industrial structure and potential labor supply

by

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1. introduction

In the process of economic development, most economies tend to go through a stage that characterizes them as «dual economies.» A dual economy is commonly assumed to contain two sectors, a modern and a backward sector. The modern sector exhibits three main characteristics:

(a) It consists of large size plants employing highly developed techniques of production (usually capital-using methods), (b) most employed labor is hired, and (c) value added per capita and, consequently, wage rates are relatively high. The backward sector is correspondingly characterized by (a) small-size plants, (b) family labor as the main source of labor supply, and (c) low value added per capita and relatively low wage rates. The dualistic nature of developing economies is generally recognized and the relevant literature is voluminous.[1] What is often overlooked, however, is the coexistence of technologically advanced and backward plants within the same industry, mainly in the modern sector of the economy. Thus, we need distinguish between economic dualism and industrial dualism. In this paper we are concerned with industrial dualism as it applies to the Greek manufacturing sector. Of course, we do not intend to exhaust the subject of industrial dualism in Greek manufacturing. We are primarily interested in the effects of the existing industrial structure on the allocation of resources, and specifically on the efficiency in the use of labor. Consequently, our criterion of smallness (or bigness) of plants is the number of employees.

The problem of allocating labor efficiently among its various uses is always important, but it acquires a special significance in the case of the Greek economy which is presently operating at, or near, full employment level. Currently, there seems to exist, mainly among employers, a growing concern about the possibility of serious labor shortages which would impair the development of the manufacturing sector. Faced with this prospect and accustomed to operate under conditions of abundant labor, various employer's organizations have suggested measures of increasing the supply of labor some of which are reasonable and some of which are not. For example, importation of foreign workers has been suggested as a source of labor supply. It is easy, but beyond the scope of this paper, to show that under the present conditions and from the national econom-

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1. See, for example, the studies by Fei and Ranis [3], Jorgenson [4], Lewis [5], Lutz [6] and Watanabe [11], where additional references may be found.

ic policy point of view, this suggestion approaches insanity.

The purpose of this paper is to draw the attention of policy makers to the large amounts of labor supply that could be freed by proper reorganization of manufacturing and allocated to other uses.

2. dualism in Greek manufacturing

Industrial dualism may refer to the size distribution of firms and/or plants. It seems that it is preferable to deal with the distribution of plants rather than of firms, since the production unit is the plant, although the decision process may be carried out at the firm level, whenever a firm has more than one plant. Fortunately, the data available for the examination of the problem at hand are collected at the plant level, but unfortunately, the relevant variables such as employment, value added, etc. are classified and reported for only two sizes of establishments. Thus we have large scale establishments that employ, on the average, ten or more persons, and small scale establishments that employ less than ten persons, on the average. Nevertheless, the data are sufficient to show the dualistic nature of the Greek manufacturing sector, and its persistence over the years.

Tables 1 and 2 contain number of establishments (plants), level of employment, value added, and value added per worker by plant size, for 1959 and 1969, respectively. The tables are self-explanatory, but it is to be noted that despite the fact that value added per capita in large plants is more than twice as large as in small plants in 1959, the small scale manufacturing has retained its proportion in the number of establishments and the level of employment. Indeed, in absolute values it has increased its size in both number of establishments and level of employment, over the period 1959-1969.

TABLE 1. *Number of Establishments, Employment, Value Added, and Value Added per Capita, in Greek Manufacturing, 1959*

	Large-Scale Manufacturing		Small-Scale Manufacturing		Total
	Absolute Value	Percentage	Absolute Value	Percentage	
1. Number of Establishments	5,851	6	100,368	94	106,219
2. Employment (in thousand)	197	45	243	55	440
3. Value Added (in million drs)	9,142	67	4,552	33	13,694
4. Value Added per Capita (in thousand drs)	46.4	—	18.7	—	31.2

Source: See item [8] in the List of References.

TABLE 2. *Number of Establishments, Employment, Value Added, and Value Added per Capita, in Greek Manufacturing, 1969*

	Large Scale Manufacturing		Small Scale Manufacturing		Total
	Absolute Value	Percentage	Absolute Value	Percentage	
1. Number of Establishments	6,356	5	112,968	95	119,324
2. Employment (in thousand)	233	47	259	53	492
3. Value Added (in million drs)	30,514	76	9,403	24	39,917
4. Value Added per Capita (in thousand drs)	131.0	—	36.3	—	81.1

Source: See item [7] in the List of References.

Although the small proportion of large establishment may be explained by the fact that the industrialization of the Greek economy is at its beginning, the persistence of a high proportion of small establishments over a period of eleven years of rapid economic development undoubtedly reflects a complex economic, social and institutional environment that allows small and less efficient firms to coexist, side by side, with large and more efficient ones.

It is also seen from Tables 1 and 2 that value added per capita in small scale manufacturing has increased, between 1959-1969, by approximately 82 percent while in large scale manufacturing it has increased by 138 percent over the same period. The explanation of the difference falls beyond the scope of our present objective, but on the basis of the existing literature we feel certain to suggest that the phenomenon is related to the capital-intensive methods of production available to larger rather than smaller establishments.

More detailed and additional observations are available for 1969 and are presented on Table 3. It is seen that the great majority of establishments (87 percent) employ four persons or less. In this category of small scale manufacturing, 104 thousand establishments employ 204 thousand workers (41.5 percent of total employment) of which 141 thousand (or approximately 69 percent) are owners and non-paid family workers. At the other extreme, establish-

TABLE 3

	Large Scale Manufacturing								Small Scale Manufacturing		Total
	30 persons or more		20-29 persons		10-19 persons		5-9 persons		4 persons or less		Total
	Absolute Value	Percent	Absolute Value	Percent	Absolute Value	Percent	Absolute Value	Percent	Absolute Value	Percent	
1. Number of Establishments	1,515	1.3	1,035	0.9	3,806	3.2	8,769	7.4	104,199	87.3	119,324
2. Owners and non-paid family workers	1,368	0.8	1,419	0.8	6,499	3.9	15,946	9.6	141,217	84.8	166,449
3. Paid workers	155,259	47.6	22,690	7.0	46,157	14.2	38,863	11.9	62,913	19.3	325, 882
4. Total Employment	156,627	31.8	24,119	4.9	52,656	10.7	54,809	11.1	204,130	41.5	492,331
5. Annual Wages and Salaries Paid (in million drs)	8,095	58.9	921	6.7	1,689	12.3	1,282	9.3	1,755	12.8	13,742
6. Value Added (in million drs)	23,872	59.8	2,203	5.5	4,438	11.1	3,351	8.4	6,052	15.2	39,917
7. Value Added per Capita (in thousand drs)	152.41	—	91.34	—	84.28	—	61.14	—	29.65	—	81.08

Source: See item [7] in the List of References.

ments with 30 persons or more form only 1.3 percent of all establishments employ about 157 thousand workers (32 percent of total employment) of which only one thousand are owners and non-paid family workers. It is evident that the small scale manufacturing is predominantly a family enterprise. In terms of value added and wages and salary payments, establishments with 30 persons or more (1.3 percent of all establishments) rank first with approximately sixty percent contribution in both value added and labor remuneration. Finally, Table 3 shows that value added per capita is increasing with the size of the establishment, the biggest increases occurring between the two classes of small scale manufacturing and between the two largest classes of large scale manufacturing.

In terms of efficiency in the allocation of labor, Tables 1 and 2 make clear that there are extremely large margins in improving the allocation of labor within the manufacturing sector by encouraging the formation of large establishments at the expense of small ones. Even if the difficulties in implementing this transformation appear to be insurmountable, large gains in efficiency of resource allocation exist at least as a possibility.

3. potential labor supply in Greek manufacturing

It is of interest to obtain an estimate, even a rough one, of the amount of labor that would be released and become available for alternative employment if the level of output of small scale manufacturing were produced by large scale firms. The transformation of small scale to large scale manufacturing is an unrealistic expectation, particularly in the short-run, in view of the fact that small firms exist and compete successfully with large ones in all countries including the advanced economies of Western Europe and North America. Nevertheless, an estimate of the potential amount of labor supply, currently employed in small production units, can be useful in creating motivation for policy makers to provide a system of incentives and disincentives that would tend to increase the average size of establishments. As it turns out, the potential amount of labor supply is quite substantial.

Table 4 presents information on the number of establishments, value added, average annual employment, and value added per worker, for small and large scale manufacturing by branch for the year 1969. From the point of view of resource allocation, the additional information supplied by Table 4 is that, although value added per worker is always higher in large scale than in small scale manufacturing, the size of the differences varies substantially among manufacturing branches. Consider, for example, the differences in Furniture (86.3 versus 55.0 thousand drs in value added per capita annually), Paper (123.2 versus 37.9), and Electrical Machinery and Appliances (152.2 versus 16.3).

TABLE 4. *Statistical Data on Large and Small Scale Manufacturing by Branch, 1969*

Branch	Large Scale Manufacturing				Small Scale Manufacturing					
	Number of Establishments	Value Added (in million drs)	Average Annual Employment	Value Added per Capita (thousand drs)	Number of Establishments	Value Added (in million drs)	Average Annual Employment	Value Added per Capita (thousand drs)	Column (6) / Column (4)	Col. (7) — Column (9)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
20. Food	1,093	3,607	33,038	109.2	18,797	1,971	49,999	39.4	18,049	31,950
21. Beverages	122	1,027	5,585	183.9	2,895	2,265	8,122	32.6	1,441	6,681
22. Tobacco	126	1,254	9,774	128.3	22	19	233	81.5	148	85
23. Textiles	824	4,553	48,924	111.0	3,600	748	14,391	52.0	6,721	7,670
24. Clothing and Footwear	662	967	14,253	67.8	24,711	1,545	56,290	27.4	22,772	33,518
25. Wood and Cork	323	590	6.523	90.4	11,981	549	19,056	28.8	6,073	12,983
26. Furniture	245	421	4,876	86.3	7,810	1,000	18,179	55.0	11,587	6,592
27. Paper	107	786	6,380	123.2	220	58	1,530	37.9	471	1,059
28. Printing and Publishing	245	974	7,321	124.5	1,684	396	5,933	66.7	3,181	2,752
29. Leather	242	346	3,683	89.1	1,542	220	4,490	49.0	2,469	2,021
30. Rubber and Plastic Products	193	1,809	9,134	143.3	688	95	2,544	37.3	663	1,881
31. Chemicals	204	2,965	13,759	236.5	683	115	2,566	44.8	537	2,029
32. Products of Petroleum and Coal	19	818	1,504	543.9	54	16	340	47.0	29	311
33. Non-metallic Mineral Products	629	2,686	17,852	150.5	4,245	439	16,361	26.8	2,917	13,444
34. Basic Metal Industries	20	2,466	5,837	422.5		1	34	29.4	2	32
35. Metal Products	436	1,685	15,134	111.3	11,909	899	25,570	35.2	8,077	17,493
36. Machinery and Appliances	318	780	8,659	90.1	1,904	322	6,280	51.3	3,574	2,706
37. Electrical Machinery and Appliances	202	1,773	11,649	152.2	1,854	115	7,051	16.3	756	6,295
38. Tansport Equipment	251	1,359	15,638	92.8	6,207	318	13,601	23.4	3,427	10,174
39. Miscellaneous	95	214	2,169	98.7	2,957	316	6,369	49.6	3,202	3,167
Total	6,356	30,580	233,392	131.02	112,968	9,406	258,939	36.3	96,096	162,843

Source: See item [7] in the List of References.

The amount of labor required to products the 1969 level of output of the small scale manufacturing, assuming that it was produced under the technological and organizational conditions prevailing in the large scale manufacturing, is obtained by dividing value added of column (6) by value added per capita of column (4). The result is reported in column (9) which shows that the volume of production of small scale manufacturing if produced by large scale manufacturing would require about 96 thousand workers. By substracting the required from the actually employed labor we obtain an estimate of the

number of workers that could be transferred to alternative productive uses. Column (10) of Table 4 presents this information by branch of industry. For the whole sector the number of transferable workers was approximately 163 thousand in 1969.

As was mentioned earlier, small size firms have shown a remarkable ability to survive and produce side by side with large firms. Establishments with less than ten workers, employ 15 percent of total employment in Japan (1960), 4 percent in the United States (1958), and less than 4 percent in Great Britain (1951).[1] Therefore, it would be unrealistic to expect a complete elimination of small establishments in Greece. Assuming that during the next ten years from 1969, under the present pressure of a tight labor market the share of small manufacturing in employment reduces to 30 percent, the absolute level of employment would be 147 thousand thus realising 112 thousand workers. This is so even if its level of output doubles, because its value added per capita has also doubled (see Tables 1 & 2). Considering large manufacturing, its value added in real terms between 1959 and 1969 has increased by 191 percent, from 9,142 to 26,645 million drs, while its value added per capita has increased by 146 percent, from 46.4 to 114.1 million drs. In 1979, ten years from 1969, if the same changes occur, the level of value added would be about 77,300 million drs, a 191 percent increase, and the value added per capita 281.4 thousand drs, a 146 percent increase. In this case, the amount of labor required would be 303 thousand workers, namely 70 thousand workers over the 1969 level of employment. Substracting 70 from 112 thousand leaves us with 42 thousand workers who can be used in other sectors of the economy.

Of course, under different assumptions somewhat different estimates will be produced. However, the main point of this arithmetic is to make clear that, under reasonably realistic assumptions, a policy of encouraging a shift from small to large establishments, in addition to other benefits, would generate enough labor supply to accommodate increasing levels of output.

4. concluding remarks

The preceding section established the fact that there exists a substantial amount of labor, now employed in the small scale manufacturing, which under certain conditions can be released and used in other lines of production. Or, alternatively, this finding may be interpreted as saying that the level of manufacturing production can increase without additional labor input, as long as the average size of manufacturing establishment increases along with the other necessary organizational changes.

In view of the fact that value added per worker increases with the size of the establishment, the policy recommendation resulting from the above calculations is that the expected and desired growth of the manufacturing sector should not be based on a policy of abundance of labor, but rather on a policy of structural reorganization. If such a reorganization is effected, the growth of manufacturing will not seriously be constrained by labor scarcities.

There are other well-known advantages as well as disadvantages connected with large scale firms.[2] Perhaps the most important advantage for the Greek manufacturing sector is the reduction in the cost of production per unit of output which, of course, is the reverse of the high value added per worker. In the presence of international competition, both in the domestic and foreign markets, the reduction in cost seems to be of vital importance for the expansion of Greek manufacture. Another strong argument in favor of larger firms is that a large firm has the interest and financial ability to devote substantial amounts of resources to research that improves the level of technology applied to production as well as to the development of new, and presumably better, products. Of course, at the present time this argument is of no practical significance in the case of Greek manufacturing firms, but it could be in the future, hopefully not the very distant one. From the point of view of incomes policy, the variable corresponding to high value added per capita is the high level of wages. For whatever reasons, high marginal product of labor or ability of firms to pay, etc., larger firms usually pay higher wages. Thus, a policy that encourages larger establishments would also have an equalizing effect on the distribution of labor earnings.

On the other hand, the observed trend toward big firms has been criticized on the grounds that it may mean a deviation from competition, as it is easier for fewer firms to cooperate and limit competition among themselves with an unfavorable result on the consumer. This is certainly a valid argument but it is of limited practical significance for the Greek manufacturing sector. Notice that for the industries with substantial labor surpluses, i.e. Food, Clothing and Footwear, Wood and Cork, Non-metallic Mineral Products, and Metal Products, the number of establishments runs in the thousands (see Table 4).

In conclusion, the author's opinion is that an economic policy scheme of incentives and disincentives that would encourage a larger size of manufacturing firms would be beneficial in terms of (1) efficiency in

1. See, Broadbridge [1], table 12, p. 50.

2. See Denison [2], Chapter 18, Slichter [9] and Stigler [10].

the use of labor whose scarcity is increasing, (2) cost of production per unit of output, and (3) distribution of labor earnings. Furthermore, no monopolistic elements should be expected to appear in the near future, as a result of such policy.

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