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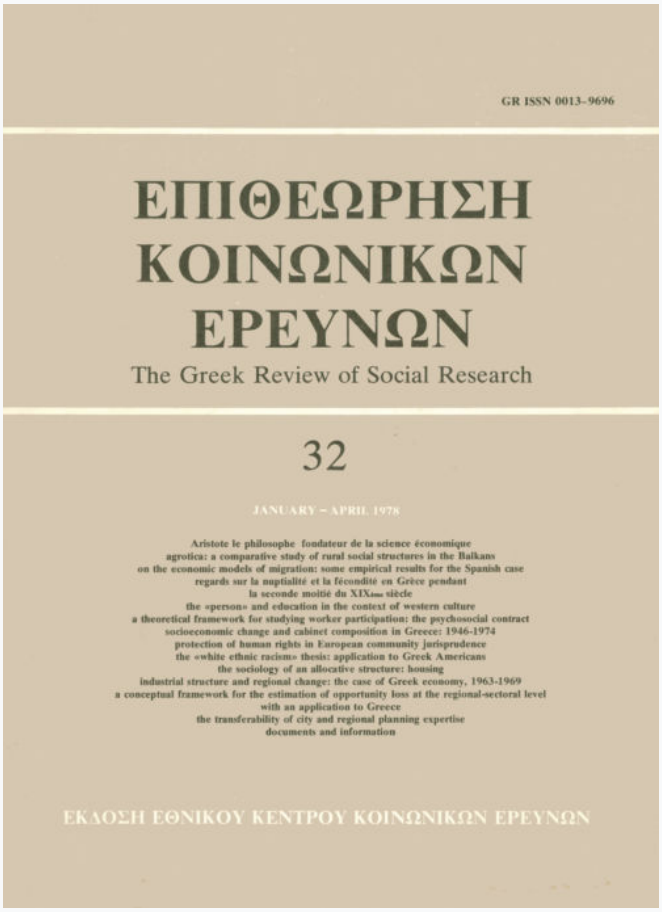

Industrial structure and regional change: The case of Greek economy, 1963-1969

Andreas A. Andrikopoulos

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industrial structure and regional change

The Case of Greek Economy, 1963 - 1969

by

Andreas A. Andrikopoulos

Department of Economics
University of Waterloo
Waterloo, Ontario, Canada

I. introduction

During the last two decades the growth differentials between regions and the effect they have on the economic development of a nation has become the most controversial and dominant issue in the field of regional economics. The emergence of underdeveloped regions in highly developed economies along with the continuously increasing disparities in the rates of growth in employment and other economic variables, has evolved, in many countries, a set of policies for regional economic development and social adjustment. In spite of the fact that regional development policies were well-defined in the various Five-Year Economic Development Plans (Exploitation of resources and development of each regional economy according to its comparative advantages, reduction of the disparities existing among the various regions, rational distribution of population and activities throughout the country, development of complementaries in each regional economy, and re-adjustment of its overall socio-economic structure), Greece in common with most other countries has failed to adopt an effective regional policy. The need for a more effective regional policy emanates from the existing disparities in per-capita income, population, economic activities, etc., among the regions of the country, especially between Greater Athens and the rest of the country. More or less, 20% of population (Population Census, 1971), 47.9% of manufacturing employment (Industrial Census, 1973), the bulk of banking and other services, etc., are concentrated in the Greater Athens and its periphery. Much slower growth has occurred in Macedonia and Central Greece and Euboea, with a significant decline in the remaining regions of the country.

The purpose of this paper, therefore, is to provide an initial contribution to the analysis of regional economic structure and change of the Greek economy and, at the same time, to identify regions and industries which, on the basis of certain criteria, would require specific regional policies aiming to enforce economic growth in depressed areas and reduce regional economic disparities.

In implementing our objective, the theoretical foundation of this analysis is discussed in section II. The theoretical model is applied in section III. The regional growth differentials and policy recommendations are discussed in section IV. Finally, some concluding remarks are provided in the last section.

II. the theoretical model

The basic statistical method used is that of the shift-share model which was first used by Creamer

(1943) and developed to a complete model by Ashby (1965). The shift-share model was thought by many to be promising as an effective device for organizing not only large bodies of information, but also for predicting regional economic growth and structure. The popularity of this model becomes evident when we draw attention to the many cases and different purposes (descriptive and/or predictive purposes) the model has been used. Both in North America, Europe and Australia the shift-share model has been used by individual authors (Dunn, 1960., Ashby, 1964., Thirwall, 1967., Steed, 1967., Maddox and Liebharsky, 1967., Brown, 1969., Kerr, 1970., Randall, 1973., Edwards, 1976., and others) and Government agencies in Canada (Statistics of Canada, 1973), United Kingdom (H.M.S.O., 1965), and United States (Ashby, 1965) either for academic discussion or policy guidelines.

Formally, the shift-share model can be summarized by the following identity:

$$\Delta L = \sum_{i=1}^{m} r_{oo}\, e_{ij} + \sum_{i=1}^{m} (r_{io} - r_{oo})\, e_{ij} + \sum_{i=1}^{m} (r_{ij} - r_{io}) \qquad (1)$$

where e_{ij} is the employment in the i industry and j region, r_{00} is the actual rate of growth in employment nationally, r_{i0} is the actual rate of growth in the entire i industry and r_{ij} stands for the rate of growth in employment in the i industry regionally. In the present analysis i ranges over m industrial sectors in region j. The term ΔL measures the actual change in employment regionally. The first term of the right-hand side of the identity, is the so-called national growth component. It is defined as the growth that would have occurred in the region if employment in all manufacturing sectors had grown at the same rate as the national average, r_{00}. The divergence between national growth and regional growth can be explained by the two shift components; that is, the industrial-mix - shift and differential shift.

The industrial-mix component is given by the second right-hand term of identity (1). It measures the employment change determined by the type of industries located in the region. More specifically, it takes into account the structural nature of a region's growth (Paris, 1970) and may be thought of as a growth industry concept which measures the growth in employment in the region that is due either to the fact that the region is characterized by a predominance of national rapid growth industries (positive industrial-mix) or to the fact that the region specializes in slow growth or declining industries at the national level (negative industrial-mix).

The third component in the identity (1) is the so-called regional-share component. It measures the extent to which additional employment growth in a specific industry is the result of that industry growing in the region at a rate different from the national rate of change. It reflects the existence of regional or locational advantages that allow industries in the region to grow at a faster (positive regional-share) or slower (negative regional-share) than they would in other regions (Edwards, 1976). Therefore, it is considered to be the dynamic element of growth in employment, thus more important for regional planning and development. The region's changing position relative to the rest of the nation is measured by the «net relative change» in employment which is the sum of the industrial-mix and regional-share component.[1]

The significance of the shift-share model centers around the fact that it summarizes the effects of three major factors on the growth of employment in a particular region (or industry): (1) national factors (r_{00}, and r_{io}); (2) local factors (r_{ij}); and (3) differential factors ($r_{ij} - r_0$). In other words, it demonstrates that the growth of a region's economy can be looked upon as a combination of exogenous or national factors, the region's initial economic structure and size, and differential factors.

However, it should be mentioned that the controversy surrounding both the conceptual and practical strengths and weaknesses of the model has been mounted and widely discussed by Brown (1969), Houston (1967), Stillwell (1969, 1970), Paris (1970), Buck (1970), and others. Nevertheless, there is, more or less, general agreement that the shift-share model, given its limitations, can be used as a guide to regional economic policy.

III. application of the shift-share model for the Greek regions, 1963-1969

The period 1963-1969, based on the two manufacturing censuses (1963, and 1969), was used to analyze the growth patterns in manufacturing employment using the shift-share model. Basically, the analysis centers around the ten geographical regions of the country, with special references to the fifty administrative departments (Nomos). The essential results are reported in Table 1. During the period under consideration total Greek manufacturing em-

1. The terminology of the three shift components is not well established in the literature. Paris (1970) summarizes the equivalent terms used by different authors, as follows: For the industrial-mix component the terms that have been used are: Composition shift (Dunn, 1952), proportional shift (Whipple, 1966), industrial-mix (DBS, 1967), structural disadvantage (Tihanyi, 1966), and structural effect (Beaud, 1966). For the competitive component the terms used by the same authors are: competition shift, differential shift, regional share, growth deficit, and regional effect. Finally, for the net relative shift, the terms used are: total shift, net relative change, labor absorptive differential, and total differential.

TABLE 1. *Shift-share Model: Growth Components of Manufacturing Employment, Greece, 1963-1969*

Geographic region and department	Actual Growth (%)	National Growth (%)	Industrial-Mix (%)	Regional-Share (%)	Net Relative Change (%)	Boudeville Regional Classification Type	No. of Ind. with Positive Net Relative Change
	1	2	3	4	5	6	7
I. Greater Athens (1)	*7.48*	*6.77*	*1.44*	*−0.43*	*0.71*	*3*	*13*
II. Rest of Central Greece and Euboea	*21.16*	*6.77*	*7.39*	*7.00*	*14.39*	*1*	*15*
Aetolia and Akarnania	−4.04	6.77	−4.38	−11.44	−15.39	8	5
Attica	14.69	6.77	21.48	−13.57	7.91	3	13
Beotia	100.00	6.77	−1.54	94.31	89.93	4	14
Euboea	23.64	6.77	0.10	16.76	16.86	2	14
Evritania	−17.50	6.77	−2.98	−21.47	−24.45	7	5
Phthiotis	−9.24	6.77	−2.67	5.21	2.54	4	9
Phokis	−32.75	6.77	−2.42	−37.10	−39.70	8	3
III. Peloponnesos	*−4.92*	*6.77*	*−1.15*	*−10.55*	*−11.70*	*8*	*11*
Argolis	17.50	6.77	−4.90	15.61	20.71	4	11
Arkadia	−29.72	6.77	−7.18	−29.35	−36.53	8	2
Akhaia	3.10	6.77	−1.98	−1.70	−3.68	7	11
Ilia (Elis)	−12.46	6.77	−7.58	−12.79	−20.37	8	4
Korinthia	22.39	6.77	0.31	15.30	15.61	2	10
Lakonia	−24.66	6.77	−2.17	−29.26	−31.43	7	2
Messenia	−24.32	6.77	−3.61	−27.47	−31.08	8	7
IV. Ionian Islands	*−14.05*	*6.77*	*−1.29*	*−19.53*	*−20.82*	*7*	*7*
Zante	−4.02	6.77	−0.10	−10.81	−10.91	8	8
Corfu	−22.15	6.77	−1.51	−27.41	−28.92	8	7
Cephalonia	−10.55	6.77	−0.54	−16.87	−17.41	8	5
Lefkas	23.53	6.77	−2.09	18.79	16.70	4	10
V. Epirus	*11.90*	*6.77*	*−1.84*	*6.96*	*5.12*	*4*	*12*
Arta	57.10	6.77	−1.46	51.72	50.26	4	10
Thesprotia	−10.36	6.77	−2.59	−14.68	17.27	8	8
Yanina	3.20	6.77	−1.47	−2.13	−3.60	8	9
Preveza	9.14	6.77	−2.48	4.78	2.30	4	13
VI. Thessaly	*6.07*	*6.77*	*−2.80*	*2.09*	*−0.71*	*4*	*12*
Karditsa	7.77	6.77	−1.57	2.57	1.00	4	8
Larisa	10.20	6.77	−2.30	5.72	3.43	4	3
Magnisia	0.65	6.77	−3.46	−2.66	−6.12	7	8
Trikala	8.28	6.77	−2.93	4.43	1.50	4	10
VII. Macedonia	*18.05*	*6.77*	*−6.32*	*17.60*	*11.28*	*4*	*18*
Grevena	...	...	...	...	...	...	...
Drama	−3.73	6.77	−5.52	−5.01	−10.53	7	7
Imathia	8.01	6.77	−2.58	3.83	1.25	4	12
Salonika	27.87	6.77	−3.01	24.11	21.10	4	18
Kavala	−5.73	6.77	−11.09	−1.41	−12.51	7	8
Kastoria	36.03	6.77	−3.10	32.35	29.25	4	9
Kilkis	−19.17	6.77	−3.26	−22.69	−25.95	8	5
Kozani	21.22	6.77	1.37	13.08	14.45	2	8
Pella	14.33	6.77	−1.96	9.52	7.56	4	8
Pieria	12.61	6.77	−4.71	10.54	5.83	4	10
Serres	−8.82	6.77	−2.90	−12.18	−15.08	7	7
Florina	−9.95	6.77	−0.32	−16.40	−16.72	7	5
Khalkidiki	5.23	6.77	−3.46	1.91	−1.55	5	9
Aghion Oros	...	6.77	...	...	...	—	

(continued)

TABLE 1. *Shift-share Model: Growth Components of Manufacturing Employment, Greece, 1963-1969*

Geographic region and department	Actual Growth (%)	National Growth (%)	Industrial-Mix (%)	Regional-Share (%)	Net Relative Change (%)	Boudeville Regional Classification Type	No. of Ind. with Positive Net Relative Change
	1	2	3	4	5	6	7
VIII. Thrace	*-3.07*	*6.77*	*-3.34*	*-6.50*	*-9.84*	*7*	*6*
Evros	-4.77	6.77	-0.42	-11.12	-11.54	7	7
Xanthi	-2.19	6.77	-8.72	-0.24	-8.96	8	9
Rodopi	-1.11	6.77	-3.97	-4.83	-7.88	7	6
IX. Aegean Islands	*-12.40*	*6.77*	*-1.97*	*-17.20*	*-19.17*	*8*	*4*
Dodecanesos	0.74	6.77	-1.74	-4.25	-5.99	8	10
Cyclades	-18.32	6.77	-2.24	-22.85	-25.09	8	4
Lesvos	-14.18	6.77	-2.46	-18.51	-20.97	8	3
Samos	-24.63	6.77	-1.46	-24.97	-31.43	8	3
Chios	-13.57	6.77	-0.48	-19.85	-20.33	8	5
X. Crete	*-2.47*	*6.77*	*-0.77*	*-8.48*	*-4.25*	*8*	*6*
Iraklion	7.00	6.77	-0.49	0.71	0.71	4	9
Lashithi	19.55	6.77	-3.47	15.63	12.16	4	10
Rethymni	-12.70	6.77	0.11	-19.58	-19.47	6	7
Canea	-21.71	6.77	-0.50	-28.00	-28.50	7	4

ployment rose by 6.77% or 31,943 employees. Nevertheless, the rates at which it increased among the geographical regions and departments varied considerably (Table l, Column l). In four regions only (Greater Athens, Central Greece/Euboea, Epirus and Macedonia) does the rate of growth exceed the corresponding national average (Column 2, Table 1). In all the other regions the rate of growth was either positive but less than the national average (Thessaly) or negative (Peloponnesos, Ionian and Aegean Islands, Thrace and Crete). The greatest increase (21.16%) was observed in Central Greece and Euboea followed by Macedonia (18.05%), Epirus (11.90%) and Greater Athens Region (7.48%). In contrast, the most significant decline occurred in Ionian (-14.05%) and Aegean (-12.40% Islands followed by Peloponnesos (-4.92%), Thrace (-3.07%) and Crete (-2.46%). Turning to the administrative departments twenty six of the fifty experienced negative rate of growth with only eighteen of the remaining showing a rate of growth above the national average.

The significance of the growth differentials among the regions can be analyzed in terms of the two shift components; that is the industrial-mix component (Table 1, Column 3) and the regional-share component (Table 1, Column 4). Of the industrial-mix component, «which summarizes the effect of the initial industrial structure upon employment growth» (Edwards, 1976) only the Greater Athens Region and Central Greece and Euboea (Rest of Attica and Euboea) experienced a positive industrial-mix amounting to 1.14% and 7.39%, respectively. This reflects the prominent role the Greater Athens Region and the Rest of Attica play in the overall performance of the Greek economy. Macedonia had the most unfavourable composition effect (-6.32%) with all the remaining regions exhibiting, more or less, the same industrial composition. Of the differential shift, which reflects the effect of the comparative position of a region relative to the rest of the country, showed a more diversified performance among the regions than the composition shift. Four geographical regions and nineteen departments experienced positive differential shift (Table 1, Column 4). It should be interesting to note that the differential shift was strong enough to outweigh the negative composition effect in two regions (Macedonia and Epirus) and in fifteen administrative departments. In contrast, the positive composition effect in the Greater Athens Region outweighed the negative differential effect. In general, four regions only experienced positive net relative change with the remaining showing relative decline (Table 1, Column 5).

The observed growth differentials in manufacturing employment among the regions has rather some interesting implications from the viewpoint of the regional economic planner with reference to the need for specific forms of economic assistance. Before we discuss this issue, the structure and composition of the industrial sectors within the major economic regions are analyzed.

TABLE 2. *Greater Athens Region: Industrial Structure and Regional Change, 1963-1969*

	National Change		Regional Change		National Growth		Industrial-Mix		Regional-Share		Net Relative Change	
	Nos.	(%)	Nos.	(%)	Nos.	(%)	Nos.	(%)	Nos.	(%)	Nos.	(%)
SIC	1	2	3	4	5	6	7	8	9	10	11	12
20	5074	6.64	2683	14.17	1283	6.77	−26	−0.13	1426	7.53	1400	7.40
21	2367	27.66	1942	83.81	158	6.77	489	20.89	1297	55.65	1784	76.54
22	−3768	−22.22	−1248	−23.06	367	6.77	−1569	28.99	−46	−0.84	−1615	−29.83
23	−955	−1.71	−855	−2.72	2129	6.77	−2665	−8.48	−319	−1.01	−2984	−9.49
24	−9126	−12.79	−1984	−6.05	2220	6.77	−6412	−19.56	2208	6.74	−4204	−12.83
25	1779	6.24	687	8.21	566	6.77	−44	−0.53	165	1.97	121	1.44
26	4822	22.24	1782	15.32	788	6.77	1798	15.46	−804	−6.91	994	8.55
27	1649	26.88	633	17.76	241	6.77	716	20.10	−325	−9.12	392	10.99
28	896	6.77	1099	10.96	679	6.77	1	−0.00	419	−4.19	420	4.19
29	365	3.67	−275	−8.22	227	6.77	−104	−3.10	−398	−11.89	−502	−15.00
30	2907	36.62	2167	35.04	419	6.77	1846	29.85	−98	−1.58	1748	28.27
31	3666	29.13	789	8.16	655	6.77	2162	22.36	−2028	−20.97	134	1.39
32	1543	111.97	564	100.18	38	6.77	592	105.20	−66	−11.80	526	93.40
33	2770	9.86	−618	−5.52	759	6.77	346	3.09	−1723	−11.38	−1377	−12.29
34	3422	149.63	657	114.26	39	6.77	821	142.85	−203	−35.37	618	107.49
35	4608	11.92	829	4.05	1388	6.77	1054	5.15	−1613	−7.87	−559	−2.73
36	1658	10.66	405	4.89	561	6.77	322	3.88	−478	−5.77	−156	−1.89
37	4694	34.54	2527	23.20	738	6.77	3025	27.77	−1235	−11.34	1789	16.43
38	475	1.37	307	1.54	1347	6.77	−1075	−5.40	34	0.17	−1040	−5.23
39	1110	13.56	828	15.64	359	6.77	359	6.79	110	2.08	469	8.87
51	2674	24.92	3978	76.53	352	6.77	943	18.15	2683	51.61	3626	69.76
	31943	6.77	17085	7.56	15312	6.77	2578	1.14	−993	−0.43	1585	0.71

1. The Greater Athens Region

The above analysis has shown that during the seven-year period 1963 to 1969 the actual change balance in the Greater Athens Region was positive and the rate of growth in employment was greater than the national average. More specifically, if the manufacturing employment in this region had grown at the same rate at which national employment grew, her total employment would have increased by 15,292 persons or 6.77%. However, the actual change was 17,085 or 7.48%. The discrepancy between hypothetical and actual change in employment is the result of the changing position of the Greater Athens Region in terms of both the regional and composition effect. A comparison of the two shift components (Table 1, Columns 3 and 4) suggests that the region had, on the average, an excess of fast growing industries at the national level (positive industrial-mix). On a broad sectoral basis, the incidence of relative employment gains or losses within the industrial structure of the region can be analyzed by using Table 2. Sixteen sectors experienced an employment increase as compared with eighteen at the national level (Table 2, Columns 1 and 3). Thirteen increased at rates in excess of the regional average (7.56%) and seven in excess of similar sectors at the national level. Turning now to the shift components (Table 2, Columns 7 to 10), it is shown that the G.A.R. recorded positive gains both in employment associated with the country's fast growing industries (positive industrial-mix) and in employment associated to the regional comparative advantage (positive regional-share) in the majority of industrial sectors. That is, although the region experienced a negative composition effect in seven out of twenty-one industrial sectors, the upward effect of the remaining sectors was strong enough to outweigh the negative effect and leave an over-all positive gain of 1.14%. The differential component, in general, plays a less important role than the structural component which is more noticeable. In thirteen industries the differential effect was negative and large enough to outbalance the positive effect of the remaining sectors and leave an overall loss of -0.43%. In the net relative change component (Table 2, Column 12), eight sectors experienced negative balances and sic: 22, sic:23, sic:24, sic:33, and sic:38 were especially prominent in this respect. On the contrary, sic:20, sic:21, sic:30, sic: 37 and sic: 51, all rapid growth industries at the national level, showed impressive gains. This suggests that the G.A.R. is a prominent fast growing area because it possesses both fast growing industries (positive industrial-mix) and industries attracted by the region's comparative position. Nevertheless, the structural component is more im-

portant than the regional. This has some rather interesting economic implications regarding future regional economic policies. This issue is discussed in a later section.

2. *The Rest of the Country*

The patterns of growth in manufacturing employment for the «Rest of the Country» are summarized in Table 3 which indicates the direction and magnitude of changes during the seven-year period 1963 to 1969. An examination of the shift-share elements indicate that although the region experienced employment increases at a rate (6.05%) below the national average (6.77%), the differential effect was strong enough (3.85%) to outweigh the negative structure effect (-1.32%) and leave the region with an overall positive change of 2.57%. Of the industrial mix component, the most unfavourable shift occurred in sic: 22, sic: 23 and sic: 24 where the loss in employment amounts to 10,646 employees or −89.50% of the total negative change. In spite of the fact that only eight sectors experienced a negative «net relative change» in the range of -1.89% and −29.83% (Table 3, Column 12), it should not be interpreted as an indication of a satisfactory performance of all the regions comprising the «Rest of the Country». This becomes quite evident when the growth patterns and their composition in the various individual regions are examined.

The Central Greece and Euboea

The Central Greece and Euboea census region emerges as a strong competitor of the G.A.R. with an overall rate of change far above the national average. It showed employment gains of 21.15% and a rather strong growth performance both in terms of industrial-mix (7.39%) and differential shift (7.00%). Its unique position is indicated by the fact that only six sectors experienced negative net relative change. Its strength lies in sic: 33, sic: 34, sic: 35 and sic: 51 accounting for 68.62% of the total positive shift. However, this does not imply that the region is uniformly developed. This becomes quite evident when the growth performance of the industrial structure within the administrative departments is examined. In spite of the fact that four departments (Attica, Beotia, Euboea and Phthiotis) experienced positive net relative change only two departments (Attica and Euboea) showed positive composition effect and three departments (Boetia, Euboea, and Phthiotis) positive differential gains. The diversity of growth differentials and the declining relative position of the departments is indicated by the large number of sectors experiencing negative net relative

TABLE 3. *Rest of the Country: Industrial Structure and Regional Change, 1963-1969*

	National Change		Regional Change		National Growth		Industrial-Mix.		Regional-Share		Net Relative Change	
	Nos.	(%)	Nos.	(%)	Nos.	(%)	Nos.	(%)	Nos.	(%)	Nos.	(%)
SIC	1	2	3	4	5	6	7	8	9	10	11	12
20	5074	6.64	2392	4.15	3893	6.77	−75	−0.13	−1426	−2.48	−1501	−2.61
21	2367	27.66	3425	6.20	218	6.77	675	20.89	2532	78.51	3207	99.44
22	−3768	−22.22	−3768	−32.63	−782	6.77	−3347	−28.99	361	3.13	−2986	−2586
23	−955	−1.71	100	0.41	1658	6.77	−2077	−8.48	519	2.12	−1558	−6.36
24	−9126	−12.79	−9126	−23.65	−2612	6.77	−7547	−19.56	1033	2.68	−6514	−16.88
25	1779	6.24	1092	5.42	1363	6.77	−107	−0.53	−164	−0.81	−271	−1.35
26	4822	22.24	3040	30.23	681	6.77	1555	15.46	804	8.00	2359	23.46
27	1649	26.88	1016	39.52	174	6.77	516	20.10	326	12.68	842	32.75
28	896	6.77	−203	−6.34	−217	6.77	0	0.00	14	0.44	14	0.44
29	365	3.67	640	9.69	447	6.77	−205	−3.10	398	6.03	193	2.93
30	2907	36.62	740	42.18	119	6.77	524	29.85	97	5.53	621	35.40
31	3666	29.13	2877	98.73	197	6.77	652	22.36	2028	69.60	2680	91.97
32	1543	111.97	979	120.12	55	6.77	857	105.20	67	8.22	924	113.37
33	2770	9.86	3208	18.80	1155	6.77	527	3.09	1526	8.94	2053	12.03
34	3422	149.63	1713	100.00	116	6.77	2446	142.85	−849	−49.59	1597	93.28
35	4608	11.92	4608	25.36	1230	6.77	936	5.15	2442	13.44	3378	18.59
36	1658	10.66	1253	17.24	492	6.77	282	3.88	479	6.59	761	10.47
37	4694	34.54	2167	80.35	183	6.77	749	27.77	1235	45.79	1984	73.56
38	475	1.37	168	1.14	995	6.77	−793	−5.40	−34	−0.23	−827	−5.63
39	1110	13.56	382	13.68	189	6.77	190	6.79	3	0.08	193	6.91
51	2674	24.92	−1304	−23.72	−375	6.77	1004	18.15	−1933	−34.94	−929	16.79
	31943	6.77	14858	6.05	9179	6.77	−3238	−1.32	9458	3.85	6320	2.57

change (Table 1, Column 7). For example, eighteen sectors in the department of Phthiotis, sixteen in the department of Evritania, and fifteen in the department of Aetolia and Akarnania, showed an overall net negative change in the period 1963-1969. It should be emphasized that the high rates of growth in certain sectors within the individual departments reflect either the establishment of large industrial complexes in these departments (shipyards in Piraeus and Eleusis, nickle plant in Larymna, etc.) that boosted manufacturing production and employment, or to the nature of the industry (resource-oriented).

The Region of Macedonia

Macedonia is the second larger region of the country accounting for 21.53% of the total population (population census, 1971) and 20.96% of the total manufacturing employment (Manufacturing census, 1969). On the average, this region has had a sound growth performance for the intercensal interval 1963-1969 which experienced a stronger net gain (11.28%) than that of the G.A.R. (0.71%). With the exception of sic: 22, sic 23, and sic: 24, all sectors experienced positive net relative change. Of them, five sectors (sic: 26, sic: 29, sic:31, sic: 35, and sic: 37) accounted for 57.73% of the total positive net relative change. The fast growing nature of these sectors is due either to the specialized character of the industry (sic: 29) or to the increased demand for these products. As it has been argued elsewhere (United Nations, 1970) in an industrialized region, the demand for basic metals (sic: 35) comes largely from «metal-transforming» industries, and large export markets, given natural constraints and competitive international markets. In this respect, the future of this sector (sic: 35) and its complementarities (sic: 34, sic: 36, etc.), is rather optimistic. For example, manufacture of machinery and appliances, manufacture of metal products, manufacture of electrical machinery apparatus, and manufacture of transport equipment, all current and potential consumers of basic metal products, experienced a rapid growth in employment. Within the region of Macedonia, only six departments (Table 1, Column 5) experienced net positive change with the Greater Salonica as a major contributor to both industrial composition and differential shift. All the other departments are stagnate or declining (Table 1, Column 6).

The Region of Peloponnesos

The declining character of this region is indicated by the fact that both employment and population shares declined. They accounted for 9.68% and 13.07% of total employment and population in 1963 and 1961, respectively, but they took only 8.62% and 11.27% in 1969 and 1961, respectively. The greatest relative decline in employment occurred in Lakonia (-24.66%) and Arcadia (-29.72%) and the most important gain in Korinthia (22.39%) and Argolis (17.50%). Of the net relative change (Table 1, Column 5) only Argolis and Korinthia experienced a growing performance which was due to the differential shift component. In spite of the fact, however, that ten sectors (sic: 21, sic: 22, sic: 27, sic: 30, sic: 31, sic: 32, sic: 33, sic: 36, sic: 37 and sic: 38) showed positive net shift in the region of Peloponnesos, only one sector (sic: 36) in Arcadia, two sectors (sic: 30, and sic: 37) in Laconia, and six in Messenia (sic: 22, sic: 27, sic: 31, sic: 36, sic: 37 and sic: 38) are positive contributors to the overall performance of the region. This suggests that the remaining departments, particularly Achaia (Industrial centre of Patras), Argolis and Korinthia, have more sound ground for future development and growth, especially for the resource-oriented industries.

The Region of Thessaly

This region experienced, more or less, satisfactory patterns of growth since in three out of four departments the rate of growth in employment was above the national average (Table 1, Column 1). However, both Greater Volos and Greater Larissa experienced higher rates of growth than the rest of the region. It should be mentioned that the growing performance of certain sectors in the region (Table 1, Column 6) reflects the competitive position of the region since the structural effect exhibits negative patterns that outbalanced the differential growth effect (Table 1, Columns 3 and 4).[2]

The Region of Crete

In spite of the fact that two departments experienced rates of growth in employment above the national average (Iraklion and Lasithi), the overall performance of the region was unsatisfactory. Both the composition and differential effects were negative (Table 1, Columns 3 and 4). On the average, only five sectors (sic: 21, sic: 26, sic: 32, sic: 33, and sic: 36) showed a positive net relative change. The type of these industries suggests that the region is specialized in resource-oriented sectors. However, more diversified appears the situation for Lasithi where additional industries, such as sic: 21, sic: 23, sic: 30, sic: 37, and sic: 38, experienced satisfactory

2. For a more detailed analysis see, Andreas A. Andrikopoulos, *The Determinant of Growth Differentials and Regional Concentration: A theoretical and Empirical Investigation,* Dissertation, University of Southern California, 1973.

TABLE 4. *Shift-share Model: Patterns of Growth in Manufacturing Employment, 1963-1969*

	Industrial-Mix										Regional-Share										Net Relative Change									
	G.A.R.	C.G.E.	P.E.L.	I.T.S.	E.P.I.	T.H.S.	M.A.C.	T.H.R.	A.I.S.	C.R.E.	G.A.R.	C.G.E.	P.E.L.	I.T.S.	E.P.I.	T.H.S.	M.A.C.	T.H.R.	A.I.S.	C.R.E.	G.A.R.	C.G.E.	P.E.L.	I.T.S.	E.P.I.	T.H.S.	M.A.C.	T.H.R.	A.I.S.	C.R.E.
20	–	–	–	–	–	–	–	–	–	–	+	+	–	–	+	–	+	–	–	–	+	+	–	–	+	–	+	–	–	–
21	+	+	+	+	+	+	+	+	+	+	+	–	–	+	–	–	–	–	–	–	+	–	+	+	+	–	+	–	–	+
22	–	–	–	–	–	–	–	–	–	–	–	+	+	+	–	–	+	–	–	+	–	+	+	–	–	–	–	–	–	–
23	–	–	–	–	–	–	–	–	–	–	–	+	–	–	+	+	+	–	–	–	–	+	–	–	+	+	–	–	–	–
24	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	–	–	–	–
25	–	–	–	–	–	–	–	–	–	–	+	+	–	–	+	–	+	+	–	–	+	+	–	–	+	–	+	+	–	–
26	+	+	+	+	+	+	+	+	+	+	–	+	–	–	+	+	+	+	–	+	+	+	–	+	+	+	+	+	+	+
27	+	+	+	+	+	+	+	+	+	+	–	+	–	–	–	+	+	–	–	–	+	+	+	–	–	+	+	–	–	–
28	+	+	+	+	+	+	+	+	+	+	+	–	–	–	–	–	+	–	–	–	+	–	–	–	–	–	+	–	–	–
29	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	+	–	–	–	–	–	–	–	–	–	+	–	–	–
30	+	+	+	+	+	+	+	+	+	+	–	+	+	–	–	–	–	+	–	–	+	+	+	+	–	+	+	+	–	–
31	+	+	+	+	+	+	+	+	+	+	–	–	–	–	–	–	+	–	–	–	+	+	+	–	–	+	+	–	–	–
32	+	+	+	+	+	+	+	+	+	+	–	–	–	–	+	–	+	–	+	+	+	+	+	–	+	+	+	–	+	+
33	+	+	+	+	+	+	+	+	+	+	–	+	+	–	+	–	–	–	–	+	–	+	+	–	+	+	+	–	–	+
34	+	+	+	+	+	+	+	+	+	+	–	–	–	–	–	+	+	–	–	–	+	+	–	–	+	+	–	–	–	–
35	+	+	+	+	+	+	+	+	+	+	–	+	–	+	+	+	+	+	–	–	–	+	–	+	+	+	+	–	–	–
36	+	+	+	+	+	+	+	+	+	+	–	–	–	–	–	+	+	–	–	+	–	–	+	–	–	+	+	–	–	+
37	+	+	+	+	+	+	+	+	+	+	–	+	–	+	+	–	+	–	+	–	+	+	+	+	+	+	+	–	+	–
38	–	–	–	–	–	–	–	–	–	–	+	–	+	+	+	–	+	+	+	–	–	–	+	+	–	+	+	–	–	–
39	+	+	+	+	+	+	+	+	+	+	+	+	–	–	+	–	+	–	–	–	+	+	–	–	+	–	+	–	–	–
51	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	–	+	+	+	+	+	+	+	+	+	+	+	+
No. of Ind. with																														
I.M.> 0	14	14	14	14	14	14	14	14	14	14	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
R.S.> 0	–	–	–	–	–	–	–	–	–	–	8	12	5	6	11	7	18	5	4	6	–	–	–	–	–	–	–	–	–	–
N.R.C.> 0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	13	15	11	7	12	12	18	6	4	6

performance. The greatest unfavourable situation has been observed for Chanea in which only four sectors (sic: 26, sic: 30, sic: 33 and sic: 36) are fast growing industries (Table 1, Column 7).

The most unfavourable situation is observed for Ionian and Aegean Islands and the region of Thrace. Only four sectors in Aegean Islands (sic: 26, sic: 32, sic 37, and sic: 51), six in Ionian Islands (sic: 21, sic: 26, sic: 30, sic: 36, sic: 37, and sic: 38) and five in Thrace (sic: 25, sic: 26, sic: 30, sic: 35, and sic: 38) showed positive net relative shift mostly because of the differential component. In contrast, the region of Epirus, as a whole, experienced gains of 5.12% in the overall period. Table 4 summarizes the patterns of growth in manufacturing employment for ten regions of the country.

IV. growth differentials and regional economic policies

It has been showed that the existing growth differentials in manufacturing employment between and within regions is attributed either to the fact that a region possesses fast (slow) growing industries at national level (positive industrial-mix), or to the attractiveness of the region because of comparative advantages (positive regional-share). This argument generates two major questions. The first is related to the

TABLE 5. *Boudeville Regional Classification Type*

Regional Classification Type	Industrial-Mix (I.M.) Component	Regional-Share (R.S.) Component	Relation Between I.M. & R.S.	Net Relative Change
Regional Type 1:	+	+	I.M. > R.S.	+
Regional Type 2:	+	+	I.M. < R.S.	+
Regional Type 3:	+	−	I.M. > R.S.	+
Regional Type 4:	−	+	R.S. > I.M.	+
Regional Type 5:	−	+	I.M. > R.S.	−
Regional Type 6:	+	−	R.S. > I.M.	−
Regional Type 7:	−	−	I.M. > R.S.	−
Regional Type 8:	−	−	I.M. < R.S.	−

type and direction of government policies in alleviating regional problems in depressed areas; the second to the selection of industrial sectors in each region which are promising of future development and growth. Regarding the first question, it is interesting to note that growth rates in underdeveloped regions can be enforced either through stimulation of new, fast growing industries, or through an improvement of the regional comparative advantages. Stimulation of fast growing industries in declining regions requires spatial diversity in the employment structure over time and, therefore, ability to predict the change and direction of this structure. On the contrary, improvement of the comparative position of the regions requires both identification of sectors with relative comparative advantage and the specification of the causes creating this advantage (resource, endowments, transportation facilities, agglomeration economies, etc.).[3] Below an attempt is made to investigate these issues.

1. *Boudeville Regional Classification Type*

In order to identify the type of regional policy needed and set priority among regions, Boudeville' s method (1966) is utilized. His method involves a classification of regions according to their performance in terms of composition and differential effects. He suggested an eight-fold classification of regional types to be made (Table 5). Regional types 1 - 4 are those that are growing faster than average, while regions 5 - 8 are growing slow or are declining. Boudeville's classification is included in Table 1, Column 6. On an aggregate regional level, only five regions (Greater Athens, Rest of Central Greece and Euboea, Epirus, Thessaly and Macedonia) fall in the first four regional classification type. Of them, only two (Greater Athens and Rest of Central Greece and Euboea) are prominent as the only regions with a positive industrial-mix component. Of the six regions showing negative net relative shift (Table 1, Column 5), the performance of Aegean and Aegean Islands was least satisfactory followed by Peleponnesos, Thrace and Crete. Of the fifty administrative departments, eighteen only fall in the sound base Boudeville' s regional classification type.

It will be argued here that the use of Boudeville' s regional classification could provide useful guidelines regarding future regional economic policies. As it has been argued elsewhere (Buck, 1970), «a region may grow slowly in relation to other regions as a result of its 'industrial - mix' or of 'locational disadvantages'. When the former applies (i.e. a region' s growth deficiency can be attributed to the structural component), this could appear acceptable in the sense that this situation can conceivably be rectified by policies acting on the distribution of industrial capital. In the latter case, however, where negative differential growth and not structure is held responsible for any shortfall, the implications for policy are felt to be different». Stilwell (1969), for example, suggests that deficiencies attributed to differential growth can be corrected either through an overall improvement in infra-structure of certain regions or through injection of growth industries in other regions. Either of these policies will make certain regions attractive in which to locate industries. Boudeville' s regional classification type allows classification of regions on a «priority» base in order (ascending/descending) of need for economic assistance and provides information concerning specific government policies towards which policy-maker should be directed.

2. *Industry Classification in Order of Potentialities*

The various economic development plans for Greece have set, as a major objective, the «exploitation of resources and development of each regional economy according to its comparative ad-

3. For a detailed analysis of the causes creating the comparative advantage see A.A. Andrikopoulos, *op. cit.* Also see Hellman (1976), Brown (1969), Chalmers and Beckhelm (1976), etc.

vantages in the dynamic sense, within the framework of the long-run prospectives concerning locational patterns of the Greek economy» (Ministry of Coordination, 1968). In the spirit of this objective and using the shift-share model, industries in each region are classified into three categories: (1) industries with comparative advantages in the dynamic sense; (2) industries of first priority for future regional development and growth; and (3) industries of second priority for economic development and growth. Industries of the first category are those that experienced differential growth in the seven-year period 1963 to 1969. First «priority» industries are those with both composition and differential effect being positive. Finally, industries in which one of the shift component (industrial-mix or regional-share) is negative constitute the second «priority» group of industries. Industries of the second category (first priority) correspond to Boudeville's regional classification of type 1-2. In contrast, those of the second group (second priority) correspond, more or less, to type 3-4 of Boudeville's classification. This industry classification for the ten geographical regions of the country is given in Table 6.

One might argue that the selection of industries according to their future potentialities gives an answer to the questions as how future economic development policy should be contacted. That is, in formulating regional economic policies there is a great deal of scope for equalizing regional growth rates by changing the industrial structure of the regions. As it has been argued elsewhere (Kerr, 1970), changes in industrial structure might produce income changes, since the income generating capacities of various industries differ. At the same time, income changes, through their influences on demand, will induce changes in industrial structure. This means that the different sectors in each region and department

TABLE 6. *Industry Classification according to Future Potentialities*

Region	Industry Group with Comparative Advantages 1	First Priority 2	Second Priority 3
I. Greater Athens	20, 21, 24, 25, 28, 38, 39, 51	21, 28, 39, 51,	20, 24, 25, 26, 27, 30, 31, 32, 33, 34, 35, 36, 37, 39, 51
II. Central Greece/Euboea	20, 22, 23, 25, 26, 27, 30, 33, 35, 37, 39, 51	26, 27, 30, 31, 35, 37, 39, 51	20, 21, 22, 23, 25, 28, 31, 32, 34, 36, 38,
III. Peloponnesos	22, 30, 33, 38, 51	30, 33, 51	20, 21, 22, 26, 27, 28, 31, 32, 34, 35, 36, 37, 38,
IV. Ionian Islands	21, 22, 35, 37, 39, 51	21, 35, 37, 51	22, 26, 27, 28, 30, 31, 32, 33, 34, 36 38, 39,
V. Epirus	20, 23, 25, 26, 32, 33, 35, 37, 38, 39, 51	26, 32, 33, 35, 37, 39, 51,	20, 21, 23, 25, 27, 28, 30, 31, 34, 36, 38, 51
VI. Thessaly	23, 26, 27, 34, 35, 36, 51	26, 27, 34, 35, 36, 51	21, 23, 28, 30, 31, 32, 33, 37, 39
VII. Macedonia	20, 22, 23, 24, 25, 26, 27, 28, 29, 31, 32, 34, 35, 36, 37, 38, 39, 51	26, 27, 28, 31, 32, 34, 35, 36, 37, 39, 51	20, 21, 22, 23, 24, 25, 29, 30, 33, 38
VIII. Thrace	25, 26, 30, 35, 38,	26, 30, 35,	21, 25, 27, 28, 31, 32, 33, 34, 36, 37, 38, 39, 51
IX. Aegean Islands	32, 37, 38, 51	32, 37, 51	21, 26, 27, 28, 30, 31, 33, 34, 35, 36, 38, 39,
X. Crete	22, 26, 32, 33, 36, 51,	26, 32, 33, 36, 51,	21, 22, 27, 28, 30, 31, 34, 35, 37, 39

Source: Table 4.

could be developed in such a way as to produce the necessary conditions for accelerating economic growth in that region and department. The above brief analysis provides two, but closely related, alternatives to that direction. First, stimulating industries with a «comparative advantage». At any point in time, there are some locations which are especially favourable to an industry than other locations. On the basis of the above analysis industrial sectors with such characteristics can be identified. Regional economic policies, therefore, based on the region's comparative advantage, should give first priority to those regions which «are capable of evolving into dynamic development pole» and promote the expansion of those industries with regional comparative advantage. This will result in a considerable specialization with all the subsequent benefits. Second, stimulating both fast growing industries at national level (positive industrial-mix) and industries with comparative advantage (positive regional-share). In any event, such policies will accelerate the reduction of disparities (income and standards of living) among regions and bolster economic growth in depressed areas.

V. concluding remarks

During the seven-year period 1963-1969 the economic performance of manufacturing employment among the economic regions of the country was quite uneven.[4] With the exception of a small number of regions and administrative departments, the majority of the country experienced negative rates of growth (Table 1). The declining performance in most of the regions was attributed either to the industrial structure of the region (industrial-mix component), or to the «competitiveness» of the region (regional-share component). Based on the shift-share model and Boudeville's regional classification type, two major recommendations are provided. The first sets priorities regarding government regional policies in accordance with the need for economic assistance; the second provides policy guidelines for future regional development and growth. Both these policies, we think, will accelerate economic growth in depressed areas and will reduce economic disparities among the regions.

4. The same situation was observed when three intercensal periods (1958-1963, 1963-1969, 1958-1969). For more detailed analysis, see A.A. Andrikopoulos, *op. cit.*

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