Cadbury Schweppes, Associated British Foods), the drink sector (Interbrew, Carlsberg), and dairy sector (Bongrain, Campina) have a strong international presence.

Overall, during the last two decades, there has been very strong growth of multinational activity. Foreign direct investments have grown faster than either trade or income fuelled by cross-border mergers and acquisitions. In fact, food transnational companies (TNCs) are well represented in the list of the largest 100 TNCs. Multinational activity is, therefore, a relevant and increasing phenomenon in food processing.

In Greece, the food industry is characterised by small-sized companies (with less than 10 employees), there are though some large companies which have

TABLE 25
Ranking of European food companies by European sales, 2008-2009

Name	Head-quarters	Sales in € Bio	Growth to 2008 (%)	Employees (x1,000)	Main sectors
Nestlé	CH	17.6	-1.1	94.2	Multi-product
Heineken NV	NL	11.3	30.1	41.8	Beer
Unilever Plc / Unilever NV	NL/UK	12.9	-3.6	30.0	Multi-product
Groupe Danone	FR	9.5	5.1	30.6	Dairy products
Lactalis	FR	8.5	-7.0	25.0	Dairy products
Associated British Food	UK	7.1	17.0	71.5	Sugar, starch, prepared foods
Friesland Campina	NL	6.9	4.3	14.7	Dairy products
Ferrero	IT	6.3	2.1	..	Confectionary
Danish Crown	DK	6.0	-9.5	24.3	Meat products
Südzucker	DE	5.9	1.6	18.0	Sugar, multi-product
Anheuser-Busch InBev	BE	5.4	-4.4	..	Beer
Carlsberg	DK	5.0	15.7	18.9	Beer
Oetker Group	DE	4.3	14.1	24.7	Multi-product
Barilla	IT	4.0	5.1	16.2	Beverages, confectionery
Nutreco	NL	3.4	20.9	6.1	Meat products
Diageo Plc	UK	3.2	4.5	..	Alcoholic beverages
Pernod Ricard	FR	3.2	9.4	..	Alcoholic beverages
Kerry Group	IR	3.0	-2.9	14.9	Multi-product
Bongrain	FR	2.9	4.8	14.2	Dairy products
Barry Callebaut	CH	2.2	-5.5	5.0	Cocoa & chocolate products

Source: CIAA, 2009.

expanded by establishing affiliates in other countries, mainly in the Balkans and Southeast Europe (SEE). As it will be explained later, consolidation will further characterise this sector due to foreign investors' interest in the Greek market. Well-known multinationals, such as Nestlé, Coca-Cola, etc., manufacture in Greece and use this market as a base to further expand their operations in the surrounding areas. Table 26 presents the top-20 firms in the Greek food sector ranked by total assets for the year 2007.

These large processors, unlike the smaller ones, rarely specialise in the production of a single product, but tend to integrate and differentiate. Vertical inte-

TABLE 26
The Top-20 food companies in Greece, 2007, Mio €

Rank	Company	Turnover		Pre-tax profits	
		2006	2007	2006	2007
1	*Coca-Cola Hel. Bottling Comp. S.A.*	625.4	686.6	138.7	174.4
2	*Vivartia S.A.*	466.5	598.1	23.9	3.9
3	*Athenian Brewery S.A.*	395.3	435.3	94.6	109.7
4	*Hellenic Sugar Industry S.A.*	304.7	205.2	-13.7	-8.2
5	*Fage Dairy Industry S.A.*	321.8	313.5	9.5	-21.8
6	*Nestle Hellas S.A.*	333.9	352.2	70.4	68.7
7	*Nestle Hellas Ice Cream S.A.*	70.8	74.3	-4.8	35.3
8	*Hellenic Quality Foods S.A.*	81.1	93.6	62	120
9	*Loulis Mills S.A.*	66.7	84.7	-4.8	3.5
10	*Creta Farm S.A.*	82.6	93.1	2.5	4.5
11	*Haitoglou S.A.*	67.2	81.8	1.8	2.4
12	*Elais-Unilever S.A.*	237.7	248.4	34.7	38.1
13	*Evga S.A.*	88.4	95.2	-7.6	2.5
14	*Allatini S.A.*	36.1	42.8	0.7	-0.7
15	*Elbisco S.A.*	88.9	94.0	0.9	-0.1
16	*Cardico S.A.*	59.5	55.4	4.0	-0.8
17	*Mevgal S.A.*	176.9	180.6	4.0	-1.9
18	*Nitsiakos S.A.*	81.3	114.3	-5.5	0.1
19	*Agroinvest S.A.*	59.7	81.7	-2.6	0.5
20	*Kolios S.A. Greek Dairy*	85.6	103.9	3.2	5.8
	Total	**3,729.9**	**4,034.7**	**349.9**	**415.9**
	Top-20 share	**34.5**	**33.8**	**64.7**	**64.2**

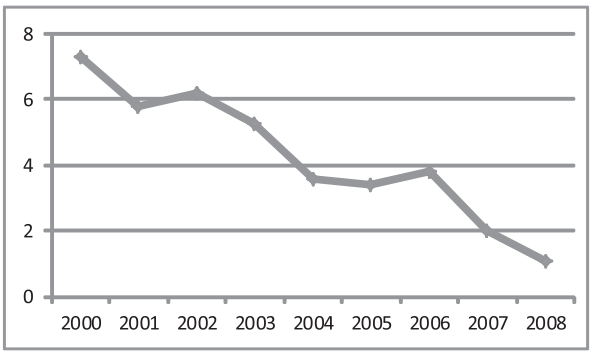
Note: Ranked by Total Assets.
Source: ICAP, Greek Financial Directory, 2009.

gration is attempted both downstream (i.e. own-produce as in the meat and wine sectors; or contracts with farms as in the dairy, tomato and sugar sectors); and upstream (i.e. building solid supply chains to distribute the final product). Differentiation is established by producing various products (i.e. dairy products as well as juices, etc.). Moreover, large food processors are capital intensive, while small firms are labour intensive.

2.1.2. International Trade Flows in the Food Market

As already mentioned, the EU plays a key role in the world trade of food products. It is the world's largest exporter of foodstuffs and the second largest importer. In 2008, the EU exported €58 Bio worth of food products to non-EU countries, while importing €57 Bio (Figure 12).

FIGURE 12
EU food trade surplus, Bio €



Source: Eurostat, Comext.

On average, less than 6% of the EU production value is exported to non-EU markets. The USA is by far the number one EU trading partner, followed by Brazil, Russia and Argentina (Table 27). Exports inside the EU reached €146.6

TABLE 27
The top EU trading partners, 2008, Mio €

Exports		Imports	
USA	10,169	*Brazil*	6,814
Russia	6,210	*Argentina*	6,341
Switzerland	4,081	*USA*	3,352
Japan	3,425	*China*	3,346
Norway	2,042	*Switzerland*	2,690
Canada	1,938	*Indonesia*	2,542
China	1,404	*Thailand*	2,373
Australia	1,380	*Turkey*	1,751
Hong Kong	1,210	*Malaysia*	1,730
Ukraine	1,208	*New Zealand*	1,613

Source: Eurostat, Comext.

Bio. Two thirds of this amount is exported by five Member States (i.e. the Netherlands, Germany, France, Belgium, and Italy).

Beverages and various processed food products such as bakery, chocolate, confectionery, pasta and prepared meals accounted for 60% of EU food exports (Table 28). Among the wide range of foodstuffs, four sectors stand out in terms of trade to non-EU countries; i.e. beverages, dairy, various food products and meat processing industries. For the first three, the EU appears to have a positive trade balance, while for processed fruit and vegetables, animal and vegetable oils and fats, and fish products, the EU has a negative trade balance.

TABLE 28
The top EU food products' exports and imports, 2008, Mio €

Exports		Imports	
Wines	6,248	*Oilcake*	8,893
Spirits	6,211	*Palm oil*	4,224
Food preparations	3,227	*Fish filets*	4,159
Cheese	2,567	*Crustaceans, molluscs*	3,907
Pork meat	2,508	*Wines*	2,457
Concentrated milk	2,379	*Prepared and preserved fish*	2,266
Animal feed	2,301	*Fruit juice*	1,566
Malted beer	2,064	*Coconut oil*	1,546
Malt extract	2,055	*Prepared and preserved meat*	1,476
Chocolate	1,938	*Sugars*	1,433
Pastries, biscuits	1,818	*Fruit preparations*	1,391
Poultry meat	1,606	*Frozen fish*	1,358
Soft drinks	1,449	*Beef meat fresh, frozen*	1,287
Olive oil	1,315	*Sheep, goat meat*	1,116
Frozen fish	1,065	*Food preparations*	1,096

Source: Eurostat, Comext.

Nevertheless, the EU market share of the global export market in food products has been shrinking over the last ten years (its share declined by almost 15%) to the benefit of other exporters such as Brazil and China. The EU food industry is therefore not benefiting from the expansion of global food markets, whereas emerging economies in Latin America and Asia have largely increased their market share to the detriment of traditional processed food exporters.

EU policies (agricultural policy, export promotion, customs regulations) should

then be adjusted to be conducive to trade activity and provide improved support for exporters. The bilateral process also needs to be pursued in key regions like MERCOSUR, the Mediterranean and the Asian region, where the EU has particular interests, where markets register strong growth and where trade agreements with other trade partners risk putting the EU at a disadvantage. Finally, there is a need to promote international standards, notably food related but also environmental standards, to sustain the competitiveness and profitability of European food companies.

Globalisation and EU membership have also changed Greece's import and export markets considerably. Trade of agro-food products accounts for a significant, though decreasing, share of total trade flows. In the period 1995-2007, the terms of exports for most of the exporting food products have worsened, indicating deterioration in Greece's competitiveness in the world markets.

In particular, increased prices, low quality, lack of standardisation, high transport costs and the high price of raw materials have affected the amount of exported food products. These are obstacles to trade mainly for the small Greek food companies, that resulted in decreased shares in major markets of the EU-15 and, as a consequence, food products are now exported to lower income markets such as the New Member States.

Large retail chains also tend to import various food products and given that there is a tendency of Greek consumers to shift their purchases from traditional (specialised) outlets to retail outlets, it can be intuitively argued that the food industry sector will be facing notable threats in the near future. It should also be mentioned that some of the Greek food products are exported non-standardised. Foreign firms standardise and resell them, therefore being credited for the product's quality.

Nevertheless, the 'Greek' and 'Mediterranean' diets have received recently widespread attention as being the healthiest diets. This attention affected the interest in Greek products and their position internationally. Greek traditional food firms further try to meet European safety and quality standards in an effort to expand their operations.

Food products accounted for 71.7% of the total value of agri-food goods exports in 2005, and 16.4% of total exports value; though a rather small share of total food production is exported (Table 29). Olives, olive oil, and traditional dairy products comprise 50% of total food exports. The remaining 50% includes meat, fruit and vegetables, wine and other products in smaller quantities.

TABLE 29
Food imports and exports for Greece

	2001	2002	2003	2004	2005
*Import penetration**	35.2	33.8	33.9	32.6	33.2
*Export attainment***	14.5	15.1	17.2	13.5	15.8

*: Ratio of imports value on the value of apparent consumption.
**: Ratio of exports value on the gross value of production at current prices.
Source: Bank of Greece.

In terms of trade balance, trade deficit increases for both agricultural and food products. In fact, the high increase of food imports over the period 1998-2005 (35.1%) and the significant reduction of exports (-10.9%) contributed to this. This situation should also be attributed to the large deficit in livestock products' trade, as well as the overall poor performance of the domestic production sector in adjusting to the evolving pattern of domestic consumption.

At an international level, Greek exports represent a little more than 0.5% of world exports for both agricultural and food products, placing Greece at the top-35 countries in the world. Moreover, the *Revealed Comparative Advantage* (RCA) used by the International Trade Commission, shows that Greece has a considerable comparative advantage in the production of both fresh and processed food products as their index number is relatively high (3.20 and 3.28, respectively). However, Greece does not appear to have a competitive advantage in food products in the world markets. It is indicative that over the last years, the annual change in world market shares was negative (3.5-5%).

In summary, the EU is the main trade partner for both imports and exports of food products. Trade flows with the EU account for more than 80% of total imports; whereas around 60% of Greek food exports have EU Member States as their destination.

2.2. Structure, Conduct and Performance of the Food Industry Sector

The empirical approach of the so-called *Structure-Conduct-Performance* (SCP) framework is here used to evaluate competition in the food industry sector. Based on the SCP framework, the term 'market structure' denotes the features of a market that may affect the behaviour and performance of the firms in a market. Market structure is in fact closely related to firms' concentration and

the size of the firms operating in an industry. Market conduct refers to the patterns of behaviour that food processors and other market participants adopt to affect or adjust to the markets in which they operate; whereas market performance refers to the extent to which markets achieve economic efficiency resulting in outcomes that are deemed good or preferred by society. The latter essentially refers to how well the market fulfils certain social and private objectives. These include price stability, profit levels, efficiency and employment growth. An overview of the indicators used in the present analysis is provided below.

TABLE 30
SCP indicators

Market structure	Market conduct	Market performance
• Firm size	• Investments	• Price stability
• Concentration	• R&D activities	• Profitability
• Cost structure		• Productivity
		• Employment

2.2.1. Structure of the Food Industry

As already mentioned, the European food industry was the largest manufacturing sector in 2008; worth over €965 Bio in terms of production and accounting for about 12.9% of total manufacturing turnover. The sector purchases and processes more than 70% of the agricultural raw materials produced in the EU and is a leading exporting sector, with a total of €58 Bio and a positive trade balance.

The food industry is, however, a relatively fragmented sector, where a few multinationals compete on the global market with global brands and a large range of products, while smaller enterprises serve local markets and concentrate on regional preferences. With more than four million employees in 310,000 companies, this sector is the leading employer in the EU, with the majority employed in small and medium-sized enterprises (SMEs) (Table 31). In fact, SMEs make up 99% of the food business population; accounting for about 50% of the turnover and employing 63% of the sectorial workforce. The rather small size structure of the food industry is a reason for its low competitiveness. Economies of scale and the resulting decreasing unit costs may be exploited only by an increase of firms' size.

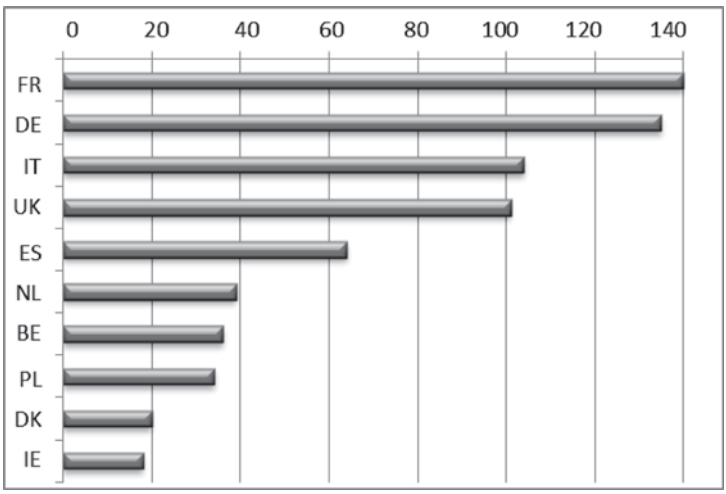
TABLE 31
Structure of the food industry and the manufacturing sector, by size-class, %, 2006

		Micro 1-9	Small 10-49	Medium 50-249	SMEs	Large > 249
Turnover	Manufacturing	5.6	12.6	21.2	39.4	60.6
	Food industry	6.5	15.2	26.9	48.7	51.3
Value Added	Manufacturing	7.3	15.5	22.5	45.4	54.6
	Food industry	8.5	15.4	23.3	47.2	52.8
Number of employees	Manufacturing	13.9	20.4	25.1	59.4	40.6
	Food industry	16.5	21.4	25.2	63.0	37.0
Number of enterprises	Manufacturing	80.7	14.8	3.6	99.2	0.8
	Food industry	79.1	16.4	3.6	99.1	0.9

Source: Eurostat.

For the EU, France, Germany, Italy, the UK and Spain are the leading producers of food products accounting for about 70% of total EU turnover (Figure 13). In a majority of Member States, the food sector features in the top-3 manufacturing industries in terms of turnover. Moreover, in at least 10 countries, it ranked first. In Ireland, Denmark and Spain, a quarter of the manufacturing

FIGURE 13
Food industry turnover by the Top-10 Member States, 2005, Bio €



Source: CIAA.

workforce are employed in the food sector; and in the Netherlands and Spain, this sector is responsible for 26% and 20%, respectively, of total manufacturing production. Considering labour productivity as a reflection of competitive conditions in the food industry sector, Ireland, the Netherlands and the UK appear to have the highest rates, followed by Denmark and Finland. For the New Member States in particular, the food industry plays an important role as an element in the process of integration, being a competitive sector that receives substantial foreign direct investments.

In terms of sectoral breakdown, the food industry sector produces a wide range of foodstuffs. The 'various food products' category (that includes bakery, pasta, pastry, chocolate and confectionary products, and baby food) is the largest sector, representing 26% of total turnover and 43% of the workforce. The meat sector, beverages and dairy products are also key branches of the industry.

A key characteristic of the Greek food industry sector is its structure as well. About 200 large firms produce 85% of total output and the market share. Conversely, 16,000 small companies produce the remaining output. These small firms, although they have low technology, contribute significantly to employment in rural areas, in the production of traditional goods and product diversity.

As indicated in Table 32, the number of enterprises is increasing, whereas the number of persons employed per firm is rather stable over the period 2003-2007. The number of food companies, though, is affected over the years by the restructuring process in the sector, the increased consolidation and the higher competition from other EU countries. Food companies are much smaller than the average EU firms, measured in turnover per enterprise. As already stated, the Greek food industry is characterised by a high proportion of small enterprises with less than twenty persons employed (97.3%), a moderate number of medium sized enterprises (2.4%) and a very small share of enterprises with more than 250 employees (0.3%) (Table 33). The concentration of employment and turnover in large enterprises is rather similar to the EU. As the low number of large enterprises occupy 60% of persons employed in the food industry and gain 66% of its total turnover, it seems reasonable to argue that the food industry is oligopolistic. Finally, the cost of labour in Greece is rather similar to the EU; whereas the food industry sector is characterised by low capital intensity and high tension of inputs (i.e. input-costs represent almost half of total costs).

The most important sub-sectors in Greece are fruit and vegetable processing, dairy, confectionary and snacks, and beverages. In total, these four subsectors account for more than 75% of sales, value added of production and

TABLE 32
Structure of food companies

	2003	2004	2005	2006	2007	EU, 2007
Number of enterprises	14,477	14,490	15,195	15,715	16,255	310,283
Turnover per person employed	120.1	123.4	121.2	129.7	141.4	201.1
Number of persons employed per enterprise	5.4	5.6	5.5	5.5	5.4	14.9
Cost structure						
Average personnel costs	20.9	22.5	23.5	25.4	26.7	26.1
Share of personnel costs in production	15.1	15.5	16.7	16.8	17.1	13.2

Note: Monetary data are in Mio €; Per head values are in Thous. €; Ratios of monetary data are in%.
Source: Eurostat.

TABLE 33
Structure of food companies by firm size, 2007

	1-9	10-19	20-49	50-249	>250
Number of enterprises	15,606	214	210	183	41
Turnover per person employed	83.6	121.4	157.4	165.9	202.7
Number of persons employed per enterprise	2.2	13.3	31.7	105.1	594
Cost structure					
Average personnel costs	21.7	20.8	22.3	25.1	33.6
Share of personnel costs in production (%)	17.1	17.4	14.8	16.4	18.1

Source: Eurostat.

employment in the food industry sector. Beverages is a major sub-sector as it accounts for about 30% of total production. Moreover, the confectionary and snacks sub-sector has the largest number of firms and the highest share of employment.

Overall, the food industry firms in Greece are small compared to the EU in terms of both turnover and employment, though the 'dualistic size structure' of firms observed for the European food industry as a whole emerges here as well. Moreover, the cost structure is not favourable for production in Greece.

2.2.2. Conduct of the Food Industry

In terms of market conduct, the development of investments in the food industry is summarised in Table 34. Gross investment in tangible goods fluctu-

TABLE 34
Conduct of food companies

	2003	2004	2005	2006	2007	EU, 2007
Investment per person employed	6.9	7.1	5.4	6.7	6.2	8.0
Gross investment in tangible goods	543.3	579.8	449.9	576.5	544.9	37,227.5
Investment rate	19.7	19.3	15.1	17.5	15.9	18.7
Share of R&D expenditure in value added	0.1	0.1	0.1	0.1	0.1	..

Source: Eurostat.

ates from year to year, and a similar trend is observed for the indicator used for the intensity of investment; namely the ratio of investment per person employed. Moreover, investment intensity is lower compared to EU figures, as well as the investment rate (the share of investment in value added). Over the period 2003-2007, the share of R&D expenditures in value added is less than even a half per cent, and the highest figure is observed for the firms with more than 250 persons employed (0.3%).

The level of innovation remains low mainly due to the small size of food firms. This means that research and development activities are very unimportant as a mean of gaining competitiveness. Conduct seems to be dominated, in fact, by the economic leadership of Western European countries. The Greek food companies should therefore realise the new market conditions and as a result, investments in R&D activities and modernisation of production methods should increase over time. It should also be mentioned here that food multinationals mostly invest in their technological production systems, retailing, new production methods, logistics, and new products (flavour, package, etc.). Smaller firms located in rural areas follow another strategy, focusing on traditional food products, organic goods and products with the logos of PDOs[3], PGIs[4], and TSG[5].

[3] For a PDO (protected designations of origin) the quality or other characteristics of the product are essential or exclusive due to a particular geographical environment with its inherent natural and human components and whose production, processing and preparation take place in the geographical area.
[4] A PGI (protected geographical indicators) possesses a quality or reputation which may be attributed to the geographical environment with its inherent natural and/or human components.
[5] TSG stands for the traditional specialty guaranteed.

The above mentioned size structure of the food industry also has important implications for the industry's competitiveness. To maintain its position and improve its share on world markets, the food industry requires greater use of technical know-how and a considerable strengthening of its capacity for innovation. As it will be further explained, there is an increasing societal awareness of the opportunities to improve the quality of life through healthy eating. The preferences of consumers for quality, convenience, diversity and healthy food, and their justifiable expectations of safety, ethics and sustainable food production serve to highlight the opportunities for innovation.

2.2.3. Performance of the Food Industry

There are many indicators that can be used as a measure of market performance. One group concerns the development of production, employment and labour productivity; as for instance employment is important from a social point of view. Another group of measures refer to the 'financial performance' of the sector, such as profitability.

As indicated in Table 35, the performance of employment is encouraging as the total number of persons employed in the food industry is increasing. The results obtained from the use of labour productivity, when measured in terms of gross value added per person employed, are also positive; as this measure has increased from 35.2 in 2003 to 38.9 in 2007. In terms of production, the food industry also has a higher growth rate than the manufacturing sector. During the

TABLE 35
Performance of food companies

	2003	**2004**	**2005**	**2006**	**2007**	**EU, 2007**
*Apparent labour productivity**	35.2	36.7	35.7	38.5	38.9	42.7
Growth rate of employment	-1.2	4.0	2.5	2.5	2.6	..
Gross operating surplus/turnover (%)	15.1	15.1	13.9	13.6	12.2	9.1
	1-9	**10-19**	**20-49**	**50-249**	**>250**	
Apparent labour productivity	21.9	28.6	36.2	42.4	62.5	
Growth rate of employment	3.4	3.6	47.1	..	..	
Gross operating surplus/turnover (%)	12.2	7.5	9.0	10.5	14.3	

Note: *Gross value added per person employed.
Source: Eurostat.

period 1995-2005, food production increased by 20.6%, whereas total manufacturing production increased by 11.7%.

Concerning the financial performance of the sector, Table 36 summarises nine financial indicators for the top-5 food companies in Greece and for the food industry on average. Over the last years, the food industry in Greece has been a rather profitable sector. In 2007, the profits of the food industry sector increased by 18.9% compared to the year before. It should also be mentioned that about 20% of the most profitable Greek firms are food enterprises, and the number of profitable food firms is increasing and tends to be twice the number of the food companies that register no profits. It is obvious from the figures included in the table that the pressure on gross profit margins reflects an in-

TABLE 36
Financial ratios of leading food companies

		Coca-Cola Hel. Bottling Comp. S.A.	**Vivartia S.A.**	**Athenian Brewery S.A.**	**Hellenic Sugar Industry S.A.**	**Fage Dairy Industry S.A.**	**TOTAL**
Fixed to total assets (%)	*2000*	0.662	0.385	0.569	0.213	0.533	0.438
	2008	0.683	0.701	0.407	0.410	0.679	0.404
Debt to equity	*2000*	3.302	1.373	1.281	0.738	4.506	1.914
	2008	1.566	2.290	0.488	0.755	3.800	2.485
Debt to assets	*2000*	0.768	0.579	0.562	0.425	0.818	0.518
	2008	0.610	0.696	0.328	0.430	0.792	0.601
Current ratio	*2000*	1.295	1.310	1.078	2.020	1.404	2.138
	2008	1.047	1.401	2.938	1.644	1.294	2.073
Liquidity	*2000*	0.950	1.090	0.840	0.860	1.100	1.627
	2008	0.840	1.130	2.600	0.930	0.990	1.591
Gross profit margin (%)	*2000*	0.052	0.021	0.186	0.049	0.050	-0.064
	2008	0.050	0.058	0.245	0.003	-0.049	-0.182
Net profit margin (%)	*2000*	0.032	0.021	0.122	0.032	0.048	-0.074
	2008	0.034	0.055	0.182	0.043	-0.035	-0.189
Return on equity (%)	*2000*	0.094	0.037	0.411	0.059	0.338	0.060
	2008	0.082	0.116	0.251	0.039	-0.170	0.078
Return on assets (%)	*2000*	0.022	0.016	0.180	0.034	0.061	0.017
	2008	0.032	0.035	0.169	0.022	-0.035	0.005

Source: Amadeus and own calculations.

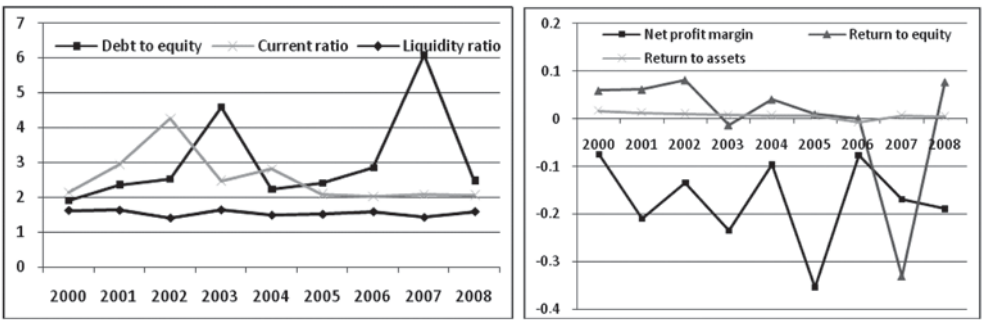
crease in production costs that cannot be passed on to consumers in the form of higher prices.

In addition, the capital structure and debt management of the sector indicate that the degree of insurance on liabilities decreases over time, as the overall viability ratios of the food industry deteriorate. In a similar manner, food firms' liquidity ratios appear to be reduced from 2000 to 2008, with significant fluctuations every single year (Figure 14).

In summary, the overall performance is adequate in terms of employment development, though the development of profits and the low level of labour productivity are distressing. Moreover, the low performance of the food industry in terms of productivity cannot be balanced by accordingly low labour costs, as the latter are similar to the EU levels. The result of the low productivity and high personnel costs is that the share of personnel costs in production is higher than in the EU. As a result, the performance of the food industry in Greece shows that competitiveness measured by indicators of productivity is rather weak among other EU food industries. Finally, at an EU level, the food sector is facing ever more international competitiveness pressure. The emerging economies are becoming important players at the global level and the EU food industry should remain focused on increasing the added value of its production. The economic performance is fair in terms of profitability and development of production, but low with respect to employment development and labour productivity.

Taking these into account, the structure performance relationship is here analysed using a simple model and estimation techniques. Based on the tradi-

FIGURE 14
Financial ratios for the food industry



Source: Amadeus and own calculations.

tional SCP hypothesis (also called *Collusion hypothesis*), higher concentration in the market coupled with barriers to entry leads to collusion among firms, thereby restricting output, increasing prices and ultimately leading to higher profits (Bain, 1951). On the other hand, efficient firms may lower costs and subsequently reduce prices relative to inefficient firms, so that the former are able to increase their market share leading to higher concentration. That is the *Efficient structure hypothesis* (Demsetz, 1973). In this framework, concentration and market share denote the two alternative views. Using an unbalanced panel dataset of 1,361 food processors in Greece for the period 1998-2007, provided by *Amadeus*, and random effects model as indicated by the Hausman test performed, the following model is estimated to test these hypotheses[6]:

$$\pi_{it} = \beta_0 + \beta_1 CN_{it} + \beta_2 MS_{it} + a^j X_{it} + \varepsilon_{it} \quad (2.1)$$

where π denotes firm's performance and is measured by returns on assets (*ROA*) and gross profit margin (*GPM*); concentration (*CN*) is measured using four firms concentration ratios; and market share (*MS*) is measured using firms' market share in the 4-digit sub-sectors of the food industry. Control variables specific to firms (*X*) include each firm's *Liquidity* (ratio of current assets over current liabilities), the years of operation (*Age*) and firm's *Size* (i.e. the number of employees), assuming that less financially constrained, more experienced and larger firms are likely to be more profitable. If a positive relationship is found between concentration and performance, while there is no relationship with market share, then collusion causes profitability. If market share and performance are positively correlated, the efficient structure hypothesis prevails.

The results presented in Table 37 indicate that in both model specifications, the concentration variable is statistically significant and positive. The market share variable has also a statistically significant positive effect on firms' performance. The same effects are observed even when both variables are introduced simultaneously in the regressions. In terms of the control variables, firms' experience appears to be an important factor for their profitability as well as their liquidity; whereas the negative impact of size shows the effect of diseconomies of scale. These results do not reveal clearly the existence of proces-

[6] The Breusch and Pagan Lagrangian multiplier test was performed, indicating that a random effects regression is appropriate.

TABLE 37
The structure performance relationship

	ROA			GPM		
	(1)	(2)	(3)	(4)	(5)	(6)
CN	0.019 (0.008)**		0.019 (0.008)**	0.409 (0.120)***		0.398 (0.120)***
MS		0.112 (0.032)***	0.108 (0.032)***		0.967 (0.457)**	0.897 (0.457)**
Liquidity	0.0001 (0.0003)	0.0001 (0.0003)	0.0001 (0.003)	0.012 (0.006)**	0.012 (0.006)**	0.012 (0.006)**
Age	0.025 (0.005)***	0.023 (0.005)***	0.023 (0.005)***	0.086 (0.084)	0.087 (0.085)	0.082 (0.084)
Size	-0.006 (0.005)	-0.001 (0.005)*	-0.010 (0.005)**	0.046 (0.068)	0.006 (0.072)	-0.003 (0.072)
No.Obs.	6,982	6,952	6,952	4,823	4,823	4,823

Values in the parentheses are Standard Errors. Significance levels: 0.01^{***}, 0.05^{**}, 0.1^{*}.

sors' market power. To further detect market power for all actors involved in the food supply chain, a commonly used indicator is therefore extensively analysed in Chapter 7, namely the price-cost mark-up.

CHAPTER 3

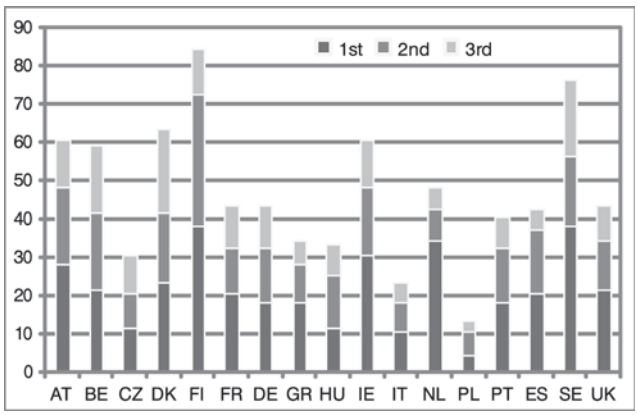
FOOD RETAILING

3.1. Food Retailers

Over the last two decades, retailing has changed considerably across the EU countries with the emergence of new store formats, the increased prevalence of retail chains, the development of out-of-town and edge-of-town retail parks, and significant investment in new technology and improved logistics. At the same time, the sector has seen the rise of giant corporations controlling significant proportions of the overall retail sales, and the emergence of internationally operating retail groups.

Moreover, assessing the power of operators in the food supply chain, it becomes clear that concentration in the retail sector is extremely high. In most EU countries, the three largest food retailers represent more than 40% of market share (Figure 15). In contrast, and as indicated in the previous chapter, the

FIGURE 15
Market shares of the top-3 food retailers



Source: CIAA.

food industry sector is a highly fragmented industry, since SMEs make up 99% of the food business population.

Amongst all the areas of retailing, it is food retailing which stands out as having seen the most profound changes, and where, by its absolute size and importance, the developments have had the greatest impact on consumers. Heavy investment by retailers has allowed them to reap economies of scale, witnessed by the rapid growth in superstores and hypermarkets offering consumers as many as 20,000 product lines.

At the same time there has been considerable consolidation that is still in progress across the EU. Although food retailing varies greatly from one EU Member State to another, all countries are seeing a trend towards larger stores. Sweden is the most consolidated market, with 91.7% of market share belonging to the leading 5 retailers in the country. The Netherlands, the UK, France and Germany all have very consolidated markets as well with 61.5%, 56.7%, 56.6% and 42.7% of the market taken up by the top-5 retailers, respectively. In these markets, there is more pressure on prices, larger retailers are changing their product offering by introducing more non-food items and they are developing an increasing private label share (Bukeviciute *et al.*, 2009).

France, the UK, Germany, Italy and Spain are the countries with the highest retail sales; whereas the leading 10 European retailers represent 40% of total retail sales. This trend suggests that food retailing in Europe will continue to be characterised by fewer, larger players, more international in their structure, with USA retailers seeking to increase their presence significantly. In fact, some analysts predict that global food retailing will be dominated by as few as four to five players in the near future.

The structure of the retail industry is, therefore, changing dramatically as a result of consolidation, and major retailers are increasingly adopting strategies of internalisation. Of the top-20 retailers worldwide, six are American, two are Japanese and the remainder are European (six are German, four French, one British and one Dutch) as presented in Table 38 below. Wal-Mart is the biggest player by far, but Europe's own retail giants, such as Carrefour, Tesco, Metro and Ahold, are also prominent.

These globally active retail chains are increasingly pooling their purchasing power and are able to buy from any source to benefit from cost advantages at the expense of local food processors that have higher production costs. Retailers are in fact increasing their strength relative to even the largest brand processors such as Nestlé and Unilever. These retailers further organise their

TABLE 38
The top-20 food retailers in 2007

Rank	Retailer	Country of origin	Retail sales (Bio $)	No of stores	Countries of operation		
					2007	2002	1997
1	*Wal-Mart*	USA	312.40	6,380	16	12	8
2	***Carrefour***	FR	92.6	12,179	36	31	14
3	***Tesco***	UK	69.6	2,365	14	10	6
4	***Metro***	DE	69.3	2,458	27	26	18
5	*Kroger*	USA	60.6	3,726	1	1	1
6	***Ahold***	NL	55.3	6,422	11	27	13
7	*Costco*	USA	52.9	460	8	8	6
8	***Rewe***	DE	51.8	11,242	14	12	9
9	***Schwarz***	DE	45.8	7,299	22	:	:
10	***Aldi***	DE	45.0	7,788	14	12	8
11	*Walgreens*	USA	42.2	4,953	2	:	:
12	***Auchan***	FR	41.8	2,686	12	15	10
13	***Edeka***	DE	41.3	19,001	5	6	5
14	*Albertson*	USA	40.4	2,541	1	1	1
15	*AEON*	Japan	40.2	10,132	11	:	:
16	*Safeway*	USA	38.4	1,914	3	3	3
17	***Intermarché***	FR	37.7	3,932	8	7	9
18	***Leclerc***	FR	35.4	581	6	:	:
19	*Seven&I*	Japan	35.3	21,136	19	:	:
20	***Tengelmann***	DE	29.8	7,730	14	14	10

Source: M&M Planet Retail.

supplies directly obtaining an increasing part of their supplies through contract farming.

In particular, retailers have seen benefits from internalising, through vertical integration, alternative farming production methods, such as organic food, fair-trade, and local branding, as a means to improve their reputation. Moreover, there has been a growth of private quality assurance schemes. Retailers endow themselves with private certification schemes either to fill a governance 'gap' left by weak state regulation and in response to consumer concerns about food safety crises, or to push costs and risks up the chain to farmers. The emergence

of private standards has potentially severe implications for farmers since they are imposed without negotiation and without any price or market access premiums.

Increased standardisation and concentration of power in the hands of major retailers has therefore raised concerns about the diminishing diversity of products and the exclusion of smaller farmers. Many supermarkets deal with a few large suppliers, whereby suppliers are obliged to conform to the standards and specifications set by retailers in order to have access to their markets. In this way, standards for products that were initially earning a premium become normalised and the minimum point of entry into the food markets.

The discount retail sector has also been more active in the European food market over the last years. Discount strategies and the discount sector are the fastest growing activity in Europe, with countries such as the UK, Poland and the Czech Republic expected to experience an increase in discounter presence. Aggressive market leaders continue to push further, forcing supermarkets to increase their offerings of private label products to maintain their market share. Retailers, in turn, are continuing to exert pressure on food processors in an attempt to pass price pressure on to suppliers.

Overall, European food retail chains are growing in size, and so are the stores in which consumers shop. Many of these large retail chain stores are supermarkets, and some of these stores are hypermarkets, selling a lot of non-food items in addition to grocery items. These larger stores seem to do particularly well in higher-income countries. In lower-income countries though, the smaller, traditional stores have greater roles. For instance, 71% of Czech consumers shop daily and although more are shopping at supermarkets, most still visit small shops.

In Greece, the three largest retailers hold more than 30% of the market share, while the ten leading supermarkets account for about 80% of both total sales and total profits in the local market. Table 39 presents the top-10 food retailers in the Greek market ranked by their total assets for the year 2007.

The turnover and trade volume indices for the retail sector appear in Tables 40 and 41, respectively. Both indicators have an upward trend over the period 2000-2005, indicating the increasing power of retailers in the food supply chain. According to Table 42, finally, the number of employees in the retail sector is increasing as well, though the number of retailing firms does not follow the same trend as a result of consolidation. In 2006, retailers' sales amounted to €8.37 Bio, an increase of 6.5% compared to 2005. Profits also increased after their decline in 2005.

TABLE 39
The top-10 companies in food retailing, 2007, Mio €

Rank	Company	Turnover		Pre-tax profits	
		2006	2007	2006	2007
1	*Carrefour Marinopoulos S.A.*	1,739	1,899	23.4	24.9
2	*Sklavenitis J. & S. S.A.*	..	912	-6.7	13.4
3	*Alfa Beta Vassilopoulos S.A.*	1,001	1,141	27.6	45.9
4	*Atlantic S.A.*	564	586	0.3	-8.3
5	*Veropoulos Bros S.A.*	610	647	1.4	6.9
6	*Masoutis. D., Supermarket S.A.*	502	542	17.2	18.2
7	*Metro S.A.*	549	601	17.8	21.0
8	*Pente S.A.*	356	381	14.3	16.3
9	*Dia Hellas S.A.*	368	381	4.9	-2.9
10	*Arvanitidis S.A.*	212	226	0.7	0.2
	Total	**3,164**	**4,279**	**100,9**	**135,6**

Note: Ranked by Total Assets.
Source: ICAP, Greek Financial Directory, 2009.

TABLE 40
Turnover index in retail trade

	2000	2001	2002	2003	2004	2005
Overall index	100	107.9	117.8	127.1	135.0	143.0
Supermarkets	100	109.6	122.5	137.8	149.4	158.8
Food, beverages and tobacco	100	108.1	114.8	120.9	127.4	131.5

Note: Disinflation of the turnover index in retail trade by the consumer price index.
Source: NSSG.

TABLE 41
Retail trade volume index

	2000	2001	2002	2003	2004	2005
Overall index	100	104.2	109.2	114	119.1	122.6
Supermarkets	100	103.8	110.3	118.7	127.6	134.3
Food, beverages and tobacco	100	101.2	101.6	101.8	106.6	109.8

Source: NSSG.

TABLE 42
Turnover, number of employees and firms in the retail sector

	Retail sale in non-specialised stores with food, beverages or tobacco predominating		Retail sale of food, beverages, tobacco in specialised stores	
	2006	**2007**	**2006**	**2007**
Number of persons employed	97,901	104,348	74,676	73,698
Number of enterprises	27,041	27,312	30,244	29,760
Turnover (Mio €)	12,681	14,267	7,070	7,201

Source: Eurostat.

As in the rest of the EU Member States, the increased presence of multinationals (e.g. Carrefour-Marinopoulos and AB-Vassilopoulos) and discount stores (e.g. Dia) affect competition and profitability in the sector. For the latter, their market share currently accounts for about 8% of total sales, and the increased number of these establishments affects food prices particularly through the promotion of private label products. Large supermarkets therefore have bargaining power in Greece as well, and can control the prices of food products, while many small retailers have no power and small market share. Moreover, large supermarkets increase their investments expanding their operation (e.g. logistics centres) and establishing new branches all over the country. Small retailers, usually located in rural areas, were bought by multinationals and private label products became the central element of their strategy, so as to improve their economic position. A common strategy also appears to be the creation of one-stop shops that supermarkets establish renting part of the stores to various non-food companies.

Table 43 includes all information concerning the market structure, conduct and performance of food retailers similarly to the one provided for food processors in the previous chapter. For reasons of comparison analysis includes also information on agri-food wholesalers. It is obvious that the number of enterprises specialised in food retailing remains rather stable over the examined period; whereas the number of wholesalers increases. Non-specialised retailers are much smaller than their counterparts in the EU, measured by the number of persons employed per enterprise, contrary to specialised stores which are rather similar. The cost of labour in the food retailing sector appears also to be at the same level as for the EU; though the average personnel costs in food

wholesaling is much lower in Greece. Regarding market conduct, the indicator used for the intensity of investment fluctuates from year to year in all cases. A significant increase is observed for wholesalers of agricultural products in 2006, but a year later this indicator becomes similar to the one for the EU. Moreover, the results for labour productivity are in general discarding, as this measure decreases over time in all cases. Finally, the market structure concentration level in food retailing is significantly high, indicating the presence of barriers to entry in this market and the potential market power of the already active food retailers. Conversely, the wholesaling sector is characterised by an ease of entry into the industry, as its relevant index is much lower.

TABLE 43
Structure, conduct and performance of agri-food retailers and wholesalers

	2003	2004	2005	2006	2007	EU, 2007
Wholesale of agricultural raw materials and live animals						
Market Structure						
Number of enterprises	2,583	2,953	3,161	3,151	3,229	63,631
Turnover per person employed	174.0	170.4	174.3	196.8	202.9	619.2
Number of persons employed per enterprise	3.5	3.4	3.6	3.5	3.5	5.4
Average personnel costs	19.4	18.5	18.9	19.0	19.7	29.13
Share of personnel costs in production (%)	25.0	23.6	17.6	17.6	18.8	19.3
Market Conduct						
Investment per person employed	4.4	5.0	2.3	18.6	11.4	8.12
Market Performance						
Apparent labour productivity	32.6	30.4	23.4	28.7	29.0	46.8
Growth rate of employment	-2.2	10.0	12.4	-3.3	4.6	..
Wholesale of food, beverages and tobacco						
Market Structure						
Number of enterprises	12,579	14,448	15,233	14,515	14,699	211,421
Turnover per person employed	241.9	235.5	265.0	281.3	290.9	458.5
Number of persons employed per enterprise	5.1	5.0	4.8	5.2	5.3	8.9
Average personnel costs	20.5	20.1	19.4	17.1	17.9	26.4
Share of personnel costs in production (%)	23.1	23.9	20.4	21.5	19.4	20.1
Market Conduct						
Investment per person employed	4.9	7.3	6.4	6.3	7.8	5.7

TABLE 43 (continued)

	2003	2004	2005	2006	2007	EU, 2007
Wholesale of food, beverages and tobacco (continued)						
Market Performance						
Apparent labour productivity	45.4	41.0	27.6	28.8	30.1	43.0
Growth rate of employment	0.7	14.3	1.2	3.2	2.4	..
Non-specialised wholesale of food, beverages and tobacco						
Market Structure						
Number of enterprises	587	672	682	485	494	31,000
Turnover per person employed	210.9	193.3	299.2	309.4	323.7	500.0
Number of persons employed per enterprise	5.4	5.6	7.8	10.7	10.6	15.0
Average personnel costs	19.0	18.5	20.2	19.6	18.4	..
Share of personnel costs in production (%)	24.0	27.1	26.7	35.0	31.8	..
Market Conduct						
Investment per person employed	5.0	6.1	8.2	6.6	5.1	..
Market Performance						
Apparent labour productivity	42.1	34.5	31.8	29.6	31.9	43.0
Growth rate of employment	-12.1	19.7	41.4	-2.5	1.3	..
Retail sale in non-specialised stores with food, beverages or tobacco predominating						
Market Structure						
Number of enterprises	26,124	28,100	25,834	27,041	27,312	460,396
Turnover per person employed	104.8	108.5	126.6	129.5	136.7	167.6
Number of persons employed per enterprise	3.8	3.4	3.7	3.6	3.8	11.6
Average personnel costs	15.2	15.4	16.0	16.0	17.8	17.8
Share of personnel costs in production (%)	28.4	29.2	35.2	41.6	38.0	34.7
Market Conduct						
Investment per person employed	3.3	3.6	3.9	4.0	3.7	5.0
Market Performance						
Apparent labour productivity	22.0	21.9	18.9	17.6	18.9	23.9
Growth rate of employment	-2.1	-2.4	0.1	2.0	6.6	..
Retail sale of food, beverages and tobacco in specialised stores						
Market Structure						
Number of enterprises	29,469	31,053	30,037	30,244	29,760	495,295
Turnover per person employed	75.0	77.0	90.0	94.7	97.7	94.0
Number of persons employed per enterprise	2.1	2.1	2.4	2.5	2.5	2.9
Average personnel costs	14.0	14.2	15.4	16.1	15.7	14.8
Share of personnel costs in production (%)	13.3	19.7	29.5	28.0	24.1	26.2

TABLE 43 (continued)

	2003	2004	2005	2006	2007	EU, 2007
Retail sale of food, beverages and tobacco in specialised stores (continued)						
Market Conduct						
Investment per person employed	1.4	1.0	3.1	2.1	2.5	2.4
Market Performance						
Apparent labour productivity	24.7	17.7	11.4	12.3	13.7	18.8
Growth rate of employment	-8.8	3.5	10.5	3.0	-1.3	..
Market Concentration – Herfindahl Index						
Wholesalers	0.80	0.69	0.72	0.59	0.62	..
Retailers	9.66	9.89	9.82	9.13	8.51	..

Source: Eurostat, Amadeus and own calculations.

TABLE 44
Sales space for retail stores, m^2

		Retail sale in non-specialised stores with food, beverages or tobacco predominating	Retail sale of food, beverages and tobacco in specialised stores	Other retail sale of food, beverages and tobacco in specialised stores
Total m^2	**2007**	15,725	12,335	2,668
	2002	27,653	30,241	4,752
Between 0 and 119 m^2	**2007**	13,195	11,397	2,375
	2002	23,051	26,438	4,149
Between 120 and 399 m^2	**2007**	..	927	..
	2002	2,753	2,980	471
Between 400 and 999 m^2	**2007**	252	4	..
	2002	347	363	60
Between 1,000 and 2,499 m^2	**2007**	..	4	..
	2002	321	279	68
Between 2,500 and 4,999 m^2	**2007**	..	1	..
	2002	132	18	1
Between 5,000 and 9,999 m^2	**2007**	12	2	..
	2002	160	5	0
Between 10,000 m^2 and more	**2007**	10	..	..
	2002	889	158	3

Source: Eurostat.

Finally, Table 44 presents the sales space (in square meters) for retail stores providing also additional information based on the size of food retailers. It appears that the overall sales space has been reduced by 51% from 2002 to 2007 mainly due to consolidation. The highest reduction is observed for retail stores having more than 1,000 m^2.

3.2. Performance Premium of Global Food Retailers

To shed more light on the importance of global food retailers in the Greek retail sector, the extent to which they differ from local retailers with respect to a number of performance indicators is here examined. A simple model is estimated using firm-level data for 237 food retailers for the 1998-2007 period retrieved from the *Amadeus* database. The model used can be denoted by:

$$y_{it} = \alpha + \beta_1 \text{GlobalRetail}_{it} + \beta_2 \log(\text{Age})_{it} + \beta_3 \log(\text{Labour})_{i(t-1)} + \text{Region}_i + \text{Year}_t + \varepsilon_{it} \quad (3.1)$$

where *y* is the outcome variable for retailer *i* operating at time *t* capturing the retailer's performance. The *GlobalRetail* variable is a dummy equal to one if the retailer *i* is a global retail chain and zero otherwise, so that the estimate of β_1 is the premium associated with global retailing. The logarithm of age is introduced to capture the learning-by-doing effects measured in years from the firm's incorporation date. The firm's size is also used to control for economies of scale, so that the logarithm of one period lag of employment is introduced. In addition, region and year fixed effects are included to take into account regional differences and macroeconomic shocks, respectively. The regional variable refers to whether a retailer operates only in Attica, or otherwise. The performance indicators include employment (i.e. number of persons employed), capital stock, capital to labour ratio, sales, sales per person employed, value added per person employed, return on assets, and return on sales. Except for the latter two indicators, all dependent variables enter in a logarithmic form. The estimated premium associated with being a global retailer for these performance indicators is presented in Table 45.

It appears that global retailers differ significantly from other retailers in Greece. The estimated premium for five indicators is positive and statistically significant at the one per cent level. Global retailers are much larger in terms of employment, capital stock and sales, while they are more capital intensive and they have higher sales per person employed. There are, however, no differ-

ences in terms of profitability measured by return on assets and return on sales.

TABLE 45
Performance of food retailers

	Global Retail	**Standard Error**	**No.Obs.**
Employment	4.779***	0.324	1,298
Capital stock	1.320***	0.218	1,118
Capital to labour ratio	1.308***	0.217	1,118
Sales	0.829***	0.191	1,114
Sales per person employed	0.817***	0.191	1,114
Value added per person employed	0.328	0.210	1,103
Return on assets	-0.011	0.037	1,118
Return on sales	-0.003	0.039	1,114

Significance levels: 0.01***, 0.05**, 0.1*.

It can be, therefore, concluded that global retailers have expanded rapidly in the Greek market over the last decade, playing an important role in the retail sector and accounting for a significant share of total sales. A simple econometric analysis revealed that global retailers differ considerably from other retailers in the country, as they are larger in scale and more capital intensive. Their rapid expansion and larger size imply then that these retailers are very likely to have greater bargaining power vis-à-vis their suppliers as they have access to a larger market and lower costs.

CHAPTER 4

FOOD CONSUMPTION

4.1. Food Consumers

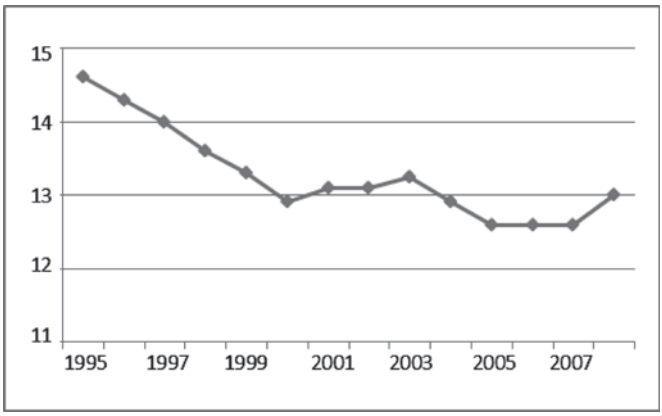
4.1.1. European Consumers

European consumers live currently in smaller households where more adults work, there is less time for meal preparations and a much greater proportion of expenditure is spent on food outside the home. A decrease in the proportion of expenditure allocated to food has occurred, while an increasing number of consumers are becoming more discerning in their food choices, taking into account qualitative aspects of food, such as the environmental characteristics, health, animal welfare, ethics, authenticity, locality and safety.

The opening of the European market also serves the changing consumer demands, making available a wider variety of food products with potential health and environmental benefits. At the same time, European consumers face more homogenous food market conditions, though food consumption patterns still differ among countries and regions in the EU. Despite differences in per capita consumption of major food categories between the EU-15 and the New Member States, the EU countries share a rising trend towards higher consumption of meat and dairy products, fruits, and vegetables. Total caloric content is also increasing, though consumer spending on food as a percentage of total household expenditure has declined (Figure 16). Nevertheless, for the first time since 1995, consumption expenditure on food and non-alcoholic beverages has increased at the expense of the other categories such as transport, clothing, recreation and culture (from 12.6% in 2007 to 13% in 2008). This trend, which is observed in most member states, can be explained by the economic and financial crisis.

Food products accounted for the largest share of household consumption before being gradually overtaken by other necessities such as housing, transport and leisure. Overall, food expenditure as a share of income is falling in the

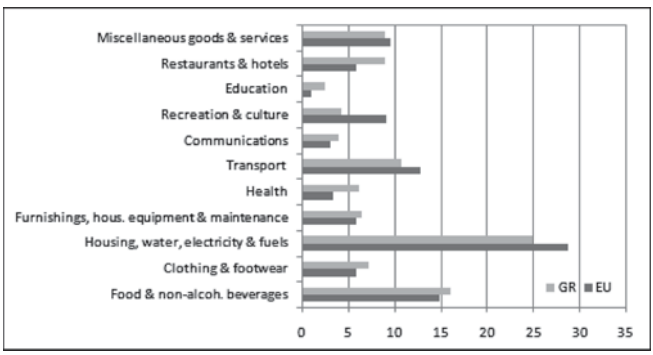
FIGURE 16
Household expenditure trends, % of total expenditure



Source: Eurostat.

EU, as incomes rise and food prices fall relative to other goods. This is consistent with Engel's Law which states that the income share of food expenditure falls as income rises, since consumers do not tend to increase their food intake very drastically. Foodstuffs rank second in the consumption expenditure of households by category, after 'housing, water and energy' (Figure 17).

FIGURE 17
Consumption expenditure on goods and services in the EU and Greece in PPS, 2005



Source: Eurostat.

The continuous decline in the share of household expenditure can be attributed to various driving factors as presented in Table 46. These factors include, among others, demographic and socioeconomic changes, and the fast pace of modern lifestyle, all of which have led to an increasing demand for convenient food, in addition to their nutritional value.

Concerning food consumption among the Member States of the EU, differences in food prices and income within the EU have led to some differences in the percentage of consumer expenditures spent on food. For the EU, food consumption was, on average, 13% of household expenditure in 2008, ranging from 27% in Romania to 7.5% in Luxembourg. Over the last 10 years, this percentage has declined by 2 percentage points. For the NMS particularly, the share of food in household expenses remains important with an average of 18%, compared to 12% in the EU-15. These differences reflect different food cultures and different expectations of freeing up disposable income from within the household food budget.

Mediterranean countries, Northern Europe, and Eastern European countries all have distinct consumption patterns. The Mediterranean diet is composed of grains, fruits, vegetables, olive oil, cheese, yogurt and fish, and of little red meat or sweeteners. Although consumption patterns are not completely uniform across all Mediterranean countries, consumers in Greece, Italy, Spain and Portugal favour products included in the Mediterranean diet. It should be noted, however, that meat consumption is now relatively high compared to the rest of the EU, while fruit and vegetable consumption is decreasing in this region.

Northern Europe (Sweden and Finland) have a distinct diet as well. Consumers in this region prefer fish, dairy products (especially milk) and sugar, mainly due to climate conditions and available land. At the same time, consumption of fruits and vegetables is below the EU average. Improvements in transport and modern food technology have contributed to an increasing trend in the consumption of vegetables, while fish and dairy consumption have a decreasing trend over the last decade.

In contrast, fish, milk and fruit consumption in Eastern European countries is relatively low, while consumption of cereals is high. Consumers in this region seem also to prefer canned foods, rice and pasta, chicken and spicy food. For some NMS such as Estonia and the Czech Republic, food consumption patterns seem to converge with those of the EU-15. For Poland and Hungary as well, consumer preferences appear to be more similar with those of the EU-15 over the last years. Nevertheless, Eastern European countries experienced a

TABLE 46
Driving factors of food consumption

Demographics	
Consumer income	European consumers spend a smaller percentage of their income on food as income rises, yet they are also willing to purchase food products of higher quality and more varieties.
Household age and size	The EU has small (even single-person) households and an aging population, experiencing declining birth rates. Smaller households lead to higher food expenditures per capita because economies of scale are lost, while single people tend to eat more often prepared food and meals away from home. Older consumers are more likely to follow the eating trends of the past.
Number of women at work	The number of women who enter the workforce is increasing in the EU. The two-income families eat more convenience foods (fast-food), away from home or spend less time on meal preparation. The consumption of frozen meals and microwave ownership are therefore rising.
Population	A major force altering food consumption patterns is shifting rural-urban populations and the resulting impact on spending and consumer preferences.
Lifestyle	
Time factor	Europeans shop weekly, spend less time in the preparation of meals and prefer more convenient food.
Social behaviour	New food products from non-European cultures are becoming very popular in the EU, and ethnic food sales are rising. European consumers have a positive attitude toward traditional and local food. The number of vegetarian consumers is also rising.
Retailing	Supermarkets have changed shopping and consumption behaviour by decreasing the number of shopping trips, reducing shopping time and providing a wide range of convenient food solutions.
Health, diets & food safety	
Concerns for health	As consumers gain affluence, their attention turns from having enough food, to the quality of food they eat. European consumers are trying to improve their diets in ways that will improve their health.
Food safety	Food scares have led to large fluctuations in the supply and/or demand for various food products. Consumers are becoming more concerned about food safety.
Culture & tradition	
	Regional foods cover consumers' need for security due to the guarantee of quality, a certain regional image or tradition and authenticity. The EU protects traditional foods associated with certain regions and local specialties while promoting food diversity (four logos were developed – i.e. PDOs, PGIs, TSG and the organic farming).

TABLE 46 (continued)

Ethics	
Concerns for animal welfare	Consumers are becoming increasingly concerned about the production processes used to make their food.
Environmental concerns	Consumers become increasingly quality-conscious and concerned about the environmental impact of food production.
Fair trade	Consumption increases not only for 'pure' ethical goods (e.g. free-range eggs), but also for fair-trade products.

Source: Kaditi & Swinnen, 2007.

decline in caloric intake for the period 1988 to 1995, as prices rose and incomes fell.

As already mentioned, the European market of alternative produce, such as organically produced foods, still remains relatively small even though it has increased in recent years. Despite the fact that the organic market, for example, is less than 10% of total food expenditure, it is significant and in many EU countries is set to grow, making the organic foods more widely available. Moreover, meaningful information (e.g. labelling) have helped consumers in overcoming mistrust and uncertainty, thereby encouraging initial use.

Finally, European consumers retain a negative attitude towards agri-food biotechnology and its derived genetically modified (GM) products. The introduction of modern biotechnology into the European agriculture has actually raised a substantial debate in the EU. As a result, applications of agri-food biotechnology have advanced at a slow pace in comparison to other areas.

In summary, there is evidence of an increasing homogenisation of food consumption patterns in the EU, though differences remain among EU countries and regions. As prices and incomes become relatively less important in explaining these differences among the EU countries, food consumption is driven by particular factors, such as culture, tradition, household composition and degree of urbanisation, that contribute to dietary patterns in different ways.

4.1.2. Food Consumption in Greece

Food expenditure is a significant part of the average Greek household expenditure. As in Europe, food products in Greece have an inelastic price and expenditure demand. Therefore, it is not surprising that the share of food ex-

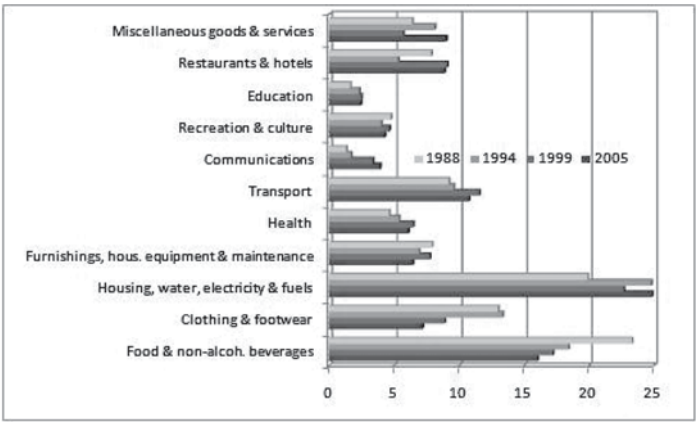
penditure has been declining over the last years. Around 16% of total consumption expenditure is currently directed to food products, though twenty years ago it was about 30% (Table 47 and Figure 18). Nevertheless, total caloric content in 2007 compared to previous years increased at a considerable rate as well as the value of household consumption expenditure on food products (Table 48 and Figure 19).

TABLE 47
Household consumption expenditure, % of total

	2008	2002	1999	1995
GR	16.5	15.8	16.8	18.2
EU-15	12.2	12.8	12.9	14.2
EU-25	12.9	13.2	13.4	14.6

Source: Eurostat.

FIGURE 18
Household consumption expenditure on goods and services



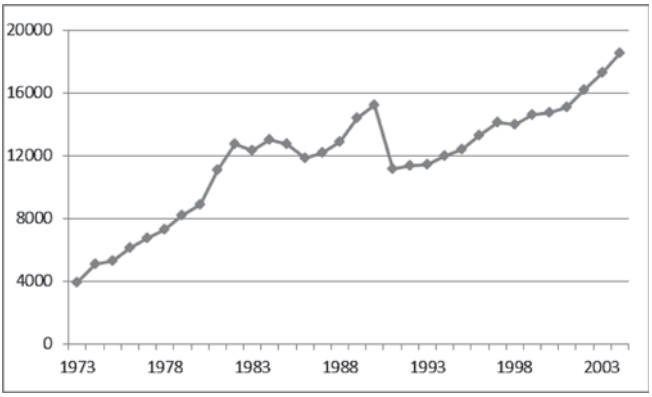
Source: Eurostat.

TABLE 48
Calorie supply per capita, kilocalories/capita/day

1960-1969	1970-1979	1980-1989	1990-1999	2000-2005	2006	2007
2,906	3,284	3,453	3,269	3,679	3,678	3,725

Source: FAOSTAT.

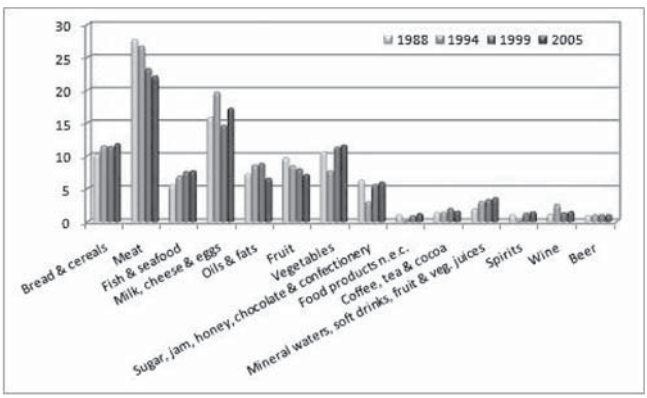
FIGURE 19
Household consumption expenditure on food products, Mio €



Source: AGRIS EC, 2005.

Meat, dairy products, as well as fruit and vegetables are the largest food commodities in terms of household budgetary shares. Per capita consumption of fruit and vegetables and olive oil is among the highest in the EU; whereas consumption of meat is below the EU average, with the possible exception of poultry meat. Figure 20 indicates consumption expenditure of certain agri-food products for four different years. An upward trend is observed in the consumption expenditure on vegetables, bread and cereals and fish products; whereas expenditure on fruits and meat products is continuously decreasing.

FIGURE 20
Consumption expenditure on certain agri-food products



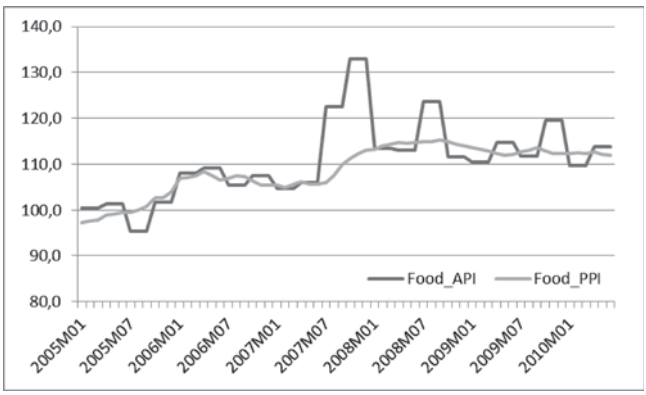
Source: Eurostat.

Overall, consumers need to be well-informed as their trust is a major factor of the food industry's development. Greek food companies are aware of consumers' behaviour and their standards are as high as European ones.

4.2. Food Prices

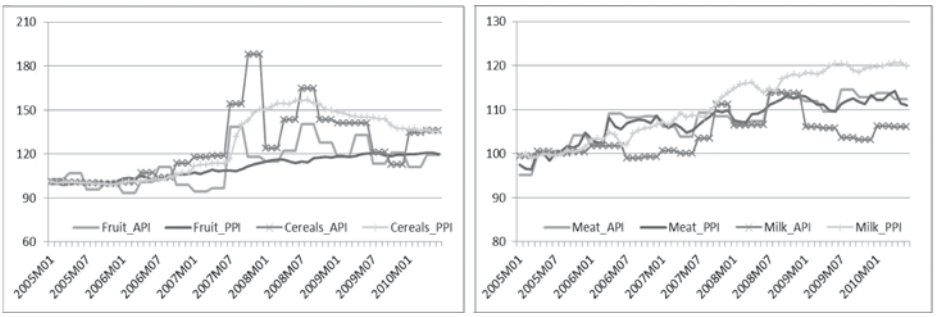
It is generally argued that the increasing food prices over the last years have changed Greek consumers' preferences. In addition to income elasticity of demand, lack of information may also explain why consumer demand, though increasing, is still mostly limited to certain categories. Figures 21 and 22 present the monthly price indices for all agricultural goods and processed food products, as well as for some main agri-food products for the period 2005-2010. It is obvious that prices of agricultural products increased significantly over the second half of 2007 and 2008, in contrast to processed food products' prices which increase at a rather stable rate. After 2008, prices appear to have a downward trend, though they remain higher than the prices prevailing before the food crisis. A similar trend is observed for the general sub-categories of fruits and meat. Nevertheless, significant fluctuations are evident for the two cases of cereals and milk, as their price indices have increased enormously after 2007. These factors have therefore undoubtedly affected food consumption in Greece.

FIGURE 21
Monthly price indices for agricultural goods and processed food products, 2005=100



Source: Eurostat.

FIGURE 22
Monthly price indices for main agri-food products, 2005=100

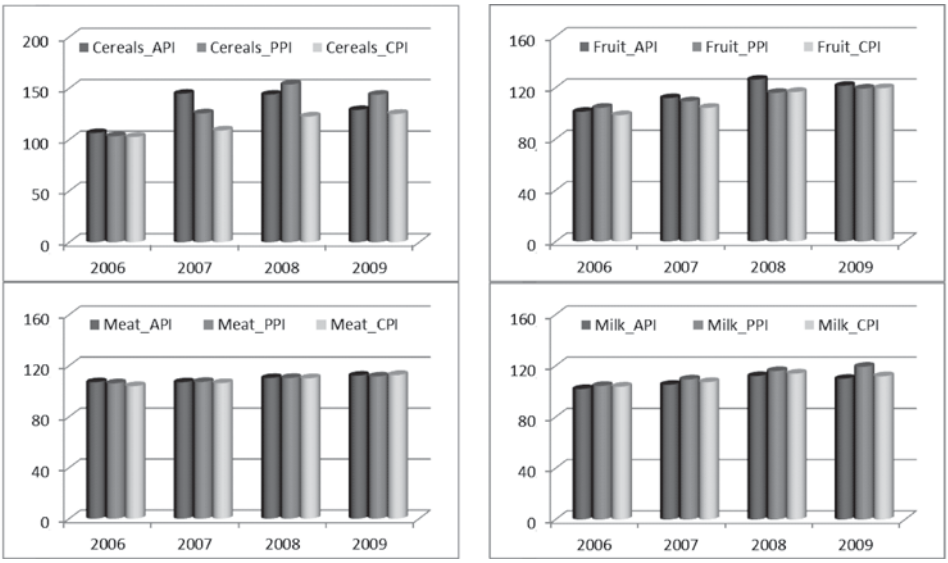


Source: Eurostat.

In terms of the price indices along the food supply chain, Figure 23 provides relevant information for four main agri-food products for the years 2006-2009. In all cases, it is the consumer price indices that have an upward trend, whereas the producer price indices remain rather stable. The agricultural price index also fluctuates for the case of cereals and milk, as in the previous figure. Overall, the price indices for agricultural producers and food processors tend to be higher than consumer price indices over time, and as a result it can be generally argued that agri-food producers' price increases are fully transmitted to consumer prices, inevitably affecting consumption patterns.

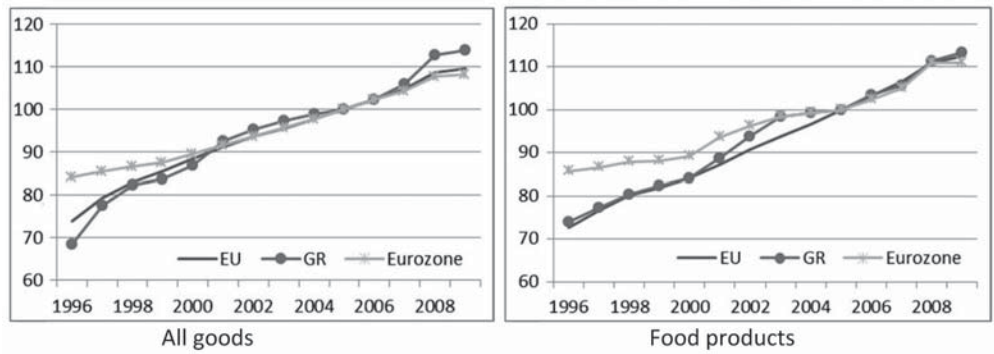
Figure 24 further illustrates the evolution of the harmonised consumer price indices in Greece, the EU and the Eurozone for all goods and for the food products separately, over the period 1996-2008. It appears that in both cases, (food) prices were significantly lower than in the Eurozone countries until 2004. Over the last years though, prices in Greece have increased considerably, and they currently exceed the Eurozone prices by more than 5%. Similar conclusions can be derived when comparing Greece with the EU countries as a whole. Examining also the consumer price indices for specific agri-food products, as in Figure 25, it can be argued that prices in Greece remain relatively high mainly due to the evolution of prices for fruits, cereals and alcoholic beverages. In 2003, a significant increase is observed in the prices of fruits and vegetables, though in the latter case, a reduction occurred over the last years reaching a lower level than the EU. In any case, it is only the prices for non-alcoholic beverages that appear to be lower in Greece in comparison to the other countries.

FIGURE 23
Price indices along the food supply chain for main agri-food products, 2005=100



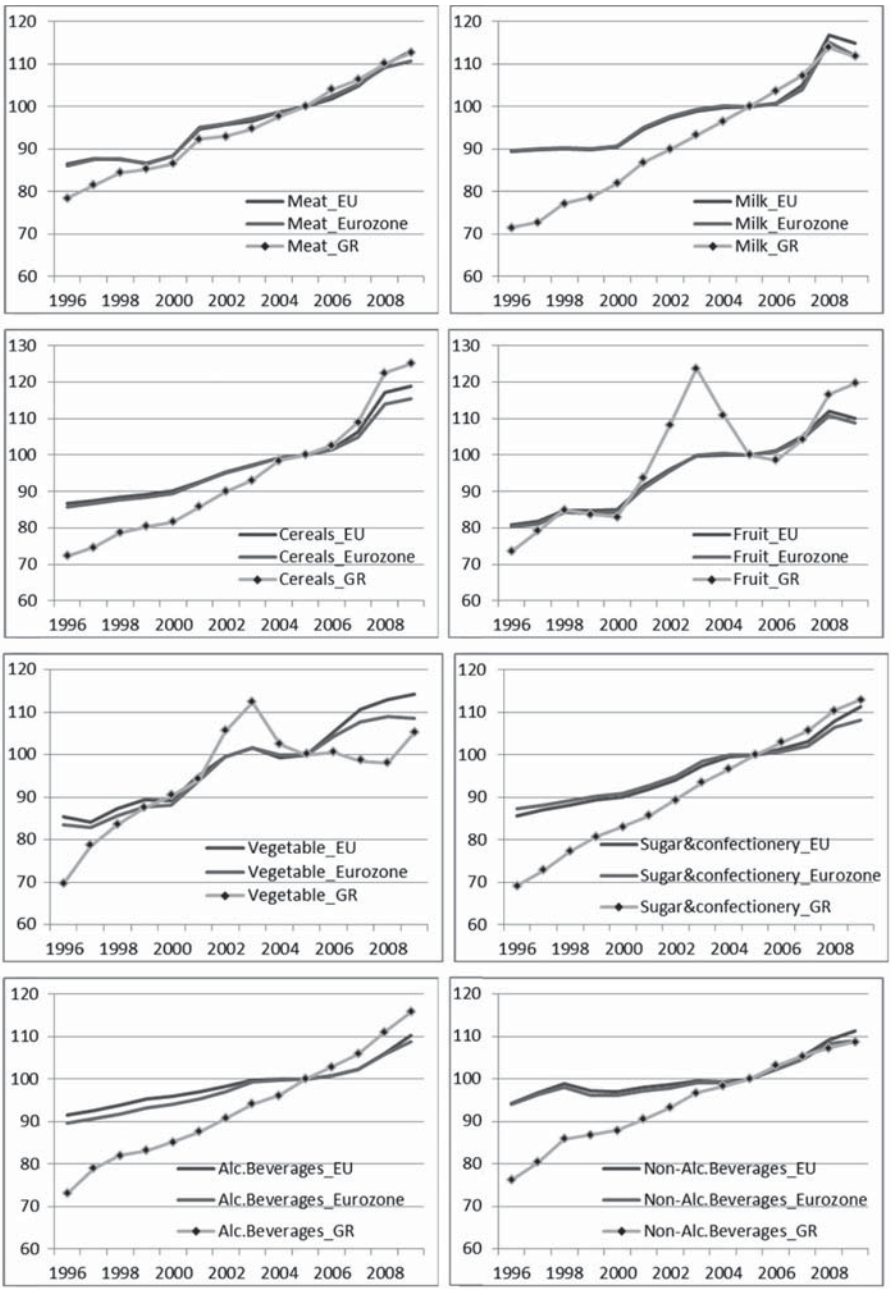
Source: Eurostat.

FIGURE 24
Harmonised consumer price indices, 2005=100



Source: Eurostat.

FIGURE 25
Harmonised consumer price indices for main agri-food products, 2005=100



Source: Eurostat.

Overall, the considerable increase in food prices has resulted in the introduction of a European food price monitor tool that can potentially ensure price transparency and provide sufficient information to consumers. Competition and other regulating authorities have also been invited to take action against abusive practices of all food actors; whereas the Commission tries also to ensure that the EU competition law is enforced along the food supply chain for its proper functioning.

CHAPTER 5

GLOBALISATION OF THE FOOD SUPPLY CHAIN

The objective of this chapter is to examine the development of economic integration and global configuration in food systems, identifying briefly the driving factors behind the development of the food supply chains.

5.1. Trade Liberalisation

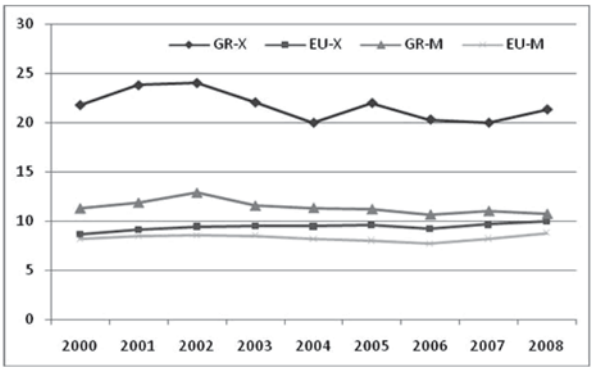
Trade liberalisation has enhanced growing market access and vital changes in the international trade flows of agricultural and food products during the last decades. A significant aspect is the increasing importance of processed, as opposed to raw, agricultural products. In this respect, market forces of global integration are getting stronger, and there is a growing interest among processors for agricultural products with specific requirements; as, for example, consistent quality, eco-compatible treatment, timely delivery, particular traits, etc. This trend is expected to grow further, since open markets are coupled with growing consumer demand for an increasing variety of choices.

Within Europe, the recent EU enlargements and increasing regional integration have brought easier access to agricultural supplies as well as new consumers. In addition to the direct impact on particular countries' economies through trade and investment, the spillover effects among countries are evident as methods of production and distribution spread, along with changes in consumer behaviour and the adoption of common lifestyles associated with the consumption of multinational brands.

Overall, the new globalised food system and the increasing presence of large multinational corporations may adversely affect agricultural producers, who cannot muster the same market power and organisation structure. Moreover, the complex task of moving food from the farm to the table, involving diverse local, national, and global actors, opened up a gap between producer prices and retail prices. Therefore, reducing trade barriers and boosting trade liberalisation may not always guarantee the facilitation of international trade flows because of the complexity of food chain channels.

Over the last decades, the EU has liberalised its trade not only for its internal market but also for the rest of the world. The importance of the food industry sector to its national economies and for Greece in particular is underlined in Figure 26, which shows that food exports and imports as a percentage of total relevant trade flows have been on a rather stable trend for both the EU and Greece.

FIGURE 26
Role and importance of the food industry sector



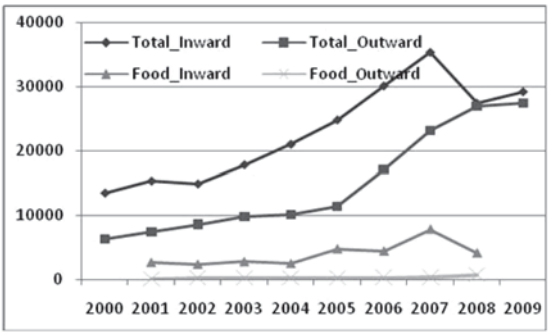
Source: Earth Trends Database.

5.2. Foreign Investments

Figure 27 indicates that the Greek foreign direct investments position has an upward trend both for total FDI and the food industry sector in particular. In the early 1990s, 26% of FDI went to the food industry sector; whereas Greece experienced a high increase in its FDI position over the period 2002-2007. Foreign investments originate mainly from the UK, the Netherlands, France, Denmark, Germany and Italy.

Certain sub-sectors in the food industry have proved attractive to foreign investors. These are of high-value production and often with a significant share of output being designated for exports (e.g. tobacco, soft drinks, brewing, confectionery, oil refining, and specific dairy products). Sugar beet processing has also been a popular target. Moreover, factors mentioned as encouraging foreign investments include low labour costs and cheap raw materials, while in

FIGURE 27
FDI position for Greece, Mio €



Source: OECD.

some countries, including Greece, their position as a platform for accessing markets to the East might also be important. As explained later, for countries that have found it difficult to attract FDI into the food industry, bureaucratic barriers, as well as sudden and unpredictable changes in the legal framework, and particularly taxation, are to blame.

Most FDI has involved the takeover of local firms, with subsequent restructuring, including new investment, transfer of new technologies and marketing expertise. As already discussed, a large number of small firms operate in the food industry, but there has been considerable consolidation through mergers and acquisitions in recent years, leading to the creation of huge corporations that dominate food manufacturing. A variety of forces; including price and availability of raw materials, increasing regulation in food safety, and the desire to achieve dominant market positions through creating and controlling global brands; all contribute to the need to achieve economies of scale and the trend towards further consolidation. Parallel to this, concentration in retailing has been growing as well. That is, it is the retailers who increasingly control food supply chains with their ability to exert enormous influence over both consumers and suppliers, despite the presence of food manufacturing giants.

In this framework, and over the last decades, fundamental changes have taken place in all economies of Southeastern Europe (SEE)[7]. These markets

[7] SEE comprises an Old Member State of the European Union (EU), Greece, and eight transition economies. These are, two New Member States, Bulgaria and Romania; five candidate

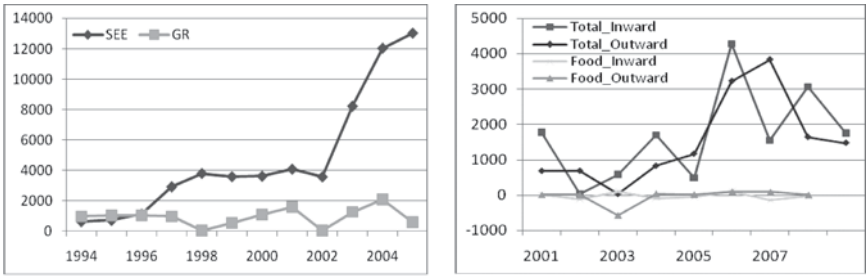
MAP 1
Greece and its neighbouring regional markets

became essentially much more accessible to foreign investors, as their domestic markets were liberalised, trade barriers were reduced and investment rules were simplified. This region, often referred to as the 'Balkans', remain effectively an area of high interest for the international business and investment community.

Since the beginning of transition, total foreign direct investments have actually gained importance, reinforcing a successful reintegration of SEE countries into the world economy, particularly for the food industry. Foreign investments increased significantly, indicating their major role in the economic development of the region (Figure 28). Greece has also been positioning itself to become not only a more attractive prospect for foreign investors, but also one of the top five investors in the transition economies of SEE. In particular, the strategic location of the region between Western Europe and the Middle East, political stability, further progress in reforms, deeper integration with the EU, the creation of a common free trade area, the comparatively low level of labour cost, and the high skills base are only a few of the factors that make this region attractive for foreign investors.

and potential candidate countries to the EU, Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Serbia and Montenegro; and a state of the former Soviet Union, Moldova.

FIGURE 28
FDI flows in SEE and Greece



Total FDI flows for SEE & GR, Mio $

FDI flows for GR, Mio €

Source: EBRD Transition Report, OECD & UNCTAD-FDISTAT.

Moreover, FDI legislation has been liberalised in all transition economies of SEE in order to attract foreign capital. SEE countries compete with each other by offering a variety of investment incentive schemes, as, for example, tax holidays, import duty exemptions, and subsidies for infrastructure, independently of their potential effectiveness. Greece, as the only country in the region that is both an EU and Eurozone member state, provides to foreign investors a political, monetary and exchange rate stability, while offering some of the most advanced infrastructure and sophisticated workforce in the region. A new legislative framework, that encourages foreign investments through new tax reforms, private investment incentives for economic development and regional convergence, and a new law for public-private partnerships, was also recently launched.

As a foreign investor itself, Greece is the gateway to multinational firms, which established their regional headquarters in Greece to expand their operations mainly in the Balkans and Eastern European countries including Russia and the Commonwealth of Independent States (CIS). Greece became the leading foreign investor in Albania and FYR Macedonia, and ranks among the first three leading foreign investors in Bulgaria, Romania, and Serbia and Montenegro. In fact, Greek direct investments in SEE over the last decade have exceeded the amount of €10 Bio. Coca-Cola Hellenic Bottling Company SA has already invested in Bulgaria, Serbia-Herzegovina and Hungary; whereas Vivartia SA has invested in Bulgaria and Romania, Boutari. J. and Son Holding SA is

TABLE 49
FDI inward stock, total, from Greece and for the food industry, Mio €

	AL Total	AL from GR	AL Food	BiH Total	BiH Food	BG Total	BG from GR	HR Total	HR from GR	HR Food	FYROM Total	FYROM from GR	FYROM Food	MD Total	ME Total*	ME from GR*	RO Total	RO from GR	RO Food
1990	..	..	..	..	..	3.1	..	..	..	..	..	..	..	..	..	..	..	..	..
1991	..	..	..	..	..	48.2	...	..	..	..	..	..	..	..	..	..	33.3	..	..
1992	..	..	..	..	..	80.2	..	..	..	..	..	..	..	..	..	..	100.6	..	..
1993	..	..	..	...	..	114.3	..	104.1	..	..	..	..	..	12.5	..	..	190.3	..	..
1994	..	..	..	..	..	202.8	..	203.1	..	..	..	..	..	23.6	..	..	333.2	..	..
1995	..	..	..	..	..	272.7	..	291.5	..	..	..	..	..	74.1	..	..	641.8	..	..
1996	..	..	..	..	..	359.7	..	699.4	..	..	..	..	..	97.9	..	..	884.6	..	..
1997	..	..	..	..	..	806.1	..	1,175.4	..	..	141.2	9.7	16.3	177.2	..	..	2,128.1	..	..
1998	..	..	..	59.6	..	1,362.5	..	1,656.8	..	..	270.4	12.8	61.5	216.2	..	..	3,783.3	..	..
1999	..	..	..	225.5	..	2,391.6	95.7	2,552.4	..	..	359.9	20.5	85.8	316.6	..	..	5,446.5	..	..
2000	..	..	..	384.0	..	2,425.8	233.3	3,005.2	..	218.3	580.1	105.3	112.4	483.4	..	..	6,965.7	..	..
2001	..	57.8	9.0	516.9	..	3,129.1	273.1	4,420.7	0.4	294.4	1,039.2	174.2	138.8	623.3	4.7	..	8,656.0	..	..
2002	..	65.7	8.0	798.6	..	3,529.6	472.4	5,793.6	0.9	347.9	1,160.7	213.0	164.9	613.7	76.4	14.9	7,482.0	..	..
2003	356.8	103.5	36.4	1,463.0	126.8	4,946.2	541.4	6,808.6	0.8	379.4	1,292.1	223.0	173.7	573.2	43.8	0.1	9,661.0	1,070.0	935.0
2004	612.2	342.4	..	2,058.4	155.8	7,420.7	637.2	9,114.2	1.0	487.0	1,610.2	264.1	182.6	622.2	52.7	0.2	15,040.0	1,233.0	1.109.0
2005	846.2	466.4	..	2,542.0	185.9	11,756.5	1,029.3	12,332.0	3.2	556.2	1,769.0	279.2	187.1	863.8	384.5	0.1	21,884.0	1,864.0	1,427.0
2006	1,054.3	559.2	..	3,165.8	239.4	17,830.4	1,689.7	20,782.0	6.4	690.7	2,098.6	320.4	189.0	955.3	492.8	0.6	34,512.0	2,680.0	1,908.0
2007	1,688.5	795.0	..	4,677.1	291.2	25,769.7	2,304.9	30,611.5	5.1	1,028.2	2,545.2	387.1	173.5	1,256.6	672.7	14.8	42,770.7	3,192.0	2,207.0
2008	1,986.0	820.1	..	5,255.6	304.0	31,526.2	2,688.9	22,827.3	3.6	831.1	2,968.8	450.7	..	1,810.2	625.4	11.4	48,797.9	3,154.0	2,226.0
2009	..	..	..	..	..	35,380.0	2,611.9	25,407.7	3.2	603.8	..	..	..	1,817.6	943.8	7.9	51,692.0	..	..

*: FDI inflows
Source: WIIW.

also present in Romania. Food companies in the Balkans that have received Greek investments include Delta Bulgaria AD, Everest BG, Ellas Food, Greko Food, Delta Romania SA, Best Foods Productions SRL, etc. FDI from Greece therefore contributes to the development and stability of SEE with a dynamic network of more than 3,600 Greek firms that do business in this region (Table 49). At the same time, according to the Invest in Greece agency, investment opportunities in Greece still exist in the markets of Mediterranean food products, organic food, ready-to-eat meals, frozen food, baby food and chocolate and confectionary.

In summary, all SEE economies have undoubtedly made significant progress in promoting private sector development through privatisation, deregulation, and a better business environment; and improving public administration. Among them, Greece not only has an advantageous location that provides access to the neighbouring regional markets, it is also a point of economic and political stability in the area. Greek businessmen have the cultural understanding of the regions and the practical experience of doing business there, so that Greece is Europe's strategic link to this sizeable, emerging market. Nevertheless, taxation, corruption, lack of access to finance, restrictive labour legislation and the poor quality of regulation are still perceived as the key constraints to invest in SEE economies. There needs to be an even stronger correspondence between the investment climate initiatives proposed by the governments and the concerns of the private sector and the foreign investor community. More cooperation with foreign (and local) investors will, therefore, help to identify the key problems that investors face in doing business. Greece is not an exemption, since corruption for example remains a major obstacle to doing business (Table 50).

As a result, the main objective of the following chapter will be the analysis of the effectiveness of various policies applied by the recipient countries in order to attract FDI in the food industry sector. The main advantages and weaknesses related to FDI inflows of all SEE economies will be identified and compared, so as to illustrate the impact of fundamental characteristics of governance and business environment on the magnitude and composition of foreign investments. The examination of how much the policy environment in the SEE matters for FDI in the food industry sector will be then the main focus of Chapter 6.

TABLE 50
Indicators on institutions and regulations in main SEE economies

		GR	BG	RO	HR
Starting a business	Procedures (number)	15	11	5	12
	Cost (% of income per capita)	20.0	9.6	5.3	13.4
Employing workers#	Rigidity of employment index	55	33	62	50
Getting credit#	Legal rights index	3	8	7	5
Protecting investors#	Investor protection index	3.0	6.0	5.7	4.0
Paying taxes	Total tax rate (% profit)	54.6	46.0	57.2	32.5
Trading across borders	Time for export (days)	20	26	27	35
	Time for import (days)	25	25	28	37
Enforcing contracts	Time (days)	819	564	537	561
*Regulatory Quality**	1998	0.83	0.83	0.75	0.58
	2006	0.86	0.95	0.73	0.77
*Political Stability**	1998	0.73	0.90	0.77	0.83
	2006	0.79	0.79	0.71	0.82
*Government Effectiveness**	1998	0.83	0.67	0.50	0.33
	2006	0.75	0.50	0.25	0.75
*Control of Corruption**	1998	0.83	0.67	0.50	0.33
	2006	0.33	0.33	0.42	0.42

Note: # The indices range from 0 to 10 (or 100), with higher values indicating more rigid regulation, and higher legal rights and investor protection, respectively. * The indices range from -2.5 to 2.5, with higher values corresponding to better governance.
Source: World Bank, Doing Business & Political Risk Services (PRS) International Country Risk Guide.

5.3. Vertical Coordination

Investments by multinational companies in the food processing and retailing sectors and the opening-up of international markets have affected local market competition, introducing higher standards, and leading in turn to extensive contracting and vertical coordination in the food supply chain (Fischer and Hartmann, 2010).

It is generally argued that supply chain restructuring and vertical coordination have positively affected local markets, as possible exchange and payment problems can be substantially diminished. Agricultural producers have also ex-

perienced beneficial effects on output, productivity and product quality through better access to inputs, timely payments and improved productivity with new investments. Direct loans and loan guarantee programs have also contributed investments in the agricultural sector improving global competitiveness. However, a key concern is that this process of vertical coordination could exclude a large share of farmers, and in particular small farmers, as MNEs tend to prefer to work with relatively fewer, larger and more modern suppliers.

For the local food processors, it is further argued that in some cases, they cannot compete with the multinationals mainly because the latter can provide to local input suppliers more credible contractual arrangements coupled with the use of assistance programs. On the other hand, local processors can benefit by imitating foreign investors and using the higher-quality inputs from their suppliers.

As a result, foreign direct investments in the agri-food sectors, through the operation of multinationals, can have significant positive backward and forward linkages (spillover effects); as, for example, product quality improvements, growth of small local suppliers through assistance programs, increased competition and productivity. Yet, FDI could lead to elimination of competitors and monopolistic or oligopolistic situations with undermined small input-suppliers.

5.4. Social Conditions & Income Growth

Demographic and social changes as well as income growth have significantly altered the way people live and work and how they spend their leisure time. Over the past 50 years, Greek citizens, like their European counterparts have become wealthier and have come to enjoy a higher standard of living, experiencing huge shifts in shopping and eating habits, with the expectation of ever cheaper food, and increasing variety all year round. As previously mentioned however, for high income consumers, the food share of total household expenditure is low, as they typically spend a large share of their incomes on more expensive items, such as health care, energy and recreation.

Another factor shaping food consumption is the demand for healthy food. In the past, the supply of ‘cheap’ food was the central objective of food policies. However, food actors are currently taking the former view to respond to consumer demand. In Greece, food manufacturers have to pay particular attention to this matter, as the majority of consumers still believes that the quality of food products in the Greek market has worsened over the last decade (VPRC sur-

vey, 2006). Consequently, most Greek consumers continue to have the same eating habits as in the past, believing that they follow a healthier diet. In addition, more consumers are now willing to buy organic food products, while the majority consume home-made meals.

Overall, among the other demographic and social changes, mentioned in Chapter 4, which might affect food consumption patterns, it is worth noting that nowadays fewer children are born to older mothers, fewer and later marriages are observed, as well as more marital breakdowns, leading to a trend towards smaller households with more people living alone. That means that the size of food markets is diminishing relative to other sectors in the economy. There is therefore considerable incentive for food actors along the supply chain to add value to their products to increase sales turnover, as well as to segment the market and offer a wider variety of choice. These are long-term trends that will inevitably continue.

5.5. Food Safety Standards

Over the last years, food regulations have become increasingly important in the arena of international trade, as food supply chains have turned out to be even more global and consumers have focused on food safety and quality. In addition to supranational and national regulations, private standards have also emerged from the agri-food sectors and in particular from food processors and retailers who want to control food safety risk. As a result, both public and private food standards have increased in quantity as well as in complexity without a clear delineation among them, but with significant implications on international food trade (Wijnands *et al.*, 2007).

In particular, regulatory policy has not developed at the same speed as the food systems have. Food safety crisis showed weaknesses in the effectiveness of the food system for protecting consumers and the decision-making process. All actors involved in the food supply chain have, therefore, further responded to food safety and quality issues to restore consumers' trust. Various private food standards were introduced, driven mainly by retailers' initiatives and allowing a benchmark requirement for all suppliers globally, while enhancing food safety using the principle of self-regulation. In addition, retailers are increasingly consolidating their systems of procurement, entering into longer-term relationships with a more limited number of preferred suppliers that can meet their requirements for volume, continuity, price competitiveness, safety and

sustainable practices. Similar to public standards, openness, transparency and compliance with fair trading legislation are also intended, though strong criticism currently prevails as they are considered to create trade barriers and reduce variety.

The emergence of food standards can also be attributed to two trade agreements under the WTO; the one on Intellectual Property Rights (IPR), and the other on safety and quality standards (Sanitary and Phytosanitary measures). Genetically modified (GM) foods deserve, finally, a special mention. A high proportion of European consumers, including Greeks, remain suspicious and would not purchase GM foods if given the choice. Legislation, which came into effect in May 2004, on GM food and feed means that any GM foods intended for sale in the EU are subject to a rigorous safety assessment, which is the responsibility of the European Food Safety Agency (EFSA). The rules also mean that any foods containing genetically modified organisms (GMOs), or ingredients produced from GMOs, must be clearly labelled.

Consequently, even the EU is by no means a homogenous food market. In fact, there is a rather wide variation in the intensity and specificity of the food safety, environmental, quality and other standards required for suppliers across different EU Member States.

CHAPTER 6

FOREIGN INVESTMENTS & INSTITUTIONS IN FOOD PROCESSING

6.1. Foreign Investments & Institutions

Since the early 1990s, development literature aims at exploring the role of institutions and regulations in economic growth. Solid laws and well-defined property rights, sound political and economic institutions, and efficient regulation of the economy are viewed as basic factors that determine macroeconomic stability, capital market development, business sector development and investment in innovation. The successful establishment and maintenance of sound institutions are, therefore, expected to exert their positive influence on economic growth through the promotion of foreign direct investments, among others things. However, foreigners' capital is more footloose than domestic capital and is likely to be more sensitive to institutional deficiencies. Moreover, the impact of institutions on FDI depends on the effectiveness of a country's regulations. Weak institutions, which may lead to corruption, reduce development in countries where regulations are effective, but may foster economic growth when regulations are ineffective.

In this framework, a number of papers have studied the relationship between institutions and/or regulations and economic growth in general or capital market development in particular. Using various econometric techniques, several studies conclude that sound institutions can encourage private (foreign) investments, improve the overall efficiency of economic system and significantly contribute to economic growth in the long-run. For instance, the works of Globerman and Shapiro (2002) and Stern (2003) showed that the quality of institutions and the economy's regulatory system have a significant impact on FDI, especially in developing countries and transition economies. Wei (2000) pointed out corruption as a significant obstacle to attract FDI; whereas Daude and Stein (2007) used a wider range of institutional variables and showed that FDI is significantly influenced by the quality of institutions. Moreover, Habib and Zurawicki (2002) examined the impact of institutional distance on bilateral FDI and found that the absolute difference of the corruption index between the in-

vestor and the host country has a negative impact on bilateral FDI. Using a sample of 89 countries, the paper of Busse and Groizard (2006) also supports the idea that foreign investments only stimulate growth in those countries that have sound institutions and lower levels of regulation. Finally, Bénassy-Quéré *et al.* (2007) concluded that, although in the short-run institutional reforms can be detrimental to FDI, FDI tends to rise more over time between countries with converging institutions.

This chapter examines whether and to what extent sound institutions and the degree of regulation deter or attract FDI flows in four economies of South-eastern Europe. In particular, analysis focuses on Greece, a mature economy and member state of the Eurozone, on two new Member States of the European Union, namely Bulgaria and Romania, and on a candidate country, Croatia. These economies are an interesting context to explore the impact of institutional quality and the effectiveness of regulations on FDI, since it is generally argued that institutional variables might be important determinants of FDI in transition economies, but less so in the more mature economies of Europe. The institutional and regulatory frameworks of the three sample countries have been reformed at various extents in the process of transition from state planning to the market economy; whereas governments in these economies compete with each other in terms of foreign-specific investment incentives to attract FDI in order to foster economy growth. In fact, all three transition countries have become especially attractive for foreign investors over the last years. At the same time, weak institutions appear to negatively affect foreign investments in Greece, despite recent deregulation. This chapter aims to examine empirically the importance of institutional convergence in these SEE economies to attract FDI, and to analyse whether the quality of institutions affect the impact of regulations on FDI.

While the existing literature has focused mainly on the effects of institutional variables on FDI using country-level data, this chapter contributes by testing a broad set of institutional and regulatory variables that may affect the decision of foreign investors to undertake investment projects in particular SEE economies using firm-level data. This enables us to ensure the robustness of the results; whereas a dynamic panel analysis is used to examine the factors that promote FDI in SEE economies over the period 1998-2006. On a country-specific level, the study also explores possible differences between FDI flows in Greece and the other SEE economies due to differences in their institutional and regulatory frameworks. Firm-level data is retrieved from *Amadeus* database, provided by

the *Bureau van Dijk* in Belgium, which include information on a number of variables, such as firm employment, sales and equity ownership position. An unbalanced panel data was constructed, which includes 476 food and beverage processing firms that have received foreign investments and a maximum of 3,684 potential observations. In particular, the firms are located in the four SEE economies as follows: Bulgaria (63), Croatia (34), Greece (36) and Romania (343). The indicators used for institutions and regulations are based on surveys undertaken by the World Bank, and in particular the *Worldwide Governance Indicators* (WGI).

Table 51 presents some information on the characteristics of the firms included in the sample, as well as descriptive statistics for the variables included in the empirical estimations. It is obvious that the majority of the firms were established after 1990, although dates of establishment for the overall sample

TABLE 51
Firm characteristics and summary statistics

Size		***Age***		***Country of Origin***	
Micro	3.4%	*Before 1979*	9.2%	*EU*	60.09%
Small	52.3%	*1980-1989*	3.1%	*US*	5.22%
Medium	13.0%	*1990-1999*	62.6%	*RoW*	34.69%
Large	16.0%	*2000-2005*	25.1%		
Very Large	15.3%				
R&D		***Loans***		***Taxation***	
Yes	22.2%	*Yes*	65.4%	*Yes*	67.1%
No	77.8%	*No*	34.6%	*No*	32.9%
	Mean	***Std Dev***	***Min***	***Max***	***NoObs***
FDI	17,010	142,352	1	3,524,480	3,684
Size	139	258	1	3,068	3,684
Age	13	24	0	185	3,684
Profits	1,071	7,355	-32,063	138,700	3,684
Operating Costs	8,551	30,731	0	625,400	3,684
Taxation	244	1,774	-2,506	30,716	3,672
GDP per capita	2,709	2,687	1,415	14,531	3,684
GDP growth	4.78	3.41	-4.6	8.7	3,684
Trade Openness	0.24	0.76	0.13	0.45	3,684
Inflation	19.30	17.17	1.7	59.1	3,684

Source: Amadeus database.

range between 1821 and 2005. About 60% of the firms have received investments from other EU countries, whereas 5.22% report investments from the US. Germany and the Netherlands are the first two European countries from where foreign investments originate, followed by France and Italy. In terms of the rest of the world, Turkey appears to have the majority of the investments in the sample countries. Most of the firms have received a loan, however only 22.2% of them have invested in R&D activities. Moreover, 32.9% of the firms paid no taxes in 2006. In terms of firm size, small firms comprised the clear majority of the sample, with an almost equal proportion of medium, large and very large firms.

6.2. Determinants of Foreign Investments

According to the *OLI paradigm* of Dunning (1993), a firm must own a unique asset it wishes to exploit (the *Ownership advantage*); it must be cost efficient to exploit the asset abroad instead of in the firm's home country (the *Location advantage*); and it must be in the firm's interest to control the asset's exploitation itself (the *Internalisation advantage*). Ownership advantages can be superior technologies, reputation, trademarks, brand names, or other intangible assets. The most important location factors are market size and the level of economic development, the cost and skill levels of labour, the availability of infrastructure and other resources that facilitate efficient specialisation of production, trade policies, and political and macroeconomic stability. Regulatory factors, such as exchange rates and taxes, as well as institutional factors are also important to affect the location and magnitude of FDI.

In terms of the latter, the quality of institutions and regulations depends on government's credibility and flexibility, respectively. Credible economies undertake strong checks protecting property rights and ensuring prospective (foreign) investors a reasonable return on investment, while avoiding the possibility of arbitrary governmental discretion. However, a credible commitment may entail the risk of policy rigidity, undermining regulation efficiency and increasing transaction costs. On the other hand, flexibility indicates the economies' capacity to tax and regulate. It may facilitate quick decision-making; however, it may also make policy less accountable in the absence of external checks. Consequently, economies with strong institutions (high credibility) should provide more political safety, while economies with weak institutions (high flexibility) should offer more investment incentives.

In brief, foreign investments are positively affected by local product and factor market development, growth potential, the availability of financing, and 'better' institutions; but they are negatively related to market risks and costs of doing business.[8] In this framework, the following baseline equation will be estimated:

$$FDI_{ijt} = \alpha + b_1 FDI_{ij(t-1)} + b_2 Size_{ijt} + b_3 Age_{ijt} + b_4 \text{Pr}ofits_{ij(t-1)} + b_5 OtherFirmVariables_{ij(t-1)} + \\ + b_6 Institutions_{ij(t-1)} + b_7 CountryVariables_{jt} + l_t d_t + c_i + u_{ijt} \quad (6.1)$$

where the subscript *i* denotes the ith firm, *j* denotes the country and *t* denotes the time. The disturbance term is specified as a two-way error component model, so that firm heterogeneity is denoted by c_i, namely the unobserved or fixed firm-specific effect; whereas year-specific dummies, d_t, are included to account for common trends in the volume of FDI stock of the firms. Parameters α, *b* and *l* are to be estimated. A set of firm- and country- specific variables likely to be associated with higher FDI are also included. A brief discussion on these explanatory variables follows, whereas the institutional and regulatory variables used in the analysis are presented in detail in the following subsection. It should be also noted that following Smarzynska and Spatareanu (2004), the dependent variable, *FDI*, is measured by the percentage of capital (equity) owned by foreign investors in each firm. In particular, FDI stock is calculated multiplying the percentage of foreign ownership by the total assets of each firm included in the sample for every available year.[9]

The first explanatory variable, *FDI*, is the dependent variable lagged by one period. The significance of this term will indicate that the investment process at firm-level is a dynamic one. This specification then imposes the methodology used for the empirical estimations, as explained in the following section.

In terms of the firm characteristics, seven explanatory variables are included in the analysis. The number of employees indicates each firm's *Size* and is expected to be positively related to FDI, as larger firms may receive larger amounts of FDI stock. Each firm's years of operation, *Age*, is also included as

[8] For a literature review on FDI determinants see Wheeler and Mody (1992) and Markusen (1995).

[9] The sample consists entirely of foreign firms and due to lack of data on foreign ownership over time, it is assumed as in the work of Damijan *et al.* (2003) that ownership remains the same during the years of the panel.

previously state-owned (old) firms are expected to be more experienced at operating in the local market so that new firms are less attractive to foreign investors. Moreover, the profits (or losses) of a firm, *Profits*, may affect an investor's decision. Higher profitability is actually expected to promote higher (future) investments.

In addition, the firm's *Operating Costs*, and in particular the cost of material inputs and labour costs may be another factor important to foreign investors. As a location advantage, the lower these costs are, the more attractive the location becomes. The lagged value of operating costs is included in order to be consistent with the lagged profits. A negative sign is expected for this explanatory variable. To examine possible technological sophistication (ownership advantage), an extra explanatory variable is further employed, the one on firms' *R&D* intensity. As a firm can acquire new technology via its own investments into R&D capital, this variable will indicate whether a firm introduced new technology (i.e know-how, patents, trademarks, etc.) using data on its intangible assets. This factor is expected to be positively related to the dependent variable. On the other hand, credit constrained firms may not be attractive for foreign investors. An explanatory variable indicating the share of debts over the firm's total assets is included, namely *Loans*. Finally, *Taxation* is introduced as another cost that is expected to have a negative impact on FDI. This can be also considered as a measure of the economy's regulations. The higher the amount of taxes paid, the lower the amount of FDI stock is likely to be.

Concerning the country control variables, the following factors may affect FDI. Following Habib and Zurawicki (2002), *GDP per capita* is considered to reflect high consumption potential in the host country and it is expected to be positively related to FDI. A positive sign for the economy's growth rate of GDP, *GDP growth*, is also likely, since high growth prospects ensures demand for the output of the local market oriented FDI. The economy's export orientation may further stimulate foreign investments. *Trade openness* is included in the analysis, as countries open to international trade provide a better platform for global business operations. A country's international orientation reflects also its competitiveness and it is expected to promote FDI flows. *Inflation* may strongly affect FDI as well, assuming it reflects a measure of macroeconomic instability (uncertainty). High inflation creates challenges in strategic planning, forecasting of demand and financing of operations, and it is therefore expected to negatively affect FDI. Finally, the quality of *Institutions and Regulations* is expected to play a significant role in attracting foreign investments. For instance, political

stability is considered as an imperative for planning, profitability and long-run success. Corruption produces bottlenecks, heightens uncertainty, and raises costs. Inability to handle corruption makes FDI challenging for investors from less corrupt countries and can result in a negative FDI decision. However, corruption may provide some investors preferential access to profitable markets. Foreign investors may count then on their bargaining power in order to decide whether to invest in a corrupt economy. Overall, weak institutions are expected to deter FDI, whereas high quality institutions attract FDI, depending always on the level of the economies' credibility as well as flexibility.

6.3. Institutional Variables

In order to assess the role of institutions and regulations as factors to attract FDI, a set of governance variables developed by Kaufmann *et al.* (2009) are employed. These indicators are constructed based on information drawn from 35 data sources provided by 33 different organisations. The data reflect the views on governance of the public and private sector, NGO experts, as well as thousands of citizens and firm survey respondents worldwide. In fact, the so-called *Worldwide Governance Indicators* (WGI) cover 212 countries over the period 1996-2008 and they include six dimensions of governance as follows.[10]

- *Voice and Accountability* (VA) – an indicator related to the political process, civil rights, and institutions that facilitate citizens' control of government actions, such as media independence.
- *Political Stability and Absence of Violence* (PV) – an indicator that measures the risk of destabilisation or removal from power of the government in a violent or unconstitutional way.
- *Government Effectiveness* (GE) – an indicator on the quality of bureaucracy, the competence of civil servants, the quality of public service provision, and the credibility of the government's commitment to its policies.
- *Regulatory Quality* (RQ) – an indicator related to the content of policies, like the existence of market-unfriendly regulations such as price controls and other forms of excessive regulation.
- *Rule of Law* (RL) – an indicator that measures the perceptions on the ef-

[10] An advantage of using country-level data on governance indicators is that it mitigates some of the measurement errors and biases associated with firm-level measures (see Asiedu and Freeman, 2009).

fectiveness and predictability of the judiciary, as well as enforceability of contracts.

- *Control of Corruption* (CC) – an indicator that measures the exercise of public power for private gain, including both petty and grand corruption and state capture.

The first two indicators (VA and PV) are essentially related to the way authorities are selected and replaced; the GE and RQ indicators refer to the ability of the government to formulate and implement sound policies (credibility); and the last two variables, RL and CC, consider aspects related to the respect, on the part of both citizens and the government, for the institutions that resolve their conflicts, and govern their interactions (flexibility). These six governance indicators are measured into units ranging from about -2.5 to 2.5, with higher values corresponding to better governance. In this paper, all measures are rescaled by subtracting the original scores from 2.5, so that they now range from 0 to 5.

As variables of institutions are often correlated with one another, it is generally not possible to include several institutions in the same equation. Although it is possible to aggregate all these variables into their first principal component, this will imply substitutability between institutional variables that refer to different areas of governance, limiting also the extent to which the relevance of each dimension can be identified. Following Daude and Stein (2007), those variables that capture similar dimensions will be, therefore, grouped to reduce possible measurement problems of the individual components. In particular, the average of VA and PV will be used in some regressions as an indicator on *Political Stability and Freedom* (PF), while the remaining variables will be grouped as the *General Government Efficiency* (GGE).

6.4. Institutional Framework & FDI

The use of the lagged dependent variable at the right-hand side of equation (6.1) causes OLS estimators to be biased and inconsistent, whereas the fixed- and random- effects estimators are also biased (Baltagi, 2008). As a result, a *generalised method of moments* (GMM) procedure will be used, following Arellano and Bover (1995) and Blundell and Bond (1998). Within many panels and few periods, estimators are constructed by first-differencing to remove the panel-level effects and using instruments to form moment conditions. In this case, moment conditions are based on both differences and levels. In particu-

lar, a system estimator that uses moment conditions in which lagged differences are used as instruments for the level equation in addition to the moment conditions of lagged levels as instruments for the differenced equation is employed. The Windmeijer (2005) biased-corrected two-step robust standard errors are reported.

In all cases, a set of explanatory variables are used in a dynamic panel data analysis to determine the significance of institutions and regulations for FDI and to take into account some other important variables related to each firm's ownership and location advantages. The governance variables are assumed to be predetermined instead of strictly exogenous, so that lagged levels are used as instruments. Moreover, a test of autocorrelation and the Sargan test of over-identifying restrictions are computed based on Arellano and Bond (1991) and do not suggest any serious problem. The output presents strong evidence against the null hypotheses that the over-identifying restrictions are valid, and that of zero autocorrelation in the first-differenced errors at order 1. There is also no significant evidence of serial correlation in the first-differenced errors at order 2.

The results in Table 52 indicate that the institutional and regulatory variables are among the variables that have a statistically significant impact on foreign investments. In Columns 1 to 6, the six governance indicators are included separately. It appears that the coefficients of *Government Efficiency*, *Regulatory Quality*, *Rule of Law*, and *Control of Corruption* bear a significantly negative sign, meaning for instance that corruption sands the wheel reducing the amount of foreign investments. This contracts the general view when using country-level data based on which corruption may oil the mechanism. The *Rule of Law* and *Control of Corruption* are shown to considerably deter FDI, as they are the two quality factors with the highest estimations. On the contrary, the two indicators related to the way governments are selected and replaced (*Voice and Accountability*, and *Political Stability and Absence of Violence*) do not appear to play a vital role in affecting decision of foreign investors. A similar conclusion is derived when combining these two factors together, as in Column 7 where the impact of *Political Stability and Freedom* is estimated. Nevertheless, the *General Government Efficiency* shows a negative and significant impact on FDI, turning out to be an important factor. A rise in institutional quality in terms of these governance indicators is, therefore, shown to attract FDI. Moreover, Column 9 presents the results when both an institutional and a regulatory factor are included in the estimation. As already argued, corruption may help circum-

venting strict regulations, even if the negative impact of corruption prevails. It is, therefore, examined whether corruption increases FDI flows that are suppressed by rigid regulations, although corruption's impact on FDI is negative. The results do not support this argument. The quality of the overall institutional and regulatory environment is again confirmed to be a factor which foreign investors consider when choosing to expand their operation in SEE economies.

In terms of the firm-specific variables, the coefficient of the lagged FDI variable is positive and statistically significant at the 1% level. Firms that have received foreign investments may, therefore, be more attractive in the future as well. The coefficients on *Size* and *R&D* activities are also positive and significant, indicating that investors prefer firms with higher levels of employment and those who can acquire new technology. On the other hand, *Loans* appear to negatively affect FDI, as expected, whereas the coefficient of *Age* indicates that firms with experience are more attractive to investors. The key country-specific variables are *GDP per capita* and *Inflation*. The former variable produces positive coefficients that are statistically significant, whereas the latter has a negative impact on FDI flows. These are then decisive factors in attracting foreign capital. The coefficient on *GDP growth* is negative and significant in some of the estimations, which is somewhat counterintuitive, yet not unusual in the literature on determinants of FDI. Overall, the results remain essentially the same regardless the measure of institutional and regulatory quality used.

Analysis so far indicates that foreign investors care about the legal aspects of the economy. But this does not mean that other factors are not important. Similarly to the theory, the results suggest that investors are interested in SEE economies also because of their comparative location advantages. In terms of the puzzling estimation of political stability and freedom's impact, a possible interpretation is that these factors are less damaging to FDI than the popular press claims. Consequently, the estimates show that the impact of institutions and regulations on FDI depends on the specific dimension considered.

The regressions presented in Table 52 constrain the effects of institutional and regulatory quality on FDI to be equal across countries. This may be a strong assumption since the sample countries include transition as well as industrial economies. An interaction between governance indicators and countries are then introduced to repeat the estimations. Since lower values of these variables correspond to institutions and regulations of higher quality, the estimated coefficients are expected to be negative so that the economy is less attractive to investors. The results presented in Table 53 confirm our previous

TABLE 52
FDI & Institutions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FDI	0.747 (0.074)***	0.687 (0.075)***	0.682 (0.085)***	0.668 (0.085)***	0.671 (0.083)***	0.667 (0.122)***	0.686 (0.072)***	0.668 (0.088)***	0.790 (0.074)***
Size	0.102 (0.061)*	0.120 (0.057)**	0.124 (0.058)**	0.107 (0.058)*	0.133 (0.060)**	0.113 (0.058)**	0.113 (0.057)**	0.142 (0.065)**	0.167 (0.061)***
Age	-0.194 (0.064)***	-0.171 (0.060)***	-0.096 (0.067)	-0.106 (0.060)*	-0.110 (0.059)*	-0.199 (0.097)**	-0.174 (0.057)***	-0.171 (0.070)**	-0.384 (0.100)***
Profits	-0.002 (0.003)	-0.002 (0.003)	-0.003 (0.004)	-0.001 (0.002)	-0.002 (0.003)	-0.001 (0.003)	-0.002 (0.003)	-0.001 (0.003)	-0.001 (0.004)
R&D	0.107 (0.030)***	0.087 (0.029)***	0.090 (0.030)***	0.085 (0.030)***	0.085 (0.030)***	0.081 (0.030)***	0.089 (0.029)***	0.070 (0.030)**	0.051 (0.031)
Operating Costs	0.0002 (0.000)	0.0002 (0.000)	0.0003 (0.000)	0.0001 (0.000)	0.0002 (0.000)	0.0001 (0.000)	0.0002 (0.000)	0.0001 (0.000)	0.0001 (0.000)
Loans	-0.311 (0.096)***	-0.305 (0.096)***	-0.284 (0.100)***	-0.244 (0.093)***	-0.254 (0.105)**	-0.283 (0.103)***	-0.297 (0.096)***	-0.257 (0.094)***	-0.354 (0.109)***
Taxation	-0.006 (0.013)	-0.006 (0.013)	-0.013 (0.017)	-0.012 (0.014)	-0.013 (0.013)	-0.013 (0.012)	-0.011 (0.013)	-0.009 (0.012)	-0.010 (0.019)
GDP per capita	0.422 (0.194)**	0.464 (0.164)***	0.306 (0.142) **	0.256 (0.130)**	0.095 (0.159)	0.477 (0.336)	0.783 (0.319)**	0.233 (0.127)*	0.845 (0.369)**
GDP growth	-0.019 (0.011)*	-0.021 (0.012) *	-0.018 (0.012)	-0.036 (0.011)***	-0.003 (0.008)	-0.009 (0.009)	-0.020 (0.012)*	-0.005 (0.007)	-0.003 (0.007)
Trade Openness	2.138 (0.817)***	1.702 (0.869) **	1.425 (0.780) *	2.633 (0.767)***	2.082 (1.015)**	1.413 (1.194)	0.312 (1.300)	2.175 (0.720)***	0.578 (0.849)
Inflation	-0.010 (0.004)***	-0.015 (0.004)***	-0.009 (0.003)***	-0.011 (0.002)***	-0.009 (0.003)***	-0.011 (0.004)***	-0.016 (0.004)***	-0.008 (0.002)***	-0.006 (0.002)***
VA	-0.044 (0.184)								
PV		0.105 (0.388)							
GE			-0.509 (0.270)*						-0.174 (0.154)
RQ				-0.339 (0.127)***					
RL					-0.697 (0.351)**				
CC						-0.548 (0.253)**			-0.271 (0.127)**
PF							0.092 (0.368)		
GGE								-0.458 (0.253)*	
Constant	-1.220 (1.347)	-1.405 (1.608)	1.124 (1.348)	0.951 (0.779)	3.103 (1.911)	0.350 (2.630)	-3.418 (2.073)*	1.460 (1.152)	3.201 (2.768)

TABLE 52 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sargan test of overidentifying restrictions	0.072	0.172	0.070	0.062	0.067	0.096	0.163	0.093	0.079
Arellano-Bond test for 2nd-order autocorrelation	0.230	0.222	0.249	0.219	0.280	0.258	0.212	0.236	0.233

Values in the parentheses are WC-Robust Standard Errors. No.Obs.: 3,196. The P-values are reported for the two tests. Significance levels: 0.01***, 0.05**, 0.1*.

finding of institutional and regulatory quality being an important factor affecting the investors' decision. The interactions have the expected negative signs and are statistically significant. This result is robust when including the interaction with the grouped governance indicator on government efficiency.

As for the magnitude of the coefficients, all regressions suggest that the effect of institutional and regulatory quality on investment flows is larger for Greece than for the transition economies. For instance, the impact of *Regulatory Quality* appears to be much higher on foreign investments going to Greece than to the rest of the sample countries. The same conclusion is reached when the measures on *Government Effectiveness* and the *Rule of Law* are used. Including these interactions has little impact on the signs or significance levels of the other explanatory variables, so that the estimated coefficients are similar to those of the previous table. Overall, the results contradict the general argument that institutional and regulatory variables might be important determinants of FDI in transition economies, but less so in the more mature economies such as Greece. The quality of institutions is, in fact, an even more important factor in the decision of foreign investors to expand their operations in this country.

TABLE 53
FDI & Institutions (cont.)

	(1) GE	(2) RQ	(3) RL	(4) CC	(5) PF	(6) GEE
FDI	0.666 (0.080)***	0.601 (0.099)***	0.690 (0.076)***	0.545 (0.128)***	0.653 (0.090)***	0.655 (0.082)***
Size	0.175 (0.073)**	0.203 (0.096)**	0.145 (0.062)**	0.183 (0.071)***	0.154 (0.061)**	0.173 (0.069)**
Age	-0.114 (0.071)	-0.090 (0.084)	-0.133 (0.055)**	-0.082 (0.121)	-0.142 (0.072)**	-0.186 (0.075)**
Profits	-0.003 (0.003)	-0.002 (0.003)	-0.003 (0.003)	-0.001 (0.002)	-0.002 (0.003)	-0.002 (0.003)
R&D	0.094 (0.025)***	0.086 (0.029)***	0.098 (0.024)***	0.072 (0.029)**	0.091 (0.028)***	0.076 (0.027)***
Operating Costs	-0.0001 (0.000)	-0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)	0.0001 (0.000)
Loans	-0.322 (0.102)***	-0.260 (0.097)***	-0.312 (0.101)***	-0.212 (0.103)**	-0.294 (0.101)***	-0.279 (0.098)***
Taxation	-0.005 (0.010)	-0.005 (0.012)	-0.005 (0.010)	-0.012 (0.010)	-0.005 (0.010)	-0.004 (0.011)
GDP per capita	1.024 (0.291)***	0.981 (0.302)***	1.041 (0.295)***	2.098 (0.589)***	1.214 (0.326)***	1.288 (0.301)***
GDP growth	0.001 (0.006)	-0.003 (0.006)	0.001 (0.005)	-0.011 (0.010)	-0.003 (0.007)	-0.001 (0.006)
Trade Openness	-0.525 (0.596)	0.056 (0.516)	-0.589 (0.699)	-2.052 (1.073)*	-0.772 (0.8.35)	-0.620 (0.604)
Inflation	-0.005 (0.002)***	-0.006 (0.002)***	-0.007 (0.002)***	-0.008 (0.002)***	-0.007 (0.002)***	-0.006 (0.002)***
Institutions×GR	-0.583 (0.202)***	-0.480 (0.201)**	-0.634 (0.236)***	-0.276 (0.222)	-0.720 (0.241)***	-0.702 (0.230)***
Institutions×HR	-0.155 (0.096)	-0.130 (0.078)*	-0.128 (0.092)	-0.838 (0.468)*	-0.150 (0.103)	-0.159 (0.137)
Institutions×RO	-0.158 (0.062)**	-0.187 (0.069)***	-0.153 (0.064)**	-0.088 (0.278)	-0.173 (0.093)*	-0.125 (0.082)
Constant	-4.939 (1.798)***	-4.492 (1.885)**	-5.051 (1.845)***	-12.534 (4.330)***	-6.103 (1.962)***	-6.761 (1.942)***
Sargan test	0.104	0.129	0.174	0.067	0.085	0.186
Arellano-Bond test	0.260	0.243	0.265	0.295	0.281	0.227

Values in the parentheses are WC-Robust Standard Errors. No.Obs.: 3,196. The P-values are reported for the two tests. Significance levels: 0.01***, 0.05**, 0.1*.

6.5. Discussion

Foreign investments are in the focus of most governments around the world. In order to be able to set a policy agenda, which is successful in promoting FDI, it is necessary to understand the determinants of this phenomenon. Using firm-level data for four economies in SEE, the importance of a wide range of institutional and regulatory variables as determinants of FDI was explored. The objective of this chapter was essentially the analysis of the effectiveness of various policies applied by the host countries in order to attract FDI. The main advantages and weaknesses related to FDI flows for four SEE economies were identified and compared, so as to illustrate the impact of fundamental characteristics of governance and business environment on the magnitude of foreign investments. The examination of how much the policy environment in the SEE matters for FDI was then the main focus of this chapter.

The obtained results show that better institutions and regulations have overall a positive and significant effect on foreign investments. Government effectiveness, the rule of law and the control of corruption play an essential role in attracting FDI. This means that in addition to its direct influence on the economic performance of a SEE country, institutional and regulatory quality also affects the economy indirectly, through its impact on the level of FDI. It would be, therefore, wise to examine further the extent of this impact and incorporate the findings into a development strategy. Other firm- and country- specific variables, such as size, age, R&D intensity and GDP per capita were also proved to have a statistically significant influence on foreign investments. These results are robust to different specifications and institutional or regulatory variables.

As far as the policy implications are concerned, the results of the analysis point to the role of the state as an institutional and regulatory builder. In this role, the governments of SEE economies should focus primarily on creating a good legal system. In the past decade, most FDI has gone to the economies that managed to establish an efficient and transparent legal system and had relatively stable political and economic conditions. As institutions converge in the region, governments should pay particular attention so as to retain their foreign investments.

CHAPTER 7

FIRMS' MARK-UPS IN FOOD SUPPLY CHAINS

7.1. Market Power in Food Systems

As already mentioned, the nature of the food supply chain has been substantially affected by the widespread consolidation and globalisation of retail and procurement markets. Processors may traditionally have driven food distribution by implementing intensive brand policies and then using a network of wholesalers and retailers to sell and distribute goods to consumers, though currently retailers have strengthened their position. The balance of power in the food system is effectively shifting from processors to global retailers, due to fundamental factors such as increased concentration and the development of sophisticated information technology. The associated structural changes that are occurring along the food supply chain have, though, broad socio-economic impacts, as they undoubtedly affect not only consumers, but also agricultural producers, food processors and wholesalers.

Global retailers experience economies of scale, lower costs and higher profits, so that a competitive price cutting behaviour as well as improved efficiency and service can be considered potential benefits. However, there may be cause for concern that consolidation and globalisation can facilitate retailers' ability to exercise market power as buyers and sellers, dictating higher prices and less variety for the consumers, and lower prices for food suppliers. Agricultural producers are forced to cut margins both from retailers, who directly buy food products, and from processors, who intend to share the burden raised by retailers' buying power. Processors and retailers also impose separately their mark-ups, increasing profits by raising prices under competitive pressures. The rising trend of food prices may further affect consumers' welfare, increase government expenditure and limit economic growth. The analysis of retailers' mark-ups has, therefore, received enormous attention in the economic literature.

According to McKinsey (2003), the entry of global retailers has a positive impact on consumers' prices, though this is not necessarily the case for all products (e.g. Schwentesius and Gomez, 2002). Concentration may be associated with increased prices, whereas the presence of global retailers has dampened the performance of local retailers by introducing higher competitive pressures (Durand, 2007). Moreover, various case studies conclude that there may be a strong relationship between the presence of global retailers and the performance of food suppliers, though the direction of such a relationship is still an open question (e.g. Chavez, 2002; Javorcik, Wolfgang and Tybout, 2006). Overall, the conventional wisdom that retailers have grown more powerful relative to all other actors involved in the food supply chain has not been supported by empirical analyses of their relative profitability (Ailawadi, 2001). The impact of consolidation and shifts of power on firm performance and market structure is not clear *a priori*, and as a result, there has been considerable debate over the appropriate policy treatment towards retailers' market power.

Previous research has examined whether ownership and increased competitive pressure affect food retailers' market power, measuring firm performance either by sales growth, labour productivity or total factor productivity. The potential problem of endogeneity related to the explanatory variables may however arise in the models used to analyse these effects. For instance, unobserved productivity shocks may have an impact both on the input factors and the output that can result in biased estimates of total factor productivity. The approaches proposed to overcome this problem by Olley and Pakes (1996) and Levinsohn and Petrin (2003) require the inclusion of exogenous instruments (e.g. investment or material inputs), that are difficult to select; whereas the methods introduced by Berry, Levinsohn and Pakes (1999) and Verboven (2002) require data for prices in order to estimate demand functions. In this chapter, firm performance is measured as the price-cost margins, that are estimated using a method proposed by Roeger (1995), based on which endogeneity problems and data requirements are avoided.

To analyse then whether all actors involved in the food supply chain deviate from the pricing behaviour that exists under perfect competition, the properties of the primal and dual Solow residuals are exploited, estimating consistently firms' mark-ups without instrumentation. In addition, the nominal values of the input and output variables are used, without having to find good deflators, and the assumption of constant returns to scale is relaxed following Dobrinsky *et al.* (2004). The firm-level data are retrieved from the *Amadeus* database, which is

compiled by a commercial data provider, *Bureau van Dijk*, and contains actual company account data. The sample consists of 2,910 firms of the food supply chain for the case of Greece and data are available for the period 1998-2007.

7.2. Price-Cost Margins

As the changing patterns of retail competition may affect food suppliers' competition and economic welfare, this section builds upon previous empirical research methods and insights from new industrial organisation studies to analyse market dynamics in the food supply chain.[11] In particular, a method proposed by Roeger (1995) for the price-cost margins estimation is employed, which is based on Hall's (1988) method of estimating mark-ups and on exploiting the properties of the primal and dual Solow residuals. The difference between the two residuals is essentially explained as a result of imperfect competition and by subtracting the two residuals from each other; the unobservable productivity term cancels out, avoiding the problem of endogeneity.

The main intuition is that the mark-up term is embodied in the measurement of total factor productivity growth, which is the output growth not accounted for by the growth in input factors. Using this method, the price-cost margins can be estimated consistently avoiding potential correlations between the unobserved productivity shocks and the input factors of production. Consider a log-linear homogenous production function $Q_{it} = F(K_{it}, L_{it}, M_{it})\ \Theta_{it}$, for output, Q_{it} where K_{it}, L_{it} and M_{it} are capital, labour and material inputs, and Θ_{it} is a shift variable representing changes in productivity efficiency of firm i at time t (a Hicks neutral technological progress). If price exceeds marginal cost, the input shares per unit of output do not sum to one, but are lower because of the existence of a mark-up factor. This mark-up as well as the technology components can be decomposed from the Solow residuals.

Based on the aforementioned production function and assuming imperfect competition, the primal Solow residual is derived after log-differentiation as follows:

$$SR_{Pit} = \Delta q_{it} - (1 - \alpha_{Lit} - \alpha_{Mit})\Delta k_{it} - \alpha_{Lit}\Delta l_{it} - \alpha_{Mit}\Delta m_{it} = (1 - \beta_{it})\Delta \partial_{it} + \beta_{it}\,(\Delta q_{it} - \Delta k_{it}) \qquad (7.1)$$

[11] Tybout (2003) provides an overview of the methods used to estimate mark-ups using firm-level data.

where $\alpha_{(L,M)it}$ is the revenue share of the respective factor and β_{it} is the Lerner index, which is closely related to the price-cost mark-up μ_{it}, as $\beta_{it} = 1 - 1/\mu_{it}$, assuming constant returns to scale. Dobrinsky *et al.* (2004) further show that in the case of variable returns to scale, the Lerner index can be denoted by $\beta_{it} = 1 - \lambda_{it}/\mu_{it}$, where λ_{it} is the returns to scale index.

The dual or priced-based Solow residual is derived by a general cost function associated with the production function, assuming that the change in marginal cost is a weighted average of changes in input prices with respect to their relative cost shares, minus the effect of technological innovation. That is defined as:

$$SR_{Dit} = (1 - \alpha_{Lit} - \alpha_{Mit})\Delta r_{it} + \alpha_{Lit}\Delta w_{it} + \alpha_{Mit}\Delta p_{mit} - \Delta p_{it} = (1 - \beta_{it})\Delta \partial_{it} - \beta_{it}\,(\Delta p_{it} - \Delta r_{it}) \quad (7.2)$$

where r_{it} is the growth rate of the rental price of capital, w_{it} is the growth rate of wages, and p_{mit} and p_{it} are the growth rates of material prices and output, respectively.

Subtracting equation (7.2) from (7.1) and adding an error term, ε_{it}, the unobservable productivity term $(1 - \beta_{it})\Delta\partial_{it}$ cancels out. The following equation can be, therefore, estimated to yield consistent estimates of the price-cost mark-up:

$$\begin{aligned}&[(\Delta p_{it} + \Delta q_{it}) - (\Delta r_{it} + \Delta k_{it})] = \\ &= \mu_{it}\,\{\alpha_{Lit}\,[(\Delta w_{it} + \Delta l_{it}) - (\Delta r_{it} + \Delta k_{it})] + \alpha_{Mit}\,[(\Delta p_{Mit} + \Delta m_{it}) - (\Delta r_{it} + \Delta k_{it})]\} + \varepsilon_{it}\end{aligned} \quad (7.3)$$

where the right-hand side is, in fact, the Solow residual measuring all variables in nominal terms.

To estimate equation (7.3), a simplified version of this expression can be denoted by:

$$\Delta y_{it} = \alpha_i + \mu_{it}\Delta x_{it} + \varepsilon_{it} \quad (7.4)$$

where y_{it} can be interpreted as the growth rate in output per value of capital in firm i; and x_{it} as a composite variable that represents the growth rates in the various input factors weighted by their respective shares in total output. A white noise error term is also included due to a possible mis-measurement of labour input or of the rental price of capital. The average price-cost margin is captured by μ_{it}, and α_i stands for an unobservable firm-level fixed effect that captures firm heterogeneity.

In this framework, sales are used as the output variable, whereas capital is

denoted by tangible fixed assets and labour input is measured as the number of employees. The rental price of capital is calculated using the following equation:

$$r_{it} = (e_{it} + \delta_{it}) \times p_i \tag{7.5}$$

where p_i stands for the index of investment goods prices, measured at a country-level[12], e_{it} is the interest paid at a firm-level, and δ_{it} is the depreciation ratio measured at a firm-level as well.[13] The industry-specific wage expenditure is used for wages, due to the lack of the wage expenditure variable. The variable called cost of goods sold is also used for the material inputs. Following Levinsohn (1993), it is further assumed that the mark-ups are the same for all firms within the same sector. The estimation of a separate mark-up for each firm is not possible, as there would not be available enough degrees of freedom. Deflation of variables using price indices is no longer needed; whereas the use of company account data implies that the financial flows associated with individual food products cannot be traced, though food actors may be multi-product firms. It is, therefore, assumed that if a firm has market power over one of its products, it is likely to have market power over its other products as well. Alternatively, the estimates of mark-ups can be reviewed as an average firm effect, assessing whether global food actors affect the average market power of the different elements in the supply chain.

Consequently, the estimated mark-ups will reflect competitive pressures in the food market, though increased competition may partially stem from conduct rules imposed by policy makers and other sources such as foreign direct investments (FDI) and consumer preferences. If global retailers achieve cost savings without reducing food prices, this would result in a higher price-cost margin. The relative performance of the food actors will be, therefore, examined as a function of the ownership structure, where performance is measured as the firms' price-cost margin. The effect of increased competitive pressure on market power will also be examined, as the pricing behaviour of firms is affected. According to Sutton (1991), a negative relationship exists between the number of firms in an industry and the price-cost margin; there is though evidence that concentration can be positively related to mark-ups (Domowitz, *et*

[12] From the AMECO database, European Commission.
[13] From the STAN database, OECD.

al., 1988). The following model is effectively estimated:

$$\Delta y_{it} = \alpha_i + \mu_1 \Delta x_{it} + \mu_2 [\Delta x_{it} \times FDI_{it}] + \mu_3 [\Delta x_{it} \times H_{jt}] + b_1 FDI_{it} + b_2 H_{jt} + b_3 d_t + u_{it} \quad (7.6)$$

where the dependent variable represents the difference between the Solow residuals; FDI_{it} is a dummy equal to one if the firm is owned by more than 10% by foreign shareholders in year t; and H_{jt} stands for the three digit Herfindahl index of concentration in sector j in year t. The coefficients μ_1 and μ_2 refer to changes in price-cost margins associated with globalisation and competition pressure, so that, for instance, the total mark-up of global food actors is equal to $\mu_1 + \mu_2$. The ownership and competition variables are also included separately to capture any difference between the primal and dual Solow residuals that is not explained by market power. A white noise error term is, finally, included as above, as well as year dummies, d_t, to control for common aggregate shocks. Equation (7.6) is estimated using OLS and fixed effects estimators. Random effects were also estimated, though the Hausman test rejected this model in favour of the fixed effect model. The latter may then capture any unobserved firm-level heterogeneity and measurement error that is constant over time.

7.3. Food Actors' Characteristics

The firm-level data used in this chapter are retrieved from the Amadeus database that consists of company accounts reported to national statistical offices for European firms in 35 countries. This dataset essentially contains firms' balance sheets, the profit and loss accounts, and information on stocks, shareholders, subsidiaries and activities. Table 54 presents the summary statistics of the variables used in the empirical estimations for each element of the food supply chain. After deleting firms with missing information, the full sample includes the unbalanced panel data on 2,910 firms for the period 1998 to 2007. In particular, the sample is composed of 199 agricultural firms, 1,361 food and beverage processing firms, 1,113 wholesalers of food products and 237 food retailers.

The majority of the firms were established after 1990, although the dates of establishment for the overall sample range between 1915 and 2006. In terms of firm size, small firms comprise the clear majority of the sample (about 46%), with an almost equal proportion of medium firms along the various elements of

TABLE 54
Food actors' characteristics

	Mean	Std Dev	Min	Max	No.Obs.
Agricultural firms					
Sales	5,857	12,420	51	141,069	1,520
Tangible fixed assets	2,531	5,008	37	65,669	1,509
Employment	44	122	1	1,070	1,508
Material cost	4,891	10,807	41	129,453	1,450
Herfindahl index	0.036	0.012	0.023	0.069	1,520
Years of operation	17	13	1	84	1,520
Food processing					
Sales	8,004	31,012	56	686,600	10,634
Tangible fixed assets	3,017	11,262	48	342,621	10,612
Employment	50	137	1	2,850	10,564
Material cost	5,336	18,643	53	336,316	10,015
Herfindahl index	0.015	0.004	0.011	0.024	10,634
Years of operation	15	12	1	92	10,634
Wholesale					
Sales	6,618	15,281	63	281,006	7,746
Tangible fixed assets	669	2,037	34	37,133	7,551
Employment	14	22	1	232	7,680
Material cost	5,334	12,093	58	217,063	7,534
Herfindahl index	0.008	0.002	0.006	0.012	7,746
Years of operation	14	9	1	81	7,746
Retail sale					
Sales	30,797	130,503	157	1,899,111	1,701
Tangible fixed assets	6,734	42,238	40	729,342	1,687
Employment	193	815	1	11,500	1,698
Material cost	22,499	93,532	72	1,349,756	1,692
Herfindahl index	0.087	0.097	0.073	0.099	1,701
Years of operation	14	8	1	67	1,701

Note: Values are expressed in thousands of €.

the supply chain (8%). The retail sector has the highest shares of large and very large firms (10 and 12%, respectively), whereas there are no wholesalers with more than 250 employees. Concerning foreign investments, it should be noted

that about 74% of these originate from other EU countries, and 11% of the reported investments are from the United States. The Netherlands and the United Kingdom are the first two European countries from where foreign investments originate, followed by France. Switzerland appears to have the majority of the investments in the sample for countries of the rest of the world. Moreover, the average Herfindahl index in 1998 is 0.242 in the processing sector, and in 2007, it appears to be reduced at a rate of 0.116. This compares to an average Herfindahl index of 0.363 and 0.079 for the agricultural and wholesale sectors over the examined period. The retailing sector, though, is becoming more competitive over time, with an exception of the last two years, whereas the average index is much higher than for the rest of the food actors (0.868).

It should be, finally, noted that the sample contains a significant share of the entire population of medium and large firms in the Greek food supply chain over the period 1998-2007. In particular, the firm-level data for the food processing sector account on average for about 85% of the total employment and 77% of total gross turnover as compared to the aggregated data retrieved from Eurostat. The data also cover most of the total employment and turnover in the retail sector (54% and 45%, respectively). In terms of the wholesale and agricultural sectors, these shares appear to be lower, as expected, due to the fact that the majority of firms operating in the local market are not obliged to publish account data. Nevertheless, the *Amadeus* data are quite representative as 33% and 11% of total turnover is covered in the wholesale and agricultural sectors, respectively.

7.4. Mark-ups' Estimation

In Table 55, the estimation results of equation (7.4) are presented. The average market power is reported for the entire food supply chain and for each actor separately. The average market power in the food supply chain, with an estimated Lerner index of 10.1%, is much higher than the estimated market power of 3.8% obtained when assuming variable returns to scale. In any case, as the Lerner index is bounded between 0 and 1 with lower values representing a higher degree of competition, food retailers appear to have a rather high market power in comparison to the other actors of the supply chain. The regression results also show that imperfect competition explains more than 95% of the difference between the primal and dual productivity measures with significant mark-ups for all elements of the food supply chain. The generally excellent fit of

TABLE 55
Firms' mark-ups

	Food supply chain **(1)**	*Agricultural firms* **(2)**	*Food processing* **(3)**	*Wholesale* **(4)**	*Retail sale* **(5)**
β_{VRS}	0.038	0.047	0.128	0.122	0.202
β_{CRS}	0.101	0.003	0.102	0.095	0.169
μ	1.112 (0.003)	0.997 (0.015)	1.113 (0.005)	1.105 (0.005)	1.203 (0.007)
$\bar{R}^2$	0.863	0.774	0.834	0.872	0.950
No.Obs.	19.084	1.369	9.574	6.650	1.491
μ_{1999}	1.185 (0.010)	1.120 (0.031)	1.163 (0.019)	1.194 (0.013)	1.218 (0.014)
μ_{2000}	1.104 (0.011)	0.840 (0.065)	1.074 (0.017)	1.135 (0.016)	1.195 (0.017)
μ_{2001}	1.048 (0.012)	1.087 (0.049)	1.154 (0.016)	0.984 (0.021)	1.007 (0.041)
μ_{2002}	1.126 (0.009)	0.959 (0.038)	1.138 (0.014)	1.115 (0.015)	1.236 (0.046)
μ_{2003}	1.117 (0.010)	1.012 (0.045)	1.036 (0.016)	1.151 (0.015)	1.277 (0.015)
μ_{2004}	1.139 (0.009)	1.117 (0.042)	1.185 (0.013)	1.122 (0.015)	1.128 (0.032)
μ_{2005}	1.106 (0.009)	0.937 (0.043)	1.217 (0.014)	1.087 (0.015)	1.263 (0.012)
μ_{2006}	1.079 (0.009)	0.881 (0.041)	1.112 (0.015)	1.058 (0.015)	1.265 (0.017)
μ_{2007}	1.076 (0.009)	0.985 (0.042)	0.963 (0.016)	1.113 (0.013)	1.259 (0.010)

Values in the parentheses are standard errors. All estimations are statistically significant at 0.01.

these equations suggest then that imperfect competition might be the cause of this discrepancy.

The estimated mark-ups are also reported year by year to trace their evolution over time. The panel estimation results are similar to those obtained for a single-year estimation. The estimated mark-up ratios range from 1.01 in 2001 to 1.28 in 2003 for the case of retailing. Using price-cost margins as a measure of market power, it is obvious that competition has increased significantly more in the retailing sector. This becomes evident by comparing columns (2) to (5). The results indicate that the firms' mark-ups, based on single year estimates,

tend to display some time variability, which may be attributed to cyclical factors or to a changing level of competitive pressure within the sectors.

Overall, the results support the general view that prices exceed marginal cost in food retailing more than in food processing, whereas there is no perfect competition in any of the sectors of the food supply chain. The estimates also suggest substantially lower mark-ups for agricultural producers and wholesalers. Another interesting result concerns the magnitude of the mark-up ratios in the regressions over time. All actors apart from retailers appear then to price closer to marginal costs, being more concerned with maximising social welfare. An alternative interpretation may be that the food suppliers and wholesalers have higher costs than retailers.

Concerning the impact of globalisation and competitive pressure on market power, it appears in Table 56 that the estimate of the mark-up ratio for the entire food supply chain is about the same estimate. In the second column, the average mark-up is estimated at 1.10. However, the price-cost margin varies with the level of foreign interest and concentration in the various sectors. Sectors with higher Herfindahl index of concentration are characterised by high market power, as expected. For instance, the coefficient of 0.29 for the retail sector suggests that a reduction in product market concentration of a percentage point is equivalent to a reduction in the average price-cost margin of 2.9 percentage points. It is also indicated that domestically owned firms have lower price-cost margins relative to foreign-owned firms, captured by μ_2. The point estimate of 0.013 for the processing sector suggests that foreign ownership is associated with an average price-cost margin of 1.076. Consequently, foreign-owned firms have better performance measured in terms of their price-cost margins, as they are better in cutting costs relative to domestic firms. Moreover, the fixed effects estimations suggest that sales are positively and significantly related to globalisation, though market concentration does not have a significant impact.

Taking into account the possibility of measurement errors in the input factors, concern arises related to the potential endogeneity of Δx_{it} in equation (7.6). The *general methods of moments* estimator (GMM), proposed by Arellano and Bond (1991), is therefore employed to account for this problem estimating equation (7.6) with instrumental variables. All lagged values of Δx_{it} starting from *t–2* and before are used as instruments and estimation is made in first differences to control for unobserved fixed effects. Table 57 shows the results obtained for this case. The estimated coefficients are quite different compared to

TABLE 56
Market power along the supply chain

	Food supply chain		*Agricultural firms*	*Food processing*	*Wholesale*	*Retail sale*
	OLS	*Fixed-effects*	*Fixed-effects*			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
μ_1	1.087 (0.006)***	1.101 (0.006)***	0.742 (0.066)***	1.063 (0.023)***	0.976 (0.029)***	0.947 (0.066)***
μ_2	0.013 (0.004)***	0.012 (0.004)***		0.013 (0.005)***		0.007 (0.007)
μ_3	0.138 (0.014)***	0.110 (0.015)***	0.758 (0.185)***	0.362 (0.147)**	1.719 (0.371)***	0.288 (0.076)***
FDI	-0.004 (0.003)	0.171 (0.090)*		0.179 (0.097)*		0.103 (0.269)
Herfindahl index	-0.003 (0.002)	-0.009 (0.015)	0.144 (0.163)	-0.121 (0.212)	0.763 (0.613)	0.449 (0.519)
Constant	0.074 (0.022)***	0.063 (0.057)	-0.617 (0.800)	0.287 (0.439)	-0.697 (0.615)	-3.358 (3.977)
R^2	0.863	0.825	0.776	0.790	0.873	0.943
No.Obs.	11.065	11.065	1.369	9.574	6.650	1.491

Values in the parentheses are standard errors. Significance levels: 0.01***, 0.05**, 0.1*. Year dummies were also included in the estimations.

those already reported, though a significant increase in mark-ups is still found due to globalisation, and concentration. The Sargan test confirms the instrument validity in all cases and the second order serial correlation test does not reject the model.

To further control for any dynamics in the mark-ups, an alternative approach to measuring market power is used following Tybout (2003). The so-called observed firm-level *price-cost margin* (PCM) is defined as sales net of expenditures on labour and materials over sales. That is:

$$PCM_{it} = \frac{P_{it} Q_{it} - P_{Mit} M_{it} - P_{Lit} L_{it}}{P_{it} Q_{it}} \tag{7.7}$$

so that the following equation can be estimated:

$$PCM_{it} = \gamma_i + \gamma_1 PCM_{it-1} + \gamma_2 (K_{it} / P_{it} Q_{it}) + \gamma_3 FDI_{it} + \gamma_4 H_{jt} + \gamma_5 d_t + \varphi_{it} \tag{7.8}$$

where γ_i is the unobserved firm-level fixed effect and φ_{it} is a white noise error term. The lagged dependent variable is included to control for the possibility that price-cost margins are mean-reverting. As additional controls, the capital to sales ratio is included, as well as the globalisation and concentration variables and the year dummies. Equation (7.8) is estimated in first differences using GMM as in the previous case. The results are shown in columns (6) to (10) of Table 57. The point estimates suggest that the firm-level PCM is on average 11.1 percentage points higher due to globalisation, whereas concentration affects, also positively, the firm-level PCM for the overall case of the food supply chain. Similar conclusions can be derived when examining separately all elements of the supply chain, though both factors appear to have a larger impact for the case of food processing. These provide then evidence of a positive effect on firm mark-ups due to globalisation and consolidation, irrespective of the method used.

7.5. Discussion

The industrialisation of agriculture, the globalisation of food processing and distribution as well as the continued consolidation of the retailing sector are all connected. An important factor to address the socio-economic problems in the food system is to understand these supply chain dynamics. For instance, the buying power of retailers may have adverse economic effects on the viability and efficiency of food suppliers, whereas such power may go hand in hand with increased selling power and thus potentially have adverse effects on consumer welfare. As competition may be considerably distorted, Roeger's (1995) method was used in this chapter that allows deriving an expression for the difference between the primal and dual productivity measures under imperfect competition, to estimate firms' mark-ups in the food supply chain. Firm-level data were used for a period of ten years for actors involved in the Greek food supply chain to estimate price-cost margins and to analyse how these are affected by foreign ownership and increased competitive pressure.

The food retail sector is the most dynamic one in Greece, as it is rapidly changing with the emergence of global retailers and the mergers of existing firms. It is in fact increasingly concentrated, offering opportunities for firms to exert market power on both the output and input markets. The obtained results show that the concentration of food retailers increases firms' profits, and the retailing sector has become relatively more profitable and powerful than the food

TABLE 57
Market power along the supply chain (cont.)

	Food supply chain	*Agricultural firms*	*Food processing*	*Wholesale*	*Retail sale*		*Food supply chain*	*Agricultural firms*	*Food processing*	*Wholesale*	*Retail sale*
	GMM						*PCM-GMM*				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**		**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
μ_1	0.943 (0.032)***	0.392 (0.089)***	1.133 (0.058)***	1.111 (0.059)***	0.990 (0.024)***	γ_1	0.235 (0.027)***	0.291 (0.015)***	0.245 (0.028)***	0.364 (0.018)***	0.010 (0.003)***
μ_2	0.331 (0.088)**		0.061 (0.058)		0.168 (0.119)	γ_2	-0.039 (0.009)***	-0.019 (0.004)***	-0.033 (0.009)***	-0.020 (0.004)***	-0.120 (0.001)***
μ_3	0.502 (0.131)***	1.436 (0.255)***	-0.365 (0.437)	0.095 (0.732)	0.227 (0.028)***	γ_3	0.111 (0.048)**		0.105 (0.049)**		0.016 (0.013)
b_1	-0.083 (0.038)**		0.107 (0.046)**		-0.020 (0.019)	γ_4	0.027 (0.008)***	0.006 (0.003)**	0.028 (0.012)**	0.049 (0.017)***	-0.017 (0.004)***
b_2	-0.031 (0.018)*	-0.215 (0.056)***	-0.888 (0.297)***	2.217 (0.880)**	0.029 (0.009)***						
Constant	0.046 (0.045)	0.651 (0.158)***	1.444 (0.492)***	-1.949 (0.779)**	-0.225 (0.076)***	*Constant*	0.057 (0.026)**	0.093 (0.009)***	0.076 (0.029)***	0.059 (0.017)***	0.294 (0.029)***
Sargan test	0.055	0.060	0.141	0.324	0.154	*Sargan test*	0.094	0.372	0.075	0.168	0.177
Autocorrelation test	0.150	0.262	0.289	0.739	0.054	*Autocorrelation test*	0.259	0.548	0.212	0.763	0.765
No.Obs.	9.465	1.167	8.209	5.560	1.256	*No.Obs.*	10.707	1.311	9.249	6.600	1.458

Values in the parentheses are standard errors. Significance levels: 0.01***. 0.05**. 0.1*. Year dummies (not reported in this table) were also included in the estimations.

processing sector. Moreover, processors, agricultural producers and wholesalers have lower price-cost margins than retailers. To check the robustness of the results, the importance of correcting mark-up estimates by the returns to scale factor was also highlighted, as the measurement bias induced by the assumption of constant returns to scale was also taken into consideration. Firms' mark-ups were further examined using GMM estimators and the observed firm-level PCM. The results are robust to various estimation techniques and specifications that control for firm-specific attributes inherent to the food supply chain.

As far as the policy implications are concerned, the results of the analysis indicate that increased concentration in food retailing has resulted in food prices increases, as retailers get their products at lower prices but they do not pass those cost savings on to consumers. If consolidation is then allowed to continue further, food prices are likely to increase in the long-term because competition among top retailers will decrease. Appropriate policies should be developed ensuring that retailers do not exchange price information, while tackling anti-competitive behaviour of individual dominant actors involved in the food supply chain. For example, regulations concerning planning and zoning restrictions, shop opening hours and retail pricing policy might affect the increasing power of retailers.

GENERAL CONCLUSIONS & POLICY IMPLICATIONS

The food industry sector in the EU, and in Greece particularly, has been considerably restructured over the last decades. Farmers and processors are no longer the dominant actors of the food supply chain. The balance of power has shifted firmly in favour of an increasingly concentrated retail sector whose main focus is satisfying consumer expectations and demands.

Our analysis demonstrates that the task of moving food 'from farm to fork' has become very complex, involving diverse local, national and global actors. As a result, the food market is constantly evolving, driven not only by changes in consumer preferences, but also by technology, linkages between members of the food supply chains, and prevailing policies and business environments. Sophisticated supply chains and distribution channels are therefore being adopted across different regions and countries. It is further argued that a very small number of major retailers is playing an increasing role in the globalisation of food systems, affecting competition in the distribution of food products, while food processing is characterised by one of the greatest degrees of transnationality, and foreign production by food multinationals is increasing.

As the food industry sector depends enormously on agricultural products (their inputs) any changes in quality, production amount, and prices of agricultural products affects this sector. Analysis showed how Greek agriculture is affected by the new global market conditions, whereas farms are expected to concentrate on more competitive products. New technology, improved quality, health controls, environmental protection, organic and bioenergy products should be their focal point. Moreover, it is no surprise that the cost of agricultural raw materials is a particular area of concern for the food industry sector, since it often represents more than half of the production costs of food products. Furthermore, it was argued that the increasing demand for agricultural raw materials in the non-food sector, in particular biofuels, puts pressure on food markets.

In terms of food consumption, the proportion of consumer spending on food is continuing to fall and the overall size of the market for food is therefore diminishing relative to other sectors in the economy. The continuous decline in the share of household expenditure can be attributed to various driving factors

such as lifestyle changes, demographics, social conditions, income growth, food safety standards, etc. Despite the growing presence of globalised food manufacturers, local cultures and ethics of consumption have been revalued in the wake of current food scares. In other words, food consumption undergoes some kind of globalisation, though there is still the safeguarding and appreciation of regional foods. Growing concerns about food safety and nutrition are in fact leading many consumers to demand quality products that are embedded in regional ecologies and cultures. As a result, cultural diversity and tradition are the foundation of the food consumption and a key aspect for further industry development.

The major driving forces in the food supply chain were further identified with a focus on similarities and differences between the EU and Greece. It was argued that international challenges are increasing in the food systems as a result of globalisation and consolidation. It is therefore essential for food manufacturers to remain competitive and achieve sustained growth, as they are exposed to pressure from the increasingly concentrated and globally active retail sector. Particular attention should be given to institutions and regulations, as they turn out to be fundamental factors affecting foreign investments in the food processing industry.

To conclude, the food processing industry is a dynamic sector in the EU and Greek manufacturing. Some of the Greek food market advantages can be the availability of high quality raw materials; the worldwide recognition of the Mediterranean diet and its products; the potential competitive labour costs and the generous investment incentives. Nevertheless, the food retail sector is the most dynamic one in Greece, as it is rapidly changing with the emergence of global retailers and mergers of existing firms. It is in fact increasingly concentrated, offering opportunities for firms to exert market power on both the output and input markets. Appropriate policies should therefore be developed ensuring that increased concentration in food retailing will not result in further food price increases.

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