

An Analysis for the Pattern of Regional Economic Change in Greece: 1973-1984*

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The paper analyses the spatial structure of the extraction, manufacturing and electricity sectors of the Greek economy. From the static point of view, for each sector and region a location quotient is estimated. Moreover, a variation of a Gini coefficient is proposed which combines the idea of the Gini coefficient introduced in spatial economics by Hoover and that of relative concentration found in the coefficient of specialization used by Isard. From the dynamic point of view a shift-share analysis is used for the period 1973-1984. The total shift from national growth is estimated and is then decomposed into two components: a proportional shift which is explained by the regions industry mix and a competitive shift which is explained by the region's locational advantages. Moreover the contribution of each sector to these components is found. The results reveal the nature and weaknesses of the Greek regions and serve as a basis for the formation of a regional development strategy and policy.

I. Introduction

This paper attempts to analyse the spatial structure of the extraction, manufacturing and electricity sectors of the Greek economy. It can be viewed as the first step of a larger project, the second step being the measurement of the variables, and especially the policy ones, which affect this structure and the final step being, the formation of a regional development strategy and policy.

The analysis is both static and dynamic. The static methods include

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the estimation of location quotients for each sector and region and of a Gini coefficient for each region measuring the unequal distribution of the sectoral employment. From the dynamic point of view the shift-share analysis is used.

All the methods mentioned above are very popular in regional economics. Location quotients were among others used by Isard (1960). Gini coefficients in regional economics by Hoover (1936), while the shift-share analysis was introduced by Perloff et al (1960). For the Greek economy, in the past, location quotients were calculated by Chiotis (1973), Kottis (1980), Kafkalas (1984) and Katochianou (1984), while a Gini coefficient was used by Katochianou (1984) and the shift-share analysis by Andrikopoulos (1969), Chiotis (1973), Kottis (1980), Kafkalas (1984) and Katochianou (1984).

In this paper the above methods are applied for the first time to the Greek regions as defined in the Presidential Decree 51/1987 "Determination of regions for the planning and coordination of regional development" in accordance to Law 1622/1986 "Local Government. Regional Development and Democratic Programming" (Gov. Gazette 1986, 1987), which are used for the formation of the EEC's Common Regional Policy (e.g. the Greek Development Plan (1989) submitted to the EEC). The data are taken from the results of the Census of Industry of 1984, National Statistical Service of Greece (NSSG) (1987) and the corresponding Census of 1973.

From the theoretical point of view the paper proposes a variation of a Gini coefficient which combines the idea of the Gini coefficient introduced in spatial economics by Hoover (1936) and that of relative concentration found in the coefficients of specialization proposed by Isard (1960). We would argue that this coefficient is more accurate and makes better economic sense. Moreover with respect to the shift-share analysis the paper proposes a way of measuring the contribution of each sector to the total, proportional and competitive shift of a region.

Section 2 offers a theoretical description of the methods used. In Section 3 the basic empirical results are presented. Section 4 concludes and suggests some extensions of the work.

II. The Method

A. Location Quotients

Let $k = 0.1$ denote the time periods of the model, $i = 1, 2, \dots, m$ the

sectors and $j = 1, 2, \dots, n$ the regions of the economy. Let a_{ij}^k be the employment in the time period k , in sector i and region j , $a_j^k = \sum_i a_{ij}^k$ the total employment of the region j in the period k , $a_i^k = \sum_j a_{ij}^k$ the national employment of the sector i in the period k and $a^k = \sum_j \sum_i a_{ij}^k$ the total employment in the economy in the period k .

The location quotient of a sector i , in a region j , compares the share of the sector i in the region, with the share of the sector i at the national level. It is given by the formula:

$$(1) \quad Q_{ij}^k = \frac{a_{ij}^k}{a_j^k} / \frac{a_i^k}{a^k}$$

The share of the sector i in the regional employment is bigger, equal or less than the share of the same sector in the national employment if and only if the location quotient is bigger, equal or less than one.

B. Gini Coefficients

Suppose that for a region j , the location quotient of each sector has been calculated. If all the quotients are equal to one, then the employment in the region is distributed among the sectors in proportion to the national sectoral pattern, otherwise, in one sense, regional employment is concentrated in relative terms, to a few sectors. The Gini coefficient proposed here is equal to 0 in the former case and tends to 0.5 in the latter case.

To obtain the coefficient G_j of the region j , we rank the location quotients of that region from the lowest to the highest and we get the corresponding sectoral ranking. This is used to form a Lorenz curve relating the share of sector i in the regional employment $\frac{a_{ij}}{a_j}$ to the share of sector i in the national employment, $\frac{a_i}{a}$ (Fig. 1).

It is easy to find that the area of the polygon is equal to:

$$(2) \quad G_j = \frac{1}{2} - \frac{1}{aa_j} \sum_i a_i \left(A_{ij} - \frac{a_{ij}}{2} \right)$$

where A_{ij} is the cumulative employment in the region j , up to the sector of rank i , starting from the sector of the lowest rank.

C. Shift-Share Analysis

Let

$$(3) \quad r_j = \frac{a_j^1}{a_j^0} - 1$$

$$(4) \quad r_i = \frac{a_i^1}{a_i^0} - 1$$

$$(5) \quad r = \frac{a^1}{a^0} - 1$$

be the rates of change of the total employment of region i , of the national employment of the sector i , and of the total employment in the economy respectively. Moreover let

$$(6) \quad r_j' = \frac{1}{a_j^0} \sum_i r_i a_{ij}^0$$

be the expected rate of change of the total employment of region j , if every sector of the region grew at the national rate. Then

$$(7) \quad t_j = r_j - r$$

$$(8) \quad p_j = r_j' - r$$

$$(9) \quad c_j = r_j - r_j'$$

are respectively the *total shift* of the region j from the rate of change of national employment, the *proportional shift* which measures the component of the total shift which is due to the industry mix of the region (i.e. the share of each sector in the regional employment), and the *competitive shift* component, which presumably measures the locational advantages of the region relative to the other regions.

It is interesting to know which sectors contribute mostly to the total, proportional and competitive shifts. For this purpose substitute (3), (4), (5), (6) into (7), (8) and (9) and rearrange to get:

$$(10) \quad t_j = \sum_i \frac{(a_{ij}^1 - (1+r)a_{ij}^0)}{a_j^0}$$

$$(11) \quad p_j = \sum_i \frac{(r_i - r)a_{ij}^0}{a_j^0}$$

$$(12) \quad c_j = \sum_i \frac{(a_{ij}^1 - (1+r_j)a_{ij}^0)}{a_j^0}$$

Each term of the sums of the proposed formulas (10), (11), (12) measures the contribution of each sector to the total, proportional and competitive shift respectively.

III. Empirical Results

Employment data at a department (Geographic subregion) level for the sectors of the economy are available from the results of the Census of the Industry performed by the National Statistical Service of Greece (NSSG). For the purpose of this study, data were taken for the extraction, manufacturing and electricity sectors from the Census of 1984 and 1973, (NSSG, 1987, 1976) and they were aggregated at the regional level as defined by P.D. 51/1987.

Table 1 presents manufacturing employment by region and Table 2 by sector. From both tables it is clear that national employment in the sectors examined increased between 1973 and 1984 by 13.0%. From Table 1 one obtains that the most important industrial regions are the declining Attica and the growing Central Macedonia. Moreover it is clear that all the regions of Northern Greece (Western, Central and Eastern Macedonia and Thrace) are growing fastly, followed by the central regions (Central Greece, Thessaly, Epirus) and the Southern regions (Western Greece, Peloponnesos). With the exception of Crete, the Greek islands are declining. From Table 2 it is obtained that three of the four largest sectors (clothing and footwear, food, and transport equipment) are growing while the fourth (textiles) is declining.

From the census data, location quotients have been calculated for each region and sector and they are presented in Tables 3 and 4, for the years 1973 and 1984 respectively.

By inspecting the tables it is obtained that Attica, Central Macedonia and Thessaly are diversified regions and hence they have not significant

Table 1
SHARE AND CHANGE OF EMPLOYMENT BY REGION, YEARS 1973, 1984

No.	Region	1973		1984		1973-1984		Rank of Percentage Rate
		Employment	%	Employment	%	Absolute Change	Percentage Change	
1	Attica	325,036	50.6	302,320	41.7	-22,716	-7.0	12
2	Central Greece	38,799	6.1	53,259	7.4	14,460	37.3	4
3	Western Greece	28,323	4.1	35,417	4.9	7,094	25.0	7
4	Peloponnesos	24,955	3.9	29,089	4.0	4,134	16.8	8
5	Ionian Islands	5,972	1.0	5,935	0.8	-37	-0.6	10
6	Epirus	10,041	1.6	13,441	1.9	3,400	33.9	5
7	Thessaly	33,412	5.2	42,115	5.8	8,703	26.0	6
8	Eastern Macedonia and Thrace	17,877	2.8	34,638	4.8	16,761	93.8	1
9	Central Macedonia	100,883	15.7	143,983	19.7	43,100	42.7	3
10	Western Macedonia	19,381	3.0	27,693	3.8	8,312	42.9	2
11	North Aegean Islands	11,205	1.8	10,831	1.5	-374	-3.3	11
12	South Aegean Islands	8,171	1.3	7,390	1.0	-781	-9.6	13
13	Crete	18,412	2.9	19,642	2.7	1,230	6.7	9
	TOTAL	642,467	100.0	725,753	100.0	83,286	13.0	

Source: Calculated from data taken from the results of the Census of Industry of 1973, 1984.

Table 2
SHARE AND CHANGE OF EMPLOYMENT BY SECTOR, YEARS 1973, 1984

Ind. Code	Sector	1973		1984		1973-1984		
		Employment	%	Employment	%	Absolute Change	Percentage Change	Rank of Percentage
11	Lignite extraction	4,135	0.7	5,232	0.7	1,097	26.5	10
12	Metallic mineral extr.	3,242	0.5	3,275	0.5	33	1.0	22
13	Hydrocarbonate and natural gas	1	0.0	507	0.1	506	50,600.1	1
14	Quarrying	9,817	1.5	6,953	1.0	-2,864	-29.2	27
15	Misc. quarrying and mining	6,407	1.0	5,306	0.7	-1,101	-17.1	26
16	Salterns	314	0.0	331	0.0	17	5.4	19
20	Food	89,283	13.9	99,412	13.7	10,129	11.3	14
21	Beverages	12,306	1.9	14,060	1.9	1,754	14.3	12
22	Tobacco	9,048	1.4	10,224	1.4	1,176	13.0	13
23	Textiles	68,419	10.6	65,548	9.0	-2,871	-4.2	24
24	Clothing and footwear	72,028	11.2	96,908	13.3	24,880	34.5	7
25	Wood and cork	34,407	5.4	33,533	4.6	-874	-2.5	23
26	Furniture	29,441	4.6	31,678	4.4	2,237	7.6	16
27	Paper	7,971	1.2	10,853	1.5	2,882	36.2	5

Table 2 (Continued)

Ind. Sector Code	1973		1984		1973-1984		Rank of Percentage
	Employment	%	Employment	%	Absolute Change	Percentage Change	
28	15,962	2.5	17,515	2.4	1,553	9.7	15
29	13,059	2.0	17,116	2.4	4,057	31.1	8
30	15,831	2.5	20,713	2.9	4,882	30.8	9
31	20,254	3.2	27,541	3.8	7,287	36.0	6
32	3,765	0.6	5,839	0.8	2,074	55.1	2
33	37,465	5.8	39,519	5.4	2,054	5.5	18
34	7,859	1.2	10,749	1.5	2,890	36.8	4
35	47,849	7.5	51,370	7.1	3,521	7.4	17
36	23,698	3.6	24,232	3.3	534	2.3	20
37	30,475	4.8	28,699	4.0	-1,776	-5.8	25
38	52,807	8.2	66,385	9.1	13,578	25.7	11
39	12,104	1.9	12,253	1.7	149	1.2	21
40	14,520	2.3	20,002	2.8	5,482	37.8	3
TOTAL	642,467	100.0	725,753	100.0	83,286.0	13.0	

Source: Calculated from data taken from the results of the Census of Industry of 1973, 1984.

Table 3
LOCATION QUOTIENTS BY REGION AND SECTOR, YEAR 1973

CO- S E C T O R	Central : Western		Peloponnese : Ionian		Eastern Macedonia : Thessaly		Central : Macedonia		Western : Macedonia		South Aegean : Islands		North Aegean : Islands		Crete
	Attica : Greece	Greece	Peloponnese : Islands	Ionian	Eastern Macedonia : Thessaly	Thessaly	Central : Macedonia	Macedonia	Western : Macedonia	Macedonia	South Aegean : Islands	Islands	North Aegean : Islands	Islands	
11 : Lignite extraction	0.80	5.00	0.21	2.18				0.08	19.04						
12 : Metallic mineral extr.	0.26	12.75	0.04	6.05				0.63	1.04					0.84	
13 : Hydrocarbonate and natural gas															
14 : Quarries	0.56	1.15	1.14	1.35				3.13	1.41					6.49	2.28
15 : Misc. quarrying and mining	0.14	6.24	0.00	0.68				2.51	0.08					7.34	
16 : Salters	0.03	0.37	8.35	0.00				4.12	0.85					4.78	16.05
20 : Food	0.54	0.89	1.55	2.63				1.47	1.28					1.11	2.40
21 : Beverages	0.80	0.42	2.71	1.48				1.16	0.80					1.61	2.26
22 : Tobacco	0.69		1.31	2.80				3.14	2.38					0.16	0.02
23 : Textiles	1.12	0.92	1.63	0.33				0.32	1.16					0.69	0.27
24 : Clothing and footwear	0.07	0.25	0.95	0.67				1.24	0.82					1.06	0.94
25 : Wood and cork	0.84	1.45	1.12	1.39				2.39	1.21					1.16	1.69
26 : Furniture	1.11	0.41	0.55	0.46				1.04	1.21					0.30	0.95
27 : Paper	1.20	0.46	4.00	1.04				0.98	0.40					0.87	1.40
28 : Printing and Publishing	1.63	0.13	0.55	1.04				0.67	0.87					0.05	0.01
29 : Leather	0.55	0.07	0.35	0.28				0.42	0.39					6.28	0.45
30 : Rubber and plastic products	1.38	1.00	1.00	0.30				0.19	0.39					0.12	3.31
31 : Chemicals	1.50	0.53	0.35	0.12				0.24	0.94					0.12	0.83
32 : Products of petroleum and coal	1.42	0.66	0.31	1.78				1.29	0.46					0.07	0.31
33 : Non-metallic mineral products	0.82	2.07	1.28	1.03				0.91	0.84					0.16	0.38
34 : Basic Metal industries	0.95	0.70	0.70	1.31				1.18	0.89					1.12	1.17
35 : Metal Products	1.03	1.29	0.89	0.92				1.40	0.54					0.55	0.88
36 : Machinery (non-electrical)	1.16	0.32	1.19	0.78				0.89	0.82					0.30	0.42
37 : Electrical supplies	1.43	1.26	0.30	0.89				0.70	0.84					0.17	0.11
38 : Transport equipment	1.32	0.45	0.63	0.54				0.22	0.72					0.66	0.22
39 : Miscellaneous ma	1.36	0.32	0.57	0.80				0.80	0.85					1.53	0.44
41 : Electricity and gas	1.19	0.73	0.93	1.19				0.69	0.74					1.57	0.59
								0.40	0.51					2.10	1.00

Table 4
LOCATION QUOTIENTS BY REGION AND SECTOR, YEAR 1984

Ind. Code	S E C T O R	Attica	Central Greece	Western Greece	Peloponnese	Ionian Islands	Thessaly	Eastern Macedonia and Thrace	Central Macedonia	Western Macedonia	South Aegean Islands	North Aegean Islands	Crete
11	Lignite extraction	0.87	0.53	0.03	4.79	0.00	0.00	0.03	0.82	20.79	0.00	0.00	0.00
12	Metallic mineral extr.	0.38	8.16	0.00	0.00	0.00	0.79	0.35	0.02	1.89	0.58	0.00	0.00
13	Hydrocarbonate and natural gas	0.95	0.90	0.40	0.00	0.00	3.68	3.75	0.10	0.08	0.00	0.00	0.00
14	Quarrying	0.19	1.26	1.06	1.78	2.87	3.53	3.62	0.46	1.45	4.47	3.90	2.15
15	Misc. quarrying and mining	0.07	6.08	0.00	0.16	0.00	0.08	0.77	2.03	2.22	3.24	0.14	0.00
16	Salters	0.00	0.00	4.08	0.00	15.00	1.95	1.67	1.82	0.00	5.33	18.00	0.00
20	Food	0.64	0.78	1.34	2.10	2.25	1.62	1.40	1.23	0.37	1.04	1.98	1.91
21	Beverages	0.84	0.68	2.28	1.33	2.50	0.80	0.93	0.84	0.33	2.70	2.47	3.00
22	Tobacco	0.59	0.09	1.43	3.12	0.00	0.08	0.04	1.97	0.00	0.00	0.00	0.00
23	Textiles	0.97	1.03	1.72	0.84	0.17	1.04	3.54	1.31	0.11	0.61	0.50	0.36
24	Clothing and footwear	1.05	0.13	0.92	0.42	0.26	0.61	0.36	1.53	0.25	0.67	0.38	0.57
25	Wood and cork	0.89	1.30	1.64	1.52	2.34	2.14	1.52	1.70	0.84	1.71	2.30	1.45
26	Furniture	1.12	0.26	0.49	0.42	0.80	1.10	0.98	1.27	0.36	1.71	0.88	1.45
27	Paper	1.23	0.80	1.96	0.53	0.08	0.04	2.72	0.59	0.04	0.04	0.00	0.17
28	Printing and Publishing	1.86	0.12	0.49	0.26	0.47	0.42	0.25	0.53	0.23	0.39	0.46	0.65
29	Leather	0.44	0.05	0.41	0.01	0.10	0.03	0.08	0.04	0.32	17.43	0.11	0.49
30	Rubber and plastic products	1.29	1.04	1.06	0.55	2.16	0.42	0.78	0.59	0.89	0.10	0.14	0.54
31	Chemicals	1.64	0.76	0.24	0.22	0.10	0.11	0.26	0.87	1.31	0.11	0.24	0.17
32	Products of petroleum and coal	1.40	0.19	0.51	3.94	0.16	0.39	0.53	0.92	0.08	0.37	0.32	0.32
33	Non-metallic mineral products	0.75	2.40	1.29	0.86	1.55	2.01	1.49	1.00	0.74	1.91	1.28	1.32
34	Basic Metal Industries	0.73	5.08	0.00	0.00	0.00	0.00	0.39	0.78	0.00	0.00	0.67	0.00
35	Metal Products	1.02	1.30	1.08	1.05	0.92	1.38	0.71	0.91	0.99	0.53	1.06	1.00
36	Machinery (non-electrical)	1.17	0.45	0.77	0.75	0.64	0.37	1.85	0.66	1.15	0.56	0.45	1.12
37	Electrical supplies	1.28	1.56	0.55	0.87	1.37	0.37	1.85	0.46	0.86	0.32	0.30	0.60
38	Transport equipment	1.28	1.34	0.73	0.71	1.10	0.70	0.83	0.61	0.70	0.25	2.01	0.80
39	Miscellaneous w/g	1.47	0.44	0.47	1.07	1.10	0.96	0.46	0.82	0.76	1.11	0.47	0.57
41	Electricity and gas	0.97	0.70	0.90	1.89	1.88	1.18	0.60	0.41	3.34	2.95	1.36	2.00

specialization in any of the sectors examined. In 1973 the same is true for Peloponnesos, Epirus and Crete. However in 1984, Peloponnesos developed more specialization in lignite mining, products of petroleum and coal, and tobacco. Epirus in quarrying and in hydrocarbonate and natural gas and Crete in beverages.

Concerning the other regions Central Greece is specialized in metallic mining, misc. quarrying and mining, and basic metal industries mainly located at Boeotia and Larymna, while it indicated a remarkable decrease of employment in lignite mining. Western Greece is specialized in salterns located mainly in Messolongi and experienced a decrease in the paper sector employment. The Ionian Islands are also specialized in salterns, while Northern Aegean Islands in salterns and quarrying (1984) and Southern Aegean Islands in salterns, quarrying and misc. quarrying and mining. Eastern Macedonia and Thrace developed a specialization in hydrocarbonate and natural gas located at Thassos and is also specialized in tobacco (Thrace) and quarrying (Pagaion). It had a decrease in the employment of salterns. Finally Western Macedonia's economy is dominated by the lignite mines of Ptolemais and the related electricity station as well as the leather sector located in Kastoria.

It is worthwhile for the reader to look at Tables 3 and 4 horizontally thus identifying the 9-12 sectors which are heavily concentrated in particular regions as discussed above.

Simple inspection of Table 4 will convince the reader that in some regions (e.g. Attica, Central Macedonia) where most sectors have location quotients near one, employment is evenly distributed among sectors following the national pattern. Indeed from Table 5 it is obtained that Attica and Central Macedonia have the lowest Gini coefficient (0.09 and 0.11 respectively). Thessaly and Western Greece are also highly diversified regions with Gini coefficients equal to 0.12 and 0.13 respectively. All four regions are urbanized with Athens, Thessaloniki, Larissa and Patras respectively being the most important urban centers. At the other end Western Macedonia is by far the region indicating heavy concentration in few sectors (lignite mines, electricity, leather) and with a Gini coefficient equal to 0.37. In between are the other Greek regions with Gini coefficients ranging from 0.19 (Crete) to 0.24 (Eastern Macedonia and Thrace).

The dynamics of regional development in Greece between 1973 and 1984 are examined by using the shift-share analysis. The results are presented in Tables 6 and 7. Table 6 shows, in the first row, the total, proportional and competitive shifts of each region, while the subsequent rows show the contribution of each sector to these shifts.

Table 5
GINI COEFFICIENTS OF THE GREEK REGIONS FOR THE YEAR 1984

No	Region	Gini Coefficient
1	Attica	0.0918965
2	Central Greece	0.2184469
3	Western Greece	0.1316277
4	Peloponnesos	0.1998418
5	Ionian Islands	0.2360777
6	Epirus	0.1907754
7	Thessaly	0.1192005
8	Eastern Macedonia and Thrace	0.2434996
9	Central Macedonia	0.1072216
10	Western Macedonia	0.3709488
11	North Aegean Islands	0.2205449
12	South Aegean Islands	0.2134914
13	Crete	0.181974

Following a typological approach similar to that introduced by Boudeville (Edwards, 1976) the regions are classified according to the values taken by the shifts. A region can have a favorable or unfavorable industry mix if $p_j \geq 0$ or $p_j < 0$ respectively. Moreover its locational advantage can be positive if $c_j \geq 0$ or negative if $c_j < 0$. Finally $|p_j|$ can be greater or less than $|c_j|$. These three elements determine the sign of t_j . If $t_j \geq 0$ ($t_j < 0$) then the region is growing faster (slower) than the country as a whole.

The results of this typology are summarized in Table 7. From the eight fastly growing regions, only in Western Macedonia growth is due to both a favorable industry mix and a locational advantage. In the seven remaining fastly growing regions, growth is due to locational advantages only, since their industry mix is unfavorable. Similarly locational disadvantages are mainly responsible for the declining or slow growth of the Greek regions although for many of them (Ionian Islands, North and South Aegean, Crete) declining is deeper because of an unfavorable industry mix.

By inspecting Table 6 in a horizontal manner it is obtained that naturally the four largest sectors of the economy (food, textiles, clothing and footwear, transport equipment) are important for the (positive or negative) growth of many Greek regions. However in some regions smaller sectors have a significant contribution to growth.

Table 6 (Continued)

Sector	EASTERN MACEDONIA AND THRACE			CENTRAL MACEDONIA			WESTERN MACEDONIA			SOUTH ALBANEAN ISLANDS			NORTH ALBANEAN ISLANDS			CRETE		
	d	s	c	t	p	c	t	p	c	t	p	c	t	p	c	t	p	c
TOTAL	80.73	-1.70	82.43	29.73	-1.32	31.05	29.91	10.10	19.81	-16.21	-4.88	-11.37	-22.55	-0.61	-21.94	-6.32	-0.37	-5.95
11 : Lignite extraction	-9.33	0.04	-0.37	-0.04	0.01	-0.05	6.83	1.66	5.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 : Metallic mineral extr.	-0.04	-0.06	0.02	-0.02	0.00	-0.02	0.86	-0.05	0.91	-0.02	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00
13 : Hydrocarbonate and natural gas	0.71	0.00	0.71	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 : Quarzite	1.67	-2.01	3.68	-0.27	-0.36	0.09	-0.38	-0.91	0.53	-6.07	-4.18	-2.69	-0.44	-1.47	1.03	-0.99	-1.22	0.23
15 : Misc. quarrying and mining	1.04	0.00	1.04	-0.81	-0.76	-0.05	2.10	-0.02	2.12	-6.07	-2.21	-3.86	0.06	0.00	0.06	0.00	0.00	0.00
16 : Saltfers	-0.05	-0.02	-0.03	0.04	0.00	0.04	0.00	0.00	0.00	0.61	-0.02	0.01	-0.07	-0.06	-0.01	0.00	0.00	0.00
20 : Food	14.22	-0.35	14.57	3.72	-0.30	4.02	-1.28	-0.13	-1.15	-3.50	-0.26	-3.24	-13.60	-0.57	-13.03	-6.35	-0.51	-5.84
21 : Beverages	0.39	0.03	0.36	0.57	0.20	0.37	-0.48	0.92	-0.50	1.51	0.04	1.47	-0.73	0.06	-0.79	0.07	0.00	0.00
22 : Tobacco	4.95	0.00	4.65	0.16	0.00	0.16	0.00	0.00	0.00	-0.25	0.00	-0.25	0.00	-0.01	0.00	0.00	0.00	0.00
23 : Textiles	1.91	-0.68	2.59	2.80	-2.12	4.92	-2.01	-0.44	-1.57	-2.98	-1.27	-1.71	0.83	-0.49	1.32	-0.13	-0.54	0.41
24 : Clothing and footwear	28.02	2.96	25.08	13.47	2.98	10.49	-3.15	1.49	-4.64	-4.81	2.36	-7.37	-7.49	2.28	-9.77	-3.43	2.21	-5.84
25 : Wood and cork	-3.60	-1.97	-1.63	-0.77	-1.00	0.23	-0.10	-0.65	0.55	0.86	-0.36	1.62	-0.78	-1.40	0.62	1.18	-0.84	2.02
26 : Furniture	2.98	-0.26	3.24	1.65	-0.30	1.35	0.21	-0.10	0.31	-0.89	-0.22	-0.67	-0.82	-0.23	-0.60	-0.43	-0.35	-0.08
27 : Paper	7.97	0.00	7.97	0.31	0.19	0.12	0.09	0.00	0.09	0.01	0.01	0.00	0.01	0.00	0.01	0.24	0.00	0.24
28 : Printing and Publishing	0.00	-0.04	0.04	0.73	-0.03	0.76	0.18	-0.01	0.19	0.13	0.02	0.11	-0.30	0.00	0.04	0.26	0.26	-0.04
29 : Leather	-0.25	0.07	-0.32	0.21	0.14	0.07	0.15	6.95	9.20	0.04	0.05	-0.01	-2.25	1.22	-3.47	0.26	0.16	0.19
30 : Rubber and plastic products	2.67	0.11	2.56	1.05	0.41	0.64	0.21	0.03	0.16	0.08	0.05	0.03	0.61	0.01	0.60	0.86	0.12	0.74
31 : Chemicals	1.85	0.94	0.91	1.67	0.33	1.34	-0.08	1.46	-1.54	0.12	0.06	0.06	-0.30	0.23	-0.53	-0.44	0.22	-0.66
32 : Products of petroleum and coal	1.41	0.00	1.41	-0.01	0.22	-0.23	0.41	0.23	0.18	0.63	0.04	-0.01	0.02	0.09	-0.07	-0.01	0.10	-0.11
33 : Non metallic mineral products	2.67	-0.52	3.19	-0.18	-0.39	0.21	-0.44	-0.27	-0.17	2.70	-0.49	-3.19	-1.84	-0.51	-1.13	-0.33	-0.52	0.19
34 : Basic Metal industries	1.12	0.00	1.12	-0.27	0.10	-0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.84	0.00	0.00	0.00
35 : Metal Products	2.30	-0.37	2.67	0.40	-0.38	0.78	-0.60	-0.23	-0.37	-0.97	-0.23	-0.74	-0.74	-0.37	-0.37	-0.53	-0.41	-0.12
36 : Machinery (non-electrical)	1.34	-0.28	1.62	1.06	-0.41	1.47	1.22	-0.11	1.33	-0.22	-0.12	-0.10	-0.41	-0.18	-0.25	0.15	-0.36	0.51
37 : Electrical supplies	2.37	-0.20	2.57	1.03	-0.64	1.67	0.42	-0.05	0.47	0.31	-0.15	0.46	0.49	-0.10	0.59	1.35	-0.20	1.55
38 : Transport equipment	3.38	0.84	2.54	2.64	0.67	1.97	0.86	0.25	0.71	3.66	1.59	2.07	2.35	0.46	1.89	0.59	1.23	-1.81
39 : Miscellaneous mfg	1.25	-0.15	1.40	0.24	-0.17	0.41	0.84	-0.02	0.66	-1.60	-0.35	-1.25	-0.56	-0.13	-0.43	-0.36	-0.15	-0.31
41 : Electricity and gas	1.08	0.22	0.86	0.33	0.29	0.04	0.75	1.00	0.75	2.71	1.18	1.53	2.38	0.56	1.82	2.90	0.67	2.23

With respect to the fastly growing regions, in Northern Greece it is clear the competitive shift of Western Macedonia is mainly due to lignite mining, electricity and leather (with clothing and footwear having a significant negative contribution), while the favorable proportional shift is mainly due to the leather sector. Hence its development depends heavily on natural resources and the localization economies of the leather center of Kastoria. To the contrary, Central Macedonia owes most of its competitive shift to clothing and footwear, food and even to the declining sector of textiles. Hence it grows in a good variety of light manufacturing sectors. Finally Eastern Macedonia and Thrace is the fastest growing region in Greece. Its tremendous competitive shift is due to a good variety of light manufacturing sectors i.e. clothing and footwear, food, paper and tobacco and one could argue that this is the result of a consistent economic policy developed since the mid 1970s (Law 289/1976, Government Gazette, 1976, and Law 1262/1982, Government Gazette, 1982).

In the regions of Southern Greece, the economy of Western Greece gained advantage in textiles, clothing and footwear as well as in metal products and transport equipment while Peloponnesos had a positive competitive shift despite the negative contribution of food, clothing and footwear sectors.

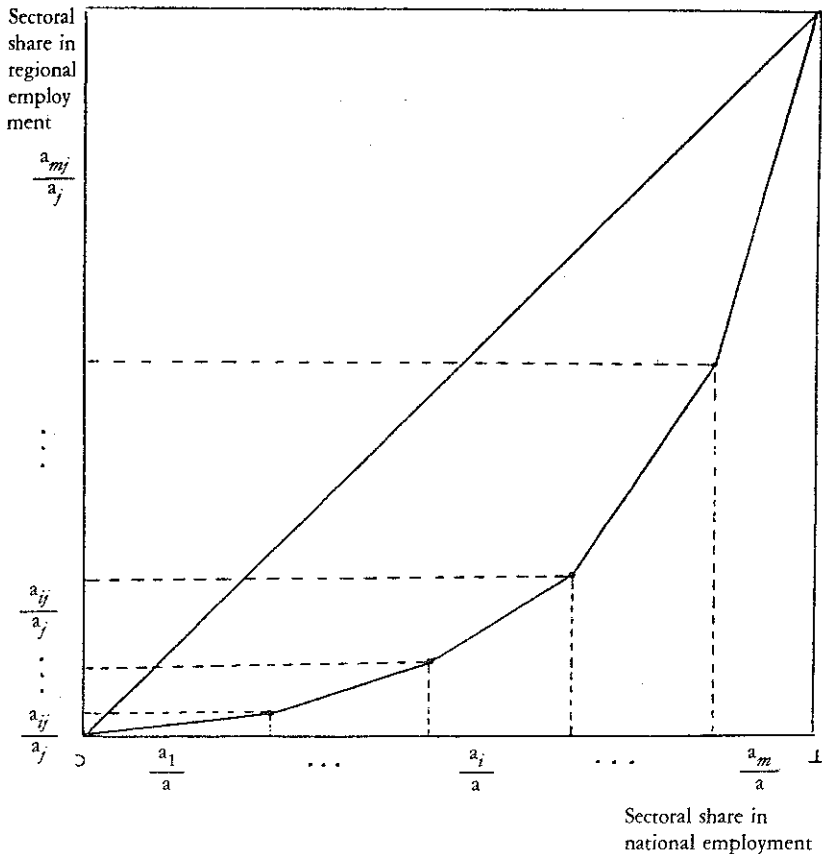
Table 7

TYPOLOGICAL CLASSIFICATION OF THE GREEK REGIONS BY GROWTH
OF EMPLOYMENT INDUSTRY MIX AND LOCATIONAL ADVANTAGE

Locational Advantage	INDUSTRY MIX	
	Favorable	Unfavorable
Positive	Western Macedonia (F)	Eastern Macedonia and Thrace (F)
		Central Macedonia (F)
		Thessaly (F)
		Western Greece (F)
		Central Greece (F)
		Peloponnesos (F)
		Epirus (F)
Negative	Attica (S)*	Crete (S)
		Ionian Islands (S)*
		South Aegean Islands (S)*
		North Aegean Islands (S)*

Source: (F), (S) denote a region growing respectively faster or slower than the country as a whole. Further an asterisk (*) denotes a declining region.

Figure 1
LORENZ CURVE FOR REGION j



In the central regions of Greece one obtains that Central Greece gained advantage in nonmetallic mineral products and especially transport equipment, that the competitive advantage of Epirus is mainly due in textiles, metal products and transport equipment with the food sector contributing negatively and that in Thessaly the positive competitive shift is due to textiles, basic metal industries and electrical supplies.

With respect to the Declining Greek regions it is evident that Attica lost competitive advantage in nearly all mining, manufacturing and electricity sectors thus indicating the decentralization tendencies of Greek manufacturing. The Ionian, Aegean islands and Crete lost advantage

mainly in food, clothing and footwear. In addition the Ionian Islands had a negative competitive shift in textiles and the south Aegean islands in misc, quarrying and mining. It seems that the Greek Islands in general have shifted to the services sectors (touristic, commercial, banking and other services). However Crete maintains a moderate positive competitive shifts, and the Ionian islands gained some competitive advantage in rubber and plastic products and transport equipment.

IV. Conclusions

The spatial structure of the extraction, manufacturing and electricity sectors of the Greek economy was analysed. It is clear that between 1973 and 1984 important changes took place. Employment in Attica declined by 7% and its share decreased from 50.6% to 41.7% indicating some decentralization of Greek manufacturing. The Ionian and Aegean island shifted to the service sector, thus indicating, with the exception of Crete, a declining industrial sector. Central Macedonia emerged as a fastly growing diversified industrial region where strong localization economies have been developed. Eastern Macedonia and Thrace appears to be a successful example of a region with had tremendous competitive shifts and thus growth rates, in some sectors of light manufacturing, as a result of consistent regional policy. Western Macedonia is the typical example of a region highly specialized in growing sectors with also created localization economies. Its structure although unstable (since it depends on the natural resources and the leather market) certainly generates high incomes and could attract more stable industries. This kind of attraction, together with proximity to Attica seem to be responsible for the advantages gained in Central Greece. The rather urbanized regions of Thessaly and of Western Greece and surprisingly the mountaineous Epirus experienced a positive competitive shift in some sectors, although they had no major structural changes, while Peloponnesos grew slowly due to a decrease in the employment of its traditional sectors.

The above analysis of the spatial and sectoral structure of Greece, suggests some natural directions of research. For example it would be useful pursuing an intraregional sectoral analysis of employment by urban, semiurban and rural areas. Given this, what is really needed is a sectoral analysis of the elements which determine the location of economic activities. This is a prerequisite for a meaningful spatial sectoral economic policy which does not simply facilitate the exciting trends but has a true impact to the location decision of firms in the socially desired direction.

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