LABOR PRODUCTIVITY IN ISRAELI MANUFACTURING: SOME PRELIMINARY FINDINGS

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In the mid-1970's, Israel had lower income per head than Western Europe, because Israel employed fewer workers per head than Europe and had too many workers in low productivity sectors. Several Israeli manufacturing sectors bear comparison with their European counterparts in productivity per workers, though on average, North European laborers produce about three-fifths to two-thirds more than Israelis in manufacturing. Some common explanations are examined and rejected.

Despite the convergence of real incomes between Israel and Western Europe during the period since 1948, the gap remains large. It is doubtful whether Israeli domestic product per capita is even half that of Western Germany or Sweden (see Table 1). This paper applies some of the procedures of Simon Kuznets (1967: ch. 3) and Irving Kravis (1984) to analyze why Israel still lags behind[2].

I proceed by separating out the influence of Israel's unusually low labor force paricipation and then, in the following section, decomposing the remaining productivity gap into that part explained by sectoral and branch productivity and that part accounted for by the sectoral branch composition of the entire economy. In the last section, I consider possible explanations for the observed productivity gap in the key manufacturing sector.

LOW LABOR FORCE PARTICIPATION

One way to analyze any difference in average productive capacity would be to examine the relationship between labor productivity and several demographic and social factors. By way of illustration, let us examine this statistical identity:

$$GDP/N = (LFP) \times (LP) \qquad \text{(Eq. 1)}$$

Where GDP/N = gross domestic product per capita;

LFP = labor force participation of the whole population (or L/N, where L is the employed labor force);

LP = average labor productivity or $\sum_i \frac{VAi}{Li}$ (Li/L) for all i sectors.

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Labor productivity is measured as the average production of value-added in all economic sectors – manufacturing, agriculture, utilities, services – weighted by their shares in employment. Our statistical breakdown means Israel's lag behind Western Europe could be accounted for by lower labor force participation, lower productivity, or a poorer allocation of labor among sectors.

In order to compare Israeli output per capita with that in any other country, price evaluations for output must, of course, be chosen, as well as a year or years for comparison[3]. This paper deals with the years 1975-76, for which the necessary price data were last available. It does not appear that the basic findings would be much changed if good comparative price data were available for the volatile years since that time.

Table 1. Civilian Labor Force Participation in 1976 and the Economic Gap

	(1) GDP/N index	(2) NA/N percent	(3) LF/N percent	(4) Unemployed (LF-L)/LF percent	(5) L/N index	(6) Part of GDP/N explained by L/N alone[3] percent	(7) GDP/L
Switzerland	244	65.2%	47.8%	0.7%[1]	149	34	164
Sweden	227	62.7	50.4	1.6[1]	155	44	146
West Germany	224	64.1	43.4	4.6[2]	130	24	172
Netherlands (1977)[4]	213	64.7	37.7	5.5[2]	112	10	191
Denmark	200	64.0	49.9	6.1[2]	147	47	136
Belgium	198	63.0	41.0	8.6[2]	117	18	169
Norway (1970)[4]	197	61.1	37.7	1.8[2]	116	17	170
France	190	63.1	41.9	4.2[2]	126	29	151
U.K. (1971)[4]	165	62.7	46.3	5.9[2,5]	137	56	121
Italy	126	64.3	35.5	3.7[1]	107	28	118
Spain	120	62.6	37.6 (1975)	1.9[2]	116	78	104
Israel	100	60.9	33.1	3.6[1]	100	—	100

Symbols:
GDP – gross domestic product
N – permanent population
NA – population of active ages 14-64 inclusive
LF – civilian labor force
L – employed full- or part-time

Footnotes:
[1] According to special survey.
[2] According to registered job-seekers (generally lower than survey estimates).
[3] The percentage of the difference between the figure in col. 1 and 100 which accounted for the difference between col. 5 and 100. The remainder is composed of the effect of productivity alone and an interaction term.
[4] Population and its components according to the census of this year.
[5] Includes temporary layoffs.

Sources:
Martin C. Spechler (1980: Table 4).
U.N. *Yearbook of Labour Statistics* and *Israel Statistical Yearbook*, various years.

In Table 1 we express the relationship above (Eq. 1) as an index, with Israel as the country of comparison (=100). Thus, the relative output per capita in Switzerland was about 2.44 times that of Israel in 1976, employing Israeli relative prices (col. 1). Switzerland had 1.49 times as many employed workers per head of permanent population (col. 5). Hence the gap in output per capita is decomposed as

$$244 = (149) \times (164)$$

The last index, given for all countries in column 7 of Table 1, is the implied gross domestic product per employed worker for the given country, when Israel is 100.

A considerable part of the economic gap in output per head between Israel and democratic Europe comes from differences in labor force participation (the middle term on the right of Eq. 2). In 1976 only 31.9% of the Israeli population were gainfully employed. This figure is computed by deducting the appropriate unemployment rate (col. 4 of Table 1) from the labor force participation. By comparison, Western European countries have rates which range from 34.2% in Italy up through 49.6% for Sweden (not shown in the table). This means that even had average labor productivity in Israel been equal to that in Europe, Israel's GDP per capita would still have been 7 to 55 per cent lower than in those same European countries (col. 5). In other words, *a quarter to half or more of Israel's lag behind the richest countries of Northwest Europe can often be attributed to the latter region's distinctly higher proportions of economically active persons* (col. 6).

EXPLANATIONS OF LOW LABOR FORCE PARTICIPATION

Employment per capita can be further decomposed into three components: the employment rate (100 - col. 4), the rate of labor force participation in active ages (col. 3 ÷ col. 2), and the active ages as a share of the whole age structure (col. 2). Put otherwise,

$$L/N = (L/LF) \times (LF/NA) \times (NA/N) \qquad \text{(Eq. 2)}$$

where the last term is defined as in Table 1.

It is interesting to note in passing that the variance in labor force participation between Israel and Western Europe comes almost entirely from different rates of participation among the active ages, i.e., from 14 or 15 to 64. The relevant difference in age structure (col. 2) between Israel and the Western European countries is quite small. No Western European country employs so few inhabitants in the active ages for market production. In Israel only 54% of adults below retirement age were in the labor force in 1976. The corresponding figure for Sweden was 80%. These rates are influenced by the size of the respective armies, the level of overall development, the rates of natural increase, and family culture. But even in conservative and semi-developed Spain, 60% of the working-age population are employed outside the home.

Israel's low rates of civilian labor force participation in the active ages can in turn be traced to low participation of both sexes, though perhaps for different reasons. Only 69.1% of Israeli men aged 15 to 65 are economically active. This compares with 79-81% in France, Italy, and Spain or 85-89% common in Northern Europe. The lower

Israeli figures may be explained by longer army conscription and more common university attendance. But the gap for adult women in comparison with the richer countries of Northwest Europe is even more striking. In 1976, only 35.6% of Israeli women aged 15 to 65 were actively in the workforce, compared with about half of French or German women, 64% of Danish women, and 69.1% of the Swedish. The Italian and Spanish rates of female participation are similar to Israel's, but in these much more predominantly agricultural countries, the statistical concept of labor force participation by unpaid family members is not exactly comparable.

The fact that so many more Swedish, Danish, and other North European women work outside the home has a dramatic effect on the measured output per capita, when compared with countries of Southern Europe or with Israel. In Israel, as of 1976, only one-third of married women were in the civilian labor force, though this has since risen to above 40% in the more difficult economic situation since. Possibly, the rise has resulted from the passage of an immigrant generation whose attitude to women's work outside the home was more negative than among the younger Israeli-born couples.

If more Israelis were to work, would this not have an effect on productivity?

Economic logic informs us that as more and more people go out to work, the average level of productivity should be lower, since more individuals of lower ability are included – children, for example. Moreover, work outside the household by most married women tends to reduce the measured productivity of workers in the country, simply because a larger share of them refrain from working extra hours and extra jobs. It is also possible that high market participation rates will create a need for personal services, the productivity of which is poorly measured, low or unknown. For all these reasons, one may speculate that if the rate of labor participation had been higher in Israel, particularly among women and juveniles under military age, the productivity gap (col. 7) might have been somewhat larger.

Incidentally, a certain offset for the relatively lower labor force participation rates of resident Israelis comes from non-resident Arabs who cross the border from the occupied territories to work in Israel proper. These non-residents accounted for 5.4% of Israel's labor force in 1976 and 4.5% of all employed workers in industry and mining. Similar numbers of foreign workers, however, are employed in Northern Europe. Hence the participation of foreign workers little affects the gap between Israel and most of the richest countries of Europe. It is, therefore, quite clear that the majority of the gap in output per head which we are trying to explain comes from differences in average productivity of Israel's economic sectors, as compared with those of Europe.

After adjustment for social and demographic characteristics, the gap in productivity per employed worker is a good deal less than the gap in domestic product and incomes per head of population. But Israel is still uniformly behind Europe.

LABOR PRODUCTIVITY ECONOMY-WIDE

The implied labor productivity disadvantage for the entire Israeli economy ranges from 4% (Spain) to 91% (the Netherlands), as reported in Table 1, Col. 7. The median country of our sample (France) produces 51% more than Israel per worker.

This gap could, of course, be broken down into the gap for each major sector, as well as Israel's somewhat different sectoral composition (see Table 2). For lack of

statistical measurability and comparability outside manufacturing[4], however, this paper concentrates on manufacturing, whose share in the countries ranges from slightly less than a quarter of employment to just over one-third.

Besides considerations of statistical measurement, there are other reasons to give primary attention to the manufacturing sector. Manufacturing determines technological change throughout the economy to a very great degree. True, service enterprises like the universities and banks also contribute to improving efficiency elsewhere, and they too earn foreign currency directly from their efforts. But it seems doubtful if it would be possible for Israel to afford such a large and well-furnished service sector[5] without the productive capacity displayed by manufacturing, agriculture, and tourism.

LABOR PRODUCTIVITY IN MANUFACTURING

Conceptually, sectoral productivity is the value of net output by all productive units within a sector per unit of input, once adjustment is made for purchases from other sectors. That is, we divide the value-added created in each sector by the productive inputs available to the sector – chiefly, the stock of capital and employed workers. The reciprocal of productivity would be the average physical cost of producing a unit of output. In the absence of comparable figures on capital stocks for a large share of the European countries in our group, the present paper concentrates attention on labor productivity or the expenditure of labor per unit output.

Table 2. Employment by Sectors (1976), in Percentage of Civilian Labor Force

	Agriculture Forestry, Fishing	Manufacturing & Mining	Other:*	Including Finance & Other Private Services	Public Services**
Israel	6.4	24.3	69.3	6.8	33.8
Denmark	9.3	22.5	68.2	6.2	30.9
France	10.8	28.3	60.9	6.0	22.6
Fed. Rep. Germany	7.1	36.3	56.7	5.5	21.8
Italy	15.5	34.2	50.3	n.a.	n.a.
Netherlands	6.5	23.2	70.3	5.7	27.9
Spain	21.4	27.5	51.1	3.1	15.8
Sweden	6.2	27.4	66.3	5.9	31.2
United Kingdom (1975)	2.7	32.4	64.9	5.6	27.5

Source: ILO, *Yearbook of Labor Statistics*, 1977

* Construction, communications, utilities, trade, and all services n.e.c.

** Communal, social, and personal.

To compare the output of Israel's manufacturing sector in 1975, it was necessary to translate the output in Europe according to a *real* exchange rate for each of the eighteen branches of manufacturing separately. Real exchange rates – the ratio of prices for similar commodities, sometimes called lira-dollar ratios for Israeli-American comparisons – are more appropriate to the measurement of productivity than the nominal

exchange rate for capital or even than the effective exchange rate (see Table 3). In 1975, the official exchange rate in Israel was too strong – that is, the lira price of foreign exchange was too low. What is more, any translation according to the *diverse* effective exchange rates (which allow for differential duties) would have the effect of reducing significantly the differences in productivity among the various branches. This is because a weak sector in Israel – like textiles, whose productivity is relatively low in comparison with the outside world – faces a higher price of foreign exchange. A weak "textile lira" offsets the sector's low productivity, principally as a way of defending this sector's output from competitive imports. The reverse would be true of a strong sector like non-metallic minerals. Translation according to systematically-differentiated effective rates of exchange would consequently obscure the inter-branch differences we are trying to identify.

From a theoretical point of view, in optimal and balanced trade the effective exchange rate would reflect *marginal* costs in Israeli currency for a dollar saved. Suppose effective exchange rates are set at a rate just sufficient to stimulate the desired amount of exports or import substitute production[6]. The situation would resemble the one depicted in this diagram where the production of a certain branch incurs increasing costs as one exports more in dollar terms, particularly for distribution abroad.

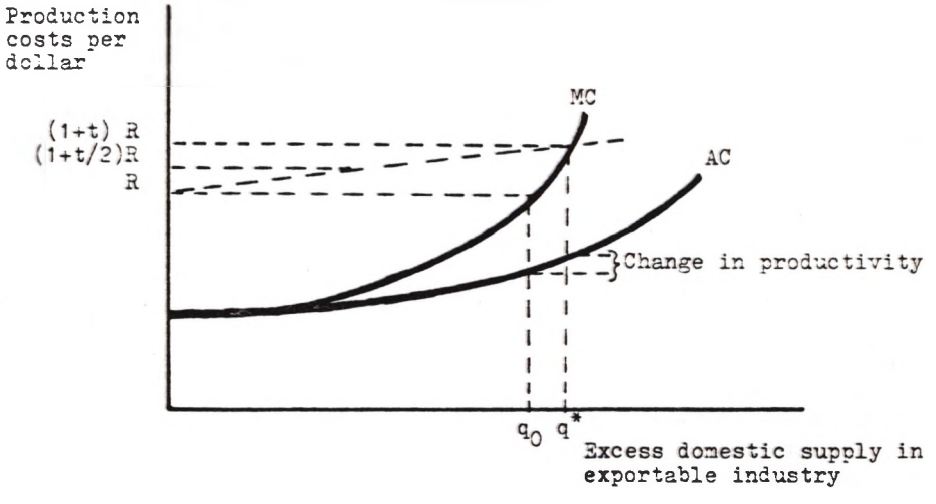


Figure 1. The Relationship between Rates of Exchange and Costs or Productivity in an Export Branch

If the rate of exchange were set at R to the dollar, then the market response would be to export q_0 only. However, if employment and national autarchy required more exports, say q*, then an export subsidy of t per cent would be needed. An increase in exported output from q_0 to q* would mean an increase in marginal costs. Normally, average costs would rise, too, indicating lower productivity in the branch. Note that the effective exchange rate in this theory does not in itself measure average costs of production, the reciprocal of which is average productivity, but the two measures do vary together. This means that the differentiated average cost per dollar saved is the best direct indicator of branch productivity – not the marginal effective exchange rate.

Table 3. Rates of Exchange in 1975[1]

	(1)	(2)	(3)	(4)	(5)
	Code no.	Effective exchange rate[3] (IL/$)	Relative rate of protection (1974)[3]	Real exchange rates[3] (IL/$)	Excess protection[3] [col. 2 ÷ col. 4]
Food, beverages & tobacco	11 - 12	10.35	1.27	8.06	1.28
Textiles	13	10.87	1.48	8.86	1.23
Clothing & made-up textiles	14	12.57	1.90	10.31	1.22
Leather & its products	15	9.41	1.42	9.63	0.98
Wood & its products	16	10.97	1.65	8.29	1.32
Paper & its products	17	10.24	1.27	6.38	1.61
Rubber & plastic products	19	13.12	1.74	7.68	1.71
Chemical & oil products	20	7.99	1.05	7.30	1.09
Non-metallic mineral products[2]	21	9.41	1.21	6.05	1.56
Basic metal	22	8.85	1.11	8.94	0.99
Metal products	23	8.25	1.21	8.94	0.02
Machinery	24	9.67	1.33	9.51	1.02
Electrical & electronic equipment	25	9.36	1.44	6.70	1.40
Transport equipment	26	11.47	1.68	8.70	1.32
Miscellaneous	28	—	—	8.33	—

[1] Average for the year
[2] Excludes diamonds
[3] Weighted average

As predicted by this theory, Table 3 shows that the adjusted effective exchange rate (col. 2) for 1975 differed somewhat from the computed real exchange rates, as listed in col. 4. The difference gives an approximation of the profitability of exporting in the branch, if price equals marginal cost and the difference between price and average cost

is unit profit. That difference also measures what might be called "excess protection". When import duties rise, the marginal costs for import substitutes will be higher. Protection widens the gap between marginal and average costs, though the exact rates created depend on the elasticity of domestic costs in the whole branch.

For these reasons, I have not used the estimates of the effective exchange rates by manufacturing branch made for another purpose by Josef Baruch, as reproduced in Table 3.

A more correct procedure for estimating relative output, in my opinion, is to express all output in dollar terms (delivered to Israeli ports) for the purpose of estimating the capacity of each Israeli manufacturing branch to make products of quality and assortment appropriate to the European market. Up to the mid-1970's there had never been data on the real rates of exchange for a reasonably representative sample of Israeli products. Then, during a study of the possible effects of a trade agreement between Israel and the EEC, Benjamin Toren collected estimates from Israeli manufacturers of the cost of IL of a dollar's worth of imports saved or, alternatively, the proceeds in dollars of a lira's worth of exports. I was able to use the manuscript findings from Toren's study with respect to dozens of product categories[7]. This sample was a small part of the tradeable products of Israeli industry, but, once properly weighted by sales, it provided the best available estimate of the necessary lira-dollar ratios from the mid- and late-1970's. These constitute the real exchange rates summarized in Table 3.

To make the conversions of output values for the whole year 1975, it was of course necessary to convert the real exchange rates collected for 1974 or early 1975 to a common date, taken to be the mid-point of 1975. For each branch (except miscellaneous and diamonds) we used the formula

$$R_t \frac{p^h_{75\text{-}t}}{p^f_{75\text{-}t}} = R_{75} \qquad \text{(Eq. 3)}$$

where R_t is the measured lira-dollar ratio for a period t months before mid-1975,

R_{75} is the constructed estimate of the lira-dollar ratio for mid-1975

$p^h_{75\text{-}t}$ is the increase in the price index between the date of sampling and June-July 1975

$p^f_{75\text{-}t}$ is the increase in dollar prices in the foreign trade conducted by Israel in products of the sector between the period of sample and mid-1975.

Using this adjusted real exchange rate, one could express both Israeli and European production in dollars for mid-1975, making the assumption that European traders traded in dollars and thus received their proceeds or paid their invoices in dollars. Each European currency could then be converted to US dollars at the average official rate for the given currency during 1975 (see Spechler, 1979).

Table 4 presents a summary of the findings. One can see that the manufacturing value-added on average was 22% to 110% higher for four European countries than for Israel. Using an unweighted geometric average, one can say that the four Northwestern

European countries studied here produced 2/3 more per worker than did the Israeli manufacturing sector.

Israel's productivity gap in the manufacturing sector is not greater on average than it is in other sectors of the economy, except for Sweden. Comparing the last two rows of Table 4 with the appropriate line in col. 7 of Table 1, we see that the U.K. has 21% higher product overall per worker than Israel, with 18-22% in manufacturing alone. This implies that for the U.K., the productivity gap is about the same for non-manufacturing as for the measured manufacturing sectors. The same is true for the comparison with West Germany. Sweden and, to a much lesser degree, Denmark display higher relative manufacturing productivity than they do in their other sectors. Given those countries' propensity for exporting manufactured products to Israel and importing tourist and agricultural services, that is perhaps as one would have expected. It is also possible that Swedish-manufactured products were somewhat overpriced in the mid-1970's relatively to the North European market.

Which Israeli sectors seem to have the highest productivity relative to West Europe? First in relative standing would be non-metallic minerals, then (2) paper, (3) rubber and plastic, (4) basic metals (5) printing and publishing, and (6) electric and electronic equipment. Looking at the other end of the spectrum, the weakest sectors in Israel, as compared with Europe, were (15) chemicals and petroleum products, (14) clothing, (13) transport equipment, (12) leather products and (11) food and tobacco. The ranking versus each of the four North European countries was very similar, with the Spearman rank correlations of the columns running from 0.50 to 0.94. This means that the differences among the Israeli manufacturing branches dominate the ranking: changing the identity of the European country taken as a basis would not change much. That is as it should be, because the four North European countries are close to one another. They trade among themselves rather freely. Israel is more distant, geographically and commercially.

An interesting conclusion is implied by the last two rows in Table 4. The average gap in productivity according to Israeli weights is uniformly and significantly larger (by one s.d.) than the unweighted average. Evidently, Israel is allocating resources to sectors which have a comparative *disadvantage* with respect to the outside world! If Israel had allocated resources among its sectors entirely at random or in equal shares, the Israel economy would have attained an average productivity higher than it actually achieved. For example, the gap *vis à vis* West Germany was 80% in fact, but it would have been only 67% had allocation been equal. Obviously, the gap could have been even smaller than 67% had allocation favored branches with high relative labor productivity. In other words, at least a tenth of the actual gap in manufacturing productivity is ascribable to an economic policy in Israel which runs against static productivity industry by industry[8]. To put the matter even more strongly, had it been possible to increase the weight of the strongest Israeli industries by half, the average productivity gap would have fallen to .53, instead of .66. The observed productivity gap might have been reduced by 20%. Instead of being eighty per cent above Israel, Europe would have been only 53% above.

When considering the results for individual manufacturing branches in Israel, one should keep in mind that each branch itself is a conglomerate of producers. No doubt, within branches there are sub-branches and enterprises which display relative labor

Table 4. Labor Productivity of Israel and Some European Countries in 1975

	Share in Israel	Value-added per Employee (Israel = 1.00)					
		F.R.G.	U.K.	Denmark	Sweden	Average	Rank
Food, beverages, & tobacco	.16	2.24	1.17	1.97	2.25	1.85	11
Textiles	.11	1.97	1.22	2.13	2.22	1.84	10
Clothing & made-up textiles	.07	2.64	1.38	1.97	2.59	2.08	14
Leather & its products	.01	2.10	1.43	1.90	2.44	1.93	12
Wood & its products	.05	2.02	1.50	1.42	2.56	1.82	9
Paper & its products	.03	0.99	0.67	1.09	1.88	1.08	2
Printing & publishing	.05	1.50	1.06	1.45	1.84	1.44	5
Rubber & plastic products	.06	1.35	1.44	1.16	1.37	1.33	3
Chemical & oil products	.10	1.91	1.90	2.39	2.40	2.14	15
Non-metallic mineral products	.06	0.79	0.56	0.79	0.89	0.75	1
Basic metal	.04	1.41	1.06	1.27	1.81	1.36	4
Metal products	.11	1.80	1.32	1.79	2.19	1.75	8
Machinery	.04	1.60	1.35	1.66	2.02	1.64	7
Electrical & electronic	.07	1.64	1.13	1.66	2.06	1.59	6
Transport & equipment	.06	2.33	1.24	1.86	2.92	1.99	13
Unweighted average		1.67	1.18	1.57	2.02	1.59	
Average weighted by Israel's value added		1.80	1.22	1.70	2.10	1.66	

productivity quite different from the average – much better or much worse than the branch average. It is quite possible that a reallocation of resources, in favor of stronger enterprises *within* a branch would give results no less dramatic than those demonstrated by our contra-factual experiment with a more rational interbranch allocation. Were conscious or market-mediated economic policy to favor mobility of resources to branches and enterprises with international comparative advantages, much could be done to offset Israel's productivity gap relative to the European market, in which Israel must compete more and more in the future.

A POSSIBLE EXPLANATION

Can we say anything about why some Israeli industries are stronger than others? One plausible explanation would follow from the theory of the "trade cycle". According to this theory, developed in the literature of international trade by Raymond Vernon, Seev Hirsch, and others, a relatively backward country – in this comparison, Israel – would suffer from a particularly large gap in the most sophisticated industries because it is unable to compete on technology (Vernon, 1966; Hirsch, 1967). In more traditional and well-understood branches, though, the disadvantages would lessen or go

away. When I checked the relationship between the productivity gap here and a synthetic index of technological sophistication constructed by Benjamin Toren (1980: Table 32), there did not seem to be any significantly positive relationship (r_s = .05) between the productivity gap overall and technological sophistication[9]. Several "obsolescent" branches, like food, textiles and clothing, were particularly backward in Israel.

EXTENSIONS

From preliminary investigation, an explanation which appears more promising is connected to the cheapness of inputs. Israeli manufacturers suffer from the fact that they are forced to buy raw materials at great expense because of the distance from the source or for political reasons. Past studies of U.S. and U.K. industries have shown that relatively high value-added per worker may be the result of having cheap raw materials near at hand as well as using them efficiently. An extension of the present research would consider the nature and price of material inputs in the countries involved. Examination of the table does show several instances – chemicals and petroleum products or vehicles, on the one side, or non-metallic minerals on the other – in which the apparent cost of raw materials seems to affect Israeli manufacturing productivity. Oddly, inexpensive agricultural products in Israel apparently do not improve the measured productivity of the Israeli food industry, at least not at this level of aggregation.

It would be desirable also at a later stage of productivity research – up to now almost ignored in Israel – to examine other factors which may explain productivity levels and change in Israel. Preliminary investigation indicates that such familiar factors as capital-intensity, the size of enterprises, and the rate of growth of demand do *not* explain much of the gap. Nativization of the labor force and, more lately, vested interests of labor (and management) representatives would be likely candidates to try (Olson, 1982).

CONCLUSION

Statistical analysis has been employed to compare Israel with several West European countries with which it has institutional and structural similarities. The size of the gap in real output and its explanation, however, varies significantly with the specific European states involved.

1. In the comparison with the northern countries of Sweden, West Germany, Denmark, as well as Switzerland, much of the large gap per capita can be assigned to greater labor force participation. The first three also have about double the Israeli productivity in well-established manufacturing industries, like textiles and food products.

2. With respect to France and the U.K., the real gap is somewhat less. The overall and manufacturing productivity gap in favor of the U.K. was quite modest in 1975 – only about a fifth. But higher labor force participation in the U.K. accounts for a majority of this difference.

3. Israel's gap per capita was estimated at only about a quarter below that of Italy and only slightly below Spain. Lower participation of Israeli men in the civilian labor force and some apparent productivity differences explain these small gaps.

4. The observed gap in productivity could be reduced considerably by emphasizing those Israeli industries with a comparative advantage measured in relative labor costs. But general efficiency and organization are apparently also subject to improvement if the European level of output per worker is to be matched.

FOOTNOTES

[1] Visiting Associate Professor of Economics; formerly, Department of Economics and Foerder Institute, Tel-Aviv University. An earlier version of this paper was presented in Hebrew on January 25, 1982, before a symposium of the Faculty of Industrial Engineering and Management at the Technion in Haifa. Thanks are due to S. Plaut, I. Modan, Ezra Hadar, and others for stimulating suggestions.

[2] See the author's survey indicating a closing of the gap between Israel and Europe even during the early 1970's (Spechler, 1980).

[3] Every choice of this sort has a definite economic significance. Here, the choice is such as to bear on the ability of Israel to produce a basket of goods appropriate to the European market, as we know from Moorsteen's Rule. For further explanation, see Spechler, 1979. In addition, there will be some sensitivity of all such price comparisons to the bundle of commodities chosen. How much cannot be determined without additional data.

[4] We lack a market measure for public and communal service output which would be distinct from the measure of input. As for trade, transportation and financial services, the market they are traded on is nearly entirely closed to international competition. Consequently, for these commercial services there would also be great difficulty in comparing and evaluating output cross-nationally. These two measurement difficulties do not apply to tourism, which is an exportable service by definition. But it turns out to be very difficult to measure the number of employed persons from various branches who produce for and cater to the tourist. Moreover, a crucial input to tourism is climate. The difference in winter conditions between Israel and Europe contributes to the success of the Israeli (and Spanish) tourist industry, not to mention a sizable share of agriculture. For all these reasons, then, a comparative appraisal of the productivity of non-industrial sectors can be misleading on account of important factors of production available in Israel without cost.

[5] The average salaried employee in 1976 earned IL 2568 monthly. In the communal services the figure was 90% of this. Employees in industry earned 6.6% above the average and in financial services 19.7% above. For the sake of industrial comparison, Simon Kuznets has found that in developed countries in 1960 the output of workers in the non-financial services was 94% of the GDP per employed worker in those countries. Services employed 37.4% of the workforce on average in them. Hence, we can see that Israeli services are not particularly favored. Kuznets (1971: Table 31)

[6] Called "made-to-measure tariffs" when referring to import substitutes? Even adjustment for the degree of openess of the Israeli economy would not be sufficient since the capital account is so overwhelming for the rate of exchange after the reform of 1977.

[7] Use of the original questionnaire was made possible thanks to Mr. Abraham Shaliv. Benjamin Toren's project is the basis of Pomfret and Toren (1980). Help of the Ministry of Trade and Industry is hereby acknowledged.

[8] Comparatively high (or low) labor productivity could be explained, too, if Israel had a higher (or lower) capital intensity than normal in a particular branch. But this would be peculiar and probably reflect another kind of inefficient allocation.

[9] The index of technological sophistication in Toren's study is a sum of points for eight separate components of the technological level, as judged by experts.

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