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Working Paper No. 27

EXPORT POLICIES AND PERFORMANCE
IN ISRAEL

by

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EXPORT POLICIES AND PERFORMANCE IN ISRAEL^x

The aims of this paper are firstly to present a unified description of the Israeli government's export policies and of the growth and composition of Israel's exports and secondly to provide macroeconomic analysis of her export performance. The first section outlines the major policies which the government has adopted to promote exports. In sections 2 and 3 the trends in the volume and composition of exports are described and comparisons made with other countries. The constant market shares model is then used in section 4 to identify the sources of Israel's export growth in the 1960s. In the final two sections exports are divided into two groups, non-manufactured goods (plus diamonds) and manufactured goods. Greater attention is paid to the latter category, since this is the area in which Israel's prospects for future export expansion are brightest and since it is also the more fruitful category for finding lessons for LDCs seeking to expand exports. Analysis of the factors behind the expansion of Israel's manufactured exports is carried out by means of constant market share analysis and econometric estimation of the aggregate supply function of manufactured exports.

The major finding concerns the relationship between export policies and performance. Both the descriptive and the analytical sections suggest a positive relationship between policy and performance. It is unclear to what extent world demand was a causal factor in Israel's export expansion, although it is found that neither the commodity nor the market composition of Israel's exports had a harmful demand-side effect on her export performance. The lack of an unfavourable commodity composition of exports is in contrast to most other LDCs. A further positive stimulus to Israel's exports lay in her domestic

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economic growth, which may have improved her international competitiveness by reducing average costs. It is, however, not proven whether the direction of causality was from increased production to increased exports or vice versa. Evidence is also found for the existence of a recession/boom effect, whereby Israeli exports increased by a greater extent when domestic demand was growing slowly than during domestic booms. Further explanations of individual export successes are given in section 6, e.g., as unintended consequences of import substitution policies or as a result of improved domestic resource allocation.

Two limitations on the scope of the paper should be made clear from the start. Export expansion is accepted as a valid goal of economic policy and no attempt is made to evaluate the reasons for adopting this goal. A complete assessment of a country's export policies requires knowledge of the consequences of her export performance on industrial development, employment, inflation and income distribution, as well as on her balance of payments position. Secondly, the question of whether the composition of Israel's exports was optimal (and whether changes in their composition were in the right direction) is not tackled. Although references are made in the paper to Israel's comparative advantage, no estimates were made of where this lay. These issues will form the subjects of future papers.

1. Government Policies to Encourage Exports

Government policy to encourage exports has been of three types. During most of Israel's existence direct financial inducements in the form of premiums, subsidies, etc. have been given to exporters. Indirect assistance, in the form of organizing and promoting foreign sales (by making bilateral trade agreements, establishing government export firms, covering risks, etc.), has also been provided. In addition to encouraging existing firms to export, the government has

taken the initiative in developing industries considered to have export potential.¹

Upon attaining independence Israel's currency was the old Palestinian pound which was at par with sterling. This was below the equilibrium exchange rate and thus provided a disincentive to exporters. To compensate exporters the government paid premiums based on total export proceeds. These premiums were the main form of financial inducement to exporters between 1949 and 1951 and were retained until 1955, although during the 1952-5 gradual devaluation when multiple exchange rates existed there was no clear distinction between export premiums and the formal exchange rate on exports. The problem with this system was that it could lead to a loss of foreign exchange, since exports could still be profitable for the entrepreneur although the foreign exchange value added was zero. This led to attempts to limit vertical differentials (between export proceeds and the price of imported inputs) between 1952 and 1955 and finally to the abolition of premiums on total export proceeds in 1955.

After 1952 export premiums were replaced as the main financial incentive to exporters by various schemes for compensation via domestic sales, of which the most important was the Pamaz arrangement. Under this arrangement exporters were allowed to retain their proceeds in foreign currency bank accounts. The value of the direct import component of exports was to be used to purchase inputs, while the foreign currency value added could be used to purchase goods in the producers' "general line of production" for use as inputs to further exports or for sale on the domestic market. The Pamaz arrangement reduced the red tape associated with applying for an import licence and fixing the exchange rate for imported inputs, and also eliminated most of the vertical differentials which had occurred with the earlier

¹ The following description of the policy measures is based on Halevi and Klinov-Malul pp. 239-245 and Michaely (1971) pp. 24-39. The description in the text merely outlines the salient points, since further details are readily available from the two quoted sources.

structure of export premiums. It could give a great incentive to export if the producer could then import goods into a domestic market where demand was strong and he had a monopolistic position. The disadvantages of the Pamaz arrangement was that it led to horizontal differentials in that the subsidy differed between industrial branches, depending on how well protected the domestic market was. After 1956 the significance of the Pamaz arrangement was eroded by (i) limitations on the amounts which could be deposited in Pamaz accounts, (ii) increased liberalization of raw material imports, undercutting the monopolistic basis of the system, (iii) the extension of direct premiums on value added. It was finally abolished in 1959.

The current system of premiums on value added was introduced in 1956. Under this system export proceeds were valued at a mixed rate; the import component was valued at the formal exchange rate, which was the cost to the exporter, and the value added was valued at the formal rate plus a premium. This provided a fairly good substitute for devaluation between 1955 and 1962 (Halevi and Klinov-Malul, p. 242). Vertical discrimination was eliminated by this system, but insofar as different exports or exports to different countries didn't receive the same subsidy horizontal discrimination was retained. After the February 1962 devaluation most export subsidies (that to the textile industry being the most notable exception) were abolished and reliance placed on the formal exchange rate to provide adequate financial incentive to export. This reliance proved to be rather unrealistic in the medium term and in 1965 some subsidies were reintroduced. Since then the size of the subsidies has steadily increased.

The extent of the direct financial inducement given to exporters is given by the effective exchange rate, i.e. the value in Israeli pounds of a dollar's worth of exports (Table I). Some quantitative parallels to the above description are clear. The largest percentage increase in the EER for exports coincides with the introduction and spread of the Pamaz arrangement 1952-4 and reveals the high rents available under the quota regime existing at that time. The slowest

Table I: OFFICIAL EXCHANGE RATE AND EFFECTIVE EXCHANGE RATES ON EXPORTS AND IMPORTS 1949-71

	(1) Official exchange rate	(2) EER for exports	(3) EER for imports	(4) = (2) ÷ (3)
1949	.34	.35	.39	0.897
1950	.357	.39	.40	0.975
1951	.357	.41	.39	1.051
1952	.702/.694	.81	.81	1
1953	1.163/.830	1.28	1.17	1.094
1954	1.663/1.506	1.73	1.80	0.961
1955	1.8	1.83	2.21	0.828
1956	1.8	2.05	2.26	0.907
1957	1.8	2.21	2.33	0.949
1958	1.8	2.37	2.35	1.009
1959	1.8	2.49	2.50	0.996
1960	1.8	2.58	2.57	1.004
1961	1.8	2.66	2.60	1.023
1962	3.0	3.00	3.57	0.840
1962	3.0	3.02	3.47	0.870
1963	3.0	3.04	3.49	0.871
1964	3.0	3.06	3.47	0.882
1965	3.0	3.08	3.55	0.868
1966	3.0	3.27	3.59	0.911
1967	3.0	3.57	3.68	0.970
1968	3.5	4.04	4.13	0.978
1969	3.5	4.05	4.22	0.960
1970	3.5	4.99	4.42	1.016
1971	3.5	5.04	5.09	0.990

Notes: (i) Two estimates are given for 1962 because of the shift from one source to the other
(ii) During 1952-4 when there were multiple exchange rates, the rate on exports is given first and that on imports second
(iii) Devaluations occurred in February 1962, November 1967 and September 1971; formal rates for these years reflect the rate existing for more than six months.

Sources: 1949-62 Michaely (1971), p. 85; 1962-71 Amiel (1972), p. 32.

increase is in the 1962-5 period when export subsidies were not granted. A more useful guide to the financial rewards of exporting is a comparison between the EER on exports and that on imports, since the usual alternative market for an exporter was to sell domestically in competition with imported goods.² The ratios of the two EERs are given in Table I.

The average EERs discussed above reveal nothing of the discrimination between exporters in different branches of the economy. No definite pattern of discrimination between major branches emerged in the early and mid 1950s (Michaely (1971), p. 102), although Baruh's estimates show some preference towards diamonds 1955-8 (Baruh, pp. 56-7). Since 1958, however, a fairly clear ranking has emerged with non-citrus agriculture receiving the highest effective exchange rate, followed by industrial goods other than diamonds, diamonds, citrus and services (Halevi and Klinov-Malul, pp. 242-3). Such broad sectoral divisions can conceal intra-sectoral variations, e.g. the incentives granted to the textile industry (cf. Table II), but they give some idea of the government's priorities.

A further inducement to exporters, which is not included in the EERs but which is conceptually close to being a direct monetary incentive, is the possibility of obtaining cheap financing from the government's Export Fund. The major reason for treating this appears to be the lack of accurate data, but by making certain assumptions Amiel is able to obtain EERs which include allowance for the interest differentials on cheap credit (Amiel (1972), p. 41).

² It should be noted that the exporter's EER is the I£ return for a dollar of value added in exports, whereas the EER on imports is the I£ cost of a dollar's worth of imports. Thus a ratio of unity does not imply neutrality between promotion of import substitution and of exports. The ideal yardstick for comparison would be Michaely's "protection rate", i.e. the I£ return for a dollar of value saved in domestic production competing with imports. (Michaely (1971), p. 115). Because of data inavailability, estimates of the protection rate are only available for 1958, when it stood at 2.63 (cf. EER on imports of 2.35).

Table II: PRINCIPAL EERs FOR COMMODITY EXPORTS, 1961-70

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Diamonds	2.65	3.00	3.00	3.00	3.00	3.00	3.08	3.50	3.50	3.79
Textiles	2.90	3.12	3.12	3.14	3.31	4.44	5.76	5.79	5.84	6.18
Other Industrial	2.69	3.00	3.03	3.04	3.05	3.20	3.50	3.92	3.90	4.48
Citrus	2.46	3.00	3.00	3.00	3.00	3.11	3.23	3.94	3.95	4.27
Other Agricultural	2.65	3.03	3.31	3.46	3.50	3.51	3.59	4.15	4.25	4.51

Source: Amiel (1972), p. 49.

Between 1962 and 1965 export subsidization in the form of interest differentials was greater than that of other direct supports. Since most of this subsidization went to the diamond industry³, a ranking of revised EERs would place diamonds higher than their ranking in the previous paragraph (or in Table II). Even in the 1966-9 period, after the revival of export premiums, interest differentials amounted to 15-20 % of total budgetary supports for industrial exports other than diamonds, and the total subsidy on diamond exports (Amiel (1972), p. 42).

Provision of greater financial inducements to export has long been recognized as only one part of the government's export promotion programme. There is a general tendency among entrepreneurs to look first to the domestic market and only later, if at all, to foreign markets. This is not so much a matter of lower rewards, but of lack of information; and obtaining information does of course have a cost. Such a problem is magnified in Israel's case since all of her export markets are located at some distance. A corollary to the lack of

³ The major reason for this is that, while the usual practice in the world market is for suppliers to permit the purchase of inputs on credit, the principal supplier to the world rough diamond market (the London Syndicate) does not sell on credit.

information by Israeli producers is the lack of information regarding the quality and range of Israeli exports available to overseas retailers and consumers.

In the 1950s a series of institutions were set up by various government ministries, the Manufacturers' Association, etc. to overcome the non-price obstacles to exporting. These institutions were primarily aimed at providing information about foreign market conditions and standards requirements. The government also established the Foreign Trade Risks Insurance Company (IFTRIC), the Israel Company for Fairs and Exhibitions (ICOPEX), and the Institute for Industrial Design and Packaging. Seminars on export problems and training programmes for managers were organized. These measures were no doubt beneficial to exporters, but it is difficult to quantify their significance. The overall impression, however, is that the Israeli government did not devote great attention to export promotion during the 1950s, which is consistent with the view that the government was concentrating its efforts on promoting import substitution at this time. The government also took the initiative in concluding bilateral trade agreements with other soft-currency countries (e.g. Yugoslavia, Turkey), although exports under these agreements were only a small proportion of total exports.

Government expenditure on the subsidization of commodity exports in the 1960s is given in Table III. Between 1962 and 1965 considerable neglect of indirect export promotion, primarily because of reduced expenditure on advertising and market research, is revealed. Expenditure on indirect subsidies even declined relative to that on direct subsidies, which was itself fairly stagnant in this period (see above). The trend was reversed in 1965 and after that the indirect export subsidies increased rapidly. This increase appears to have continued into the 1970s.

Combining the above descriptions of direct and indirect assistance to exports reveals definite shifts in the government's emphasis on export promotion. In the early 1950s exporters were granted financial incentives to recompense them for the low exchange

Table III: **INDIRECT SUBSIDIZATION OF COMMODITY EXPORTS 1962-9 (In million)**

	1962	1963	1964	1965	1966	1967	1968	1969
Participation in export costs	2.9	2.9	3.3	1.1	8.3	12.0	16.7	22.7
- transport costs	0.2	0.1	0.5	0.2	4.6	4.1	5.0	5.5
- production costs	2.7	2.8	2.8	0.9	3.7	7.9	11.7	17.2
Export promotion	0.3	-	-	-	-	7.3	8.6	19.3
Advertising and market research	5.1	3.3	0.2	2.1	3.8	9.7	21.4	25.4
Total indirect subsidies	8.3	6.2	3.5	3.2	12.1	29.0	46.7	67.4
Total direct subsidies	2.1	7.8	10.9	16.9	56.0	125.1	169.4	195.4

Source: Amiel (1972), p. 51.

rate. Between 1953 and 1955 the EER on exports fell relative to that on imports, but it then rose again until 1958 (Table I). Since the protection rate (cf. footnote 3) would have been higher than the EER on imports, it can safely be said that government policy favoured import substitution vis-à-vis export promotion throughout the 1950s. This bias was also reflected in the scale of government resources devoted to non-financial inducements to exporters. In the early 1960s government policy moved away from import substitution and quota restrictions towards reliance on the price mechanism. The devaluation of February 1962 was intended to remove the price disincentive to exporters which a low exchange rate had formed. It was hoped that this would be sufficient to increase exports rapidly, but when this hope proved unfounded (cf. next section) the government resorted again (1966) to export premiums and to increased expenditure on indirect inducements to exporters.

The direct and indirect subsidies were aimed at encouraging existing firms to export a greater proportion of their output or at

encouraging new firms to consider foreign as well as domestic markets. The situation in Israel, whereby a considerable proportion of the available capital is allocated by the government, also permits the government to try to increase exports by discriminating in its allocation of investment funds in favour of branches of the economy which tend to have large export/output ratios. In the 1950s export potential was one of the criteria governing the allocation of investment funds, but it tended to be ignored and emphasis was placed on import substituting potential.⁴ The emphasis was reversed in the 1960s, as can be seen from Table IV. In this table industries are ranked by their export/sales ratios and an arbitrary dividing line is drawn between the low and high export-ratio industries. The share in investment in manufacturing of the ten low export industries is seen to have fallen rapidly between 1958-9 and 1962-3, risen again between 1962-3 and 1966-7 and then fallen again, in that the 1968-9 share was 49 % compared to 61.8 % in 1958-9. This pattern fits in with the above description of government export policy as revealed in subsidies. After a lack of emphasis on export promotion during most of the 1950s, it became a major policy goal around the turn of the decade. After the 1962 devaluation there was a slackening of government activity in this field, since it was thought that the devaluation itself was sufficient to encourage exports, but then active promotion of exports was resumed in the later 1960s.

In this section government policies to encourage exports have been grouped into three categories: direct financial inducements, indirect aid to exporters and the use of development funds to establish new enterprises in industries with export potential. Although the above tools have been the major weapons of export

⁴ It is, of course, possible that investment in an industry may be justified both because it can efficiently produce previously imported goods and because it can sell its products abroad. The textile industry, for example, was expected to be able to achieve both of these goals, and in consequence received substantial allocations from the Development Budget.

Table IV: PERCENTAGE ALLOCATION BY INDUSTRY OF TOTAL INVESTMENT IN MANUFACTURING, 1958-69

Industry	Exports as a percentage of Sales (1965)	Percentage Share of Total Investment in Manufacturing					
		1958-59	1960-61	1962-63	1964-65	1966-67	1968-69
1 Electrical & electronic equipment	1.8	2.6	1.6	2.2	2.7	6.0	4.9
2 Transport equipment	1.9	5.7	7.5	5.1	6.6	8.9	8.7
3 Metal products	2.6	4.8	4.1	3.9	5.2	4.7	7.8
4 Non-metallic mineral products	4.1	4.1	7.6	7.5	8.5	7.9	2.9
5 Printing and publishing	4.3	2.8	1.8	2.0	2.6	1.3	2.3
6 Leather & leather products	4.9	0.5	0.3	0.3	0.6	0.7	0.5
7 Paper, cardboard & their products	5.5	10.7	2.7	1.6	1.8	3.9	2.6
8 Basic metal	5.7	11.5	7.9	2.6	2.6	1.3	2.4
9 Food products	7.4	16.5	13.6	14.4	16.5	18.5	13.8
10 Wood & wood products	8.2	2.6	4.1	3.4	3.3	2.5	2.8
Σ (1 - 10)		61.8	51.2	43.0	50.4	55.7	48.7
11 Chemicals	12.2	10.8	7.3	7.1	9.6	7.7	6.2
12 Machinery	12.7	2.1	2.2	2.1	2.7	3.8	6.3
13 Textiles	14.5	13.0	19.7	16.1	11.1	11.8	17.6
14 Rubber & plastic products	15.2	4.6	3.8	2.9	3.9	4.2	5.8
15 Clothing	16.4	0.9	0.7	0.9	0.7	1.0	1.7
16 Miscellaneous manufacturing	33.7	0.8	0.8	1.1	0.7	0.8	1.2
17 Mining & quarrying	49.1	5.8	14.0	26.4	20.7	14.5	12.2
18 Polished diamonds	99.0	0.2	0.3	0.4	0.2	0.5	0.3
Σ (11-18)		38.2	48.8	57.0	49.6	44.3	51.3

Source: Michaely (1973), ch. 6, Table 9.

promotion policy, the list is not exhaustive. Especially in a small country where personal contacts are important, a policy goal of export expansion can be pushed in many ways. For example, industrial organization policy has been used to encourage exports in two ways. Firstly, permission to form a cartel has been linked with promises from the firms concerned to raise their exports.⁵ Secondly, although there is no institutionalized encouragement of industrial concentration, the Ministry of Commerce and Industry has at times encouraged mergers as a means of increasing efficiency and export competitiveness. This has led to a conflict between encouraging efficiency and discouraging monopoly power, but since 1969 (when the Encouragement to Industry Act removed some of the obstacles to mergers) the balance has been tipped in favour of encouraging industrial concentration and leaving the task of providing competition to liberalized imports. A further dimension to government trade policy is the negotiations with the EEC which have been taking place since 1962. The first agreement was signed in June 1970 and a fuller agreement is to be signed in January 1975. Although these agreements have had little effect on Israel's exports in the past, relations with the EEC will be an important factor in the future.

2. Aggregate Export Performance

The time path of Israel's balance of trade can be seen from Table V. Net exports (i.e. gross exports minus returned exports) have consistently failed to match net imports, leading to the substantial trade deficit in every year of her existence. The deficit quadrupled between 1949 and 1972, but did not rise greatly on a per capita basis and was falling as a percentage of GNP (but with large fluctuations around the trend). A more economically meaningful picture of Israel's export performance (for most purposes) is given by the series in

⁵ This has often been put in the form of having the cartel members pay a levy on home sales, which is to be used for export premia. Although this system is neither equitable nor efficient, it has the advantage from the government's viewpoint of requiring no budgetary involvement (cf. Shefer, p. 418-9, for a critique of this practice).

Table V:

ISRAEL'S FOREIGN TRADE 1949-72 (current prices)

	Net exports	Net imports	Trade deficit	Exports per capita	Imports per capita	Trade deficit per capita
1949	28	252	223	27	241	214
1950	35	300	265	28	237	209
1951	45	382	337	30	255	225
1952	43	322	279	27	201	174
1953	58	280	222	35	170	135
1954	86	287	201	51	170	119
1955	89	334	245	51	192	141
1956	107	376	269	58	205	147
1957	140	433	293	72	224	152
1958	139	421	282	70	211	141
1959	176	427	251	85	207	122
1960	211	496	284	100	234	134
1961	239	584	345	110	269	159
1962	271	626	355	118	273	155
1963	338	662	324	142	278	136
1964	352	816	464	142	329	187
1965	406	815	408	158	317	159
1966	477	817	340	181	311	129
1967	517	757	240	191	279	88
1968	602	1,093	491	214	389	175
1969	689	1,304	616	238	451	212
1970	734	1,433	670	246	481	235
1971	915	1,812	897	297	589	292
1972	1,102	1,958	856	343	609	266

Note: Columns 1-3 are in \$ millions,
columns 4-5 are in dollars.

Source: Statistical Abstract of Israel 1973, pp. 196-7.

Table VI which improves on column 1 of Table V in three ways: (a) services are included, (b) constant prices are used, and (c) the direct import component is subtracted from net exports to give a more accurate measure of the net contribution to foreign exchange earnings.⁶

The principal feature of all three export series (total, per capita and value added at constant prices) is the rapid growth rate. This expansion has not been even and can be divided into several sub-periods. The early years of Israel's existence, especially 1952-4, saw rapid growth from a low base, followed by a period of relatively slow growth between 1954 and 1958. During the years 1958-63 an export boom occurred as merchandise exports per capita more than doubled and the value added almost tripled. The year 1964 signalled the end of the boom, but in the next year export growth picked up again and has proceeded fairly steadily since.

The best available indicator of the share of Israel's productive resources devoted to exports is the ratio of value added in exports to total value added (i.e. GNP). In 1949 the ratio was negligible and in the early and mid 1950s it fluctuated around 5 %. Thereafter it has followed a constantly rising trend reaching 10 % in the early 1960s and 15 % in the early 1970s.⁷

It is interesting to compare Israel's exports/GNP ratios with those of other countries. Unfortunately this cannot be done on a value added basis for lack of data, but a comparison of total export/GNP ratios for 1954 and 1968 is given in Table VII. Of all the countries listed, only Spain and the USA devoted a smaller proportion of their resources to exports than Israel did in 1954. This finding

⁶ A still better measure would be given by subtracting direct and indirect import requirements (cf. Tables XXIII and XXIV below), but this is only possible for years for which input-output tables exist.

⁷ All figures in this paragraph are from Michaely (1973), ch.1.4. Ratios are in constant (1955) prices.

Table VI: VALUE ADDED IN EXPORTS OF GOODS AND SERVICES AT CONSTANT PRICES
(1955 I£ millions)

Year	Exports	Year	Exports
1950	38	1962	477
1951	48	1963	563
1952	64	1964	560
1953	80	1965	646
1954	124	1966	708
1955	117	1967	772
1956	154	1968	936
1957	185	1969	949
1958	200	1970	1146
1959	247	1971	1615
1960	320	1972	1751
1961	359		

Note: Value Added is here defined as net exports minus imported direct inputs.

Source: Michaely (1973), ch. 6, Table 8.

Table VII: COMMODITY EXPORTS AS A PROPORTION OF GNP, SELECTED COUNTRIES
1954 and 1968

	1954	1968		1954	1968
U S A	3.5 %	3.9 %	W. Germany	15.1 %	24.6 %
New Zealand	26.3 %	20.7 %	Netherlands	35.2 %	34.2 %
Canada	17.4 %	19.0 %	Israel	5.6 %	10.6 %
Switzerland	20.5 %	23.0 %	Ireland	22.0 %	26.7 %
Sweden	19.5 %	19.3 %	Austria	18.2 %	17.5 %
Australia	18.2 %	13.3 %	Spain	4.2 %	6.3 %
Belgium	26.7 %	39.4 %	Turkey	6.5 %	4.6 %
U.K.	15.4 %	14.9 %	Yugoslavia	13.0 %	15.8 %
France	9.5 %	10.0 %	Greece	8.1 %	6.2 %
Denmark	22.3 %	21.3 %	Japan	7.9 %	11.4 %
Norway	16.5 %	21.4 %	Brazil	7.7 %	6.6 %
Finland	17.5 %	20.4 %	Taiwan	19.8 %	24.1 %

Note: countries are in order of 1954 per capita GNP

Source: Amiel (1973), pp. 61-2.

is all the more significant in view of the fact that Israel is the smallest country (in terms of population) in the sample, which one might expect to be a force in favour of increased outward orientation.⁸ By 1968 Israel's export/GNP ratio had reached 10.6 %, but was still small in comparison with the developed European countries. The comparison is especially striking vis-à-vis smaller countries like Belgium (39.4 %) and Denmark (21.3 %), or even the poorer small countries like Ireland (26.7 %) and Austria (17.5 %). The Israeli economy had become more externally oriented than several of the semi-developed countries of southern Europe, e.g. Spain (6.3 %), Turkey (4.6 %) and Greece (6.2 %) - but not Yugoslavia (15.8 %). The tendency apparent in these data is for countries to become more externally oriented in their economic affairs as their GNP increases. Israel has followed this path to some extent, but the smaller European countries' experience indicates that much scope remains for increasing the share of Israel's productive resources engaged in the production of exports.

A more dynamic evaluation of Israel's export performance is given by comparing her export growth rate with that of other countries. Between 1950 and 1970 Israel's exports, measured in current dollar prices, increased by an annual average of 16.4 %. The average rate for LDCs was 4.7 % (for non-oil exporting LDCs 3.9 %) and for developed market economies 8.0 %. Apart from the oil countries Libya (38.5 %) and Iran (17.0 %) and a few miniscule island economies (Bahamas, Bermuda, Virgin Islands and the Ryu Kyu Islands), only South Korea's export growth rate of 21.2 % exceeded Israel's. The other export-oriented Asian economies had lower growth rates, e.g. Taiwan (14.1 %) and Hong Kong (7.7 %), and Japan's export growth rate (15.7 %) was marginally less than Israel's. The highest export growth rates in Europe - Italy (13.0 %), Yugoslavia (12.9 %), Bulgaria (15.1 %) - were significantly below Israel's.⁹ In sum,

⁸ Cross-section econometric studies have revealed statistically significant negative correlation between export/GNP ratios and population (cf. Leamer and Stern, pp. 153-6, for a survey of the literature).

⁹ All figures in this paragraph from United Nations: Handbook of International Trade and Development Statistics 1972, pp. 22-5, 30.

for a country with few natural resources, Israel's export growth rate was spectacular.

An evaluation of Israel's aggregate export performance is mixed. On the one hand she has done exceptionally well, but not well enough to remove her endemic trade deficit. On the other hand, she could do better in view of her rapid increase in GNP, if the experience of the smaller European countries is a relevant guide. Thus, analysis of the causes of Israel's export growth could have the twofold purpose of indicating whether there are any lessons for other LDCs wishing to increase their export growth rate and of identifying ways in which Israel could increase her export earnings still further. Before turning to such an analysis we will examine the composition of Israel's exports.

3. The Composition of Israel's Exports

The export structure inherited by Israel upon becoming independent was a typical example of monoculture. In 1949 citrus fruits and juices accounted for 67 % of Israel's exports. A second important export sector was created by the inflow of skilled craftsmen who established a diamond polishing industry and in 1949 this accounted for 19 % of exports. The next most important export earner was artificial teeth with some 2 %.

Since 1949 citrus and diamonds have remained the major export earners, but their relative importance has declined as exports of other industrial goods (especially textiles, clothing, chemicals and machinery) has increased. The trend through to 1970 can be seen clearly in Table VIII, although a slight reversal of the trend occurred after 1970 as world diamond prices increased. If value added figures for exports were to be used, the trend towards "other industrial" exports would remain but the importance of citrus would be increased and that of diamonds reduced. Foreign exchange value added in citrus is over 80 % compared to 20 % in diamonds and

Table VIII: COMPOSITION OF ISRAEL'S COMMODITY EXPORTS, 1949-72

	1949	1955	1960	1965	1970	1972
Agricultural products	68 %	39	30	22	16	15
Diamonds	19 %	24	27	33	32	37
Other industrial products	3 %	38	43	46	51	47

Note: 1949 figures do not add to 100 because of a category "Various Articles"

Other figures may not add up to 100 because of rounding

Sources: Halevi & Klinov-Malul, p. 150; Statistical Abstract of Israel 1950/1, p. 80; Ibid., 1973, p. 208.

around 50 % in "other industrial" exports.¹⁰ The share of citrus in value added of commodity exports is currently about 20 % compared to 10 % for diamonds (Michaely (1973), ch. 1.4.). A further trend has been the rapid increase in the exports of two services, tourism and transportation services, from negligible values in 1950 to around 50 % of the value of total merchandise exports in 1970. Value added in tourism is high (estimated at 75 %) and low in shipping (estimated at 15-18 %).¹¹

The data in Table VIII clearly indicate a shift in emphasis in Israel's commodity exports away from the two traditional goods and towards assorted manufactured goods. This result is, however, only suggestive of increased export diversification because the arbitrary

¹⁰ Value added in exports is defined here as $\frac{X_i - M_i}{X_i}$ where

X_i = foreign exchange earned by the sale of the i^{th} good,

M_i = foreign exchange spent on producing the exports of the i^{th} good. Data are from Halevi and Klinov-Malul, p. 149.

¹¹ Halevi and Klinov-Malul, p. 151.

criterion of the share in exports of the two main commodities was used. A more common criterion, but equally arbitrary, is to look at the proportion of exports taken up by the ten main export groups. Amiel has done this for the period 1954-69 at the three digit SITC level, and his results are presented in Table IX. The interesting conclusion is that on this criterion the increased diversification of Israel's exports since 1954 has been very small; the ten main export groups account for 75 % in 1969 compared to 78 % in 1954.

An alternative concept of export diversification is to examine the number of commodities exported. Whereas in 1954 Israel exported commodities in 123 of the 177 SITC three digit groups, her exports came from 145 groups in 1969 (Table X). Thus a distinct trend towards finding new export goods is revealed. The fluctuations around the trend are, however, of greater interest, for the major periods of increase were 1958-61 and 1964-7 which were years of relatively slow domestic growth. This finding supports the hypothesis that entrepreneurs who do not normally export are more willing to seek out export possibilities in a recession. It also suggests, as an extension to this hypothesis, that such entrepreneurs are not too concerned about maintaining their export sales once the domestic market revives. This hypothesis will be tested in section 6 (d), but for the moment we will return to the question of commodity concentration.

None of the criteria used so far to measure concentration are completely satisfactory. The share of the x largest groups only concerns one tail of the distribution and ignores changes within that part of the distribution, while the number of commodity groups exported says nothing at all about the shape of the distribution. The problem of finding a measure which is sensitive both to the shape of the whole distribution and to the number of units has been best overcome by the Hirschman index (Hirschman, pp. 157-60):

$$(1) \quad H = 100 \cdot \sqrt{\frac{\sum_{i=1}^n x_i^2}{X^2}} \quad i = 1, \dots, n$$

Table IX:

DISTRIBUTION OF ISRAEL'S TEN MAIN EXPORT GROUPS, 1954-69

(cumulative percentages)

	I	II	III	IV	V	VI	VII	VIII	IX	X
1954	41(051)	60(667)	63(053)	66(661)	69(651)	72(629)	74(841)	76(631)	77(698)	78(561)
1955	38(051)	61(667)	64(651)	67(661)	70(841)	73(629)	75(053)	77(631)	78(698)	79(561)
1956	40(051)	64(667)	68(053)	71(629)	74(661)	77(651)	79(841)	81(698)	83(631)	85(561)
1957	36(051)	60(667)	64(629)	67(651)	70(053)	73(841)	75(661)	78(561)	79(698)	81(631)
1958	36(051)	61(667)	65(841)	69(053)	73(629)	76(025)	79(561)	81(651)	83(631)	85(698)
1959	27(051)	54(667)	58(053)	61(841)	65(629)	68(025)	71(651)	73(561)	76(698)	78(631)
1960	28(667)	50(051)	55(025)	60(841)	63(629)	67(698)	70(053)	73(651)	75(561)	77(631)
1961	29(667)	47(051)	51(841)	57(841)	60(698)	63(629)	67(053)	70(651)	72(735)	74(631)
1962	32(667)	50(051)	55(698)	59(651)	63(698)	66(629)	70(053)	73(025)	75(631)	77(561)
1963	33(667)	55(051)	60(698)	64(651)	68(053)	71(841)	74(629)	76(682)	78(631)	79(561)
1964	37(667)	52(051)	57(053)	62(651)	66(841)	68(682)	70(698)	73(629)	75(561)	77(631)
1965	36(667)	53(051)	58(053)	62(651)	65(841)	68(561)	71(698)	73(682)	75(629)	77(631)
1966	38(667)	54(051)	57(053)	61(651)	64(651)	64(599)	70(682)	73(561)	75(698)	77(629)
1967	35(667)	51(051)	56(053)	59(841)	63(599)	66(735)	69(735)	71(561)	73(682)	75(629)
1968	36(667)	51(051)	55(841)	59(053)	64(698)	67(599)	70(651)	72(561)	74(682)	76(629)
1969	35(667)	49(051)	55(841)	59(053)	63(698)	65(651)	68(599)	71(682)	73(561)	75(629)

Note: The figures in parentheses are the Standard International Trade Classification (SITC) code numbers (adapted to Israeli requirements): 025 - eggs; 51 - citrus; 053 - canned and processed fruit; 561 - manufactured fertilizers; 599 - refined petroleum products; 629 - rubber products; 631 - plywood; 651 - yarn and woven textiles; 661 - cement; 667 - diamonds; 698 - metal products; 735 - ships and boats; 841 - apparel.

Source: Amiel (1973), p. 64.

Table X: THE HIRSCHMAN CONCENTRATION INDEX OF ISRAEL'S COMMODITY EXPORTS AND THE NUMBER OF EXPORT GROUPS, 1954-69

	H	Number of export groups		H	Number of export groups
1954	45.4	123	1963	40.9	143
1955	43.4	125	1964	41.2	140
1956	46.3	129	1965	40.9	144
1958	43.4	128	1966	41.9	148
1959	38.4	126	1967	39.6	160
1960	37.3	134	1968	40.0	152
1961	35.4	149	1969	39.3	145
1962	38.4	147			

Note: in both calculations commodity groups are defined at the SITC three digit level.

Source: Amiel (1973), p. 55.

where n = the number of export groups, x_i = the value of exports of the i^{th} group, $X = \sum_{i=1}^n x_i$. Maximum possible concentration,

$H = 100$, occurs when a single commodity is exported and minimum possible concentration, $H = 100/\sqrt{n}$, occurs when exports are divided equally between the n export groups. Amiel's estimates of H for Israel 1954-69 are given in Table X. According to the Hirschman criterion Israel's commodity exports did become less concentrated between 1954 and 1969. This was not, however, a continuous development. Substantial diversification only occurred in the years 1956-61. Between 1961- and 1964 there was a reverse movement towards increased concentration and since 1964 there has been little change in the degree of concentration.

Israel's concentration index (H) was higher in 1968 than that of all developed countries apart from Australia, New Zealand and

Iceland. It was lower than that of most LDCs, although there were some surprising exceptions (e.g. India, Afghanistan, Tunisia, Paraguay, Morocco, Peru, which all had considerably lower per capita GNPs than Israel). The small export-oriented Asian countries all had more diversified exports than Israel, i.e. Hong Kong, Singapore, Taiwan and South Korea.¹² This suggests that although Israel is now far from a monocultural economy it would be possible for her to go still further in diversifying her exports.

A further aspect of export concentration is the variety of destinations to which the exports go. Since Israel's immediate neighbours, and natural trading partners, have no commercial links with her she has been forced to seek out more distant markets (Table XI). Initially these were dominated by the U.K. and the USA, which took almost 70 % of Israel's exports in 1949. The importance of the U.K. as a market has declined considerably since 1949, but western Europe and the USA have remained the principal destinations for Israel's exports, e.g. in 1972 almost 20 % went to the USA and 40 % to the U.K. and EEC. There is some connection between commodity and market concentration because certain markets are associated with specific goods (e.g. citrus and W. Europe, diamonds and Hong Kong).

In section 1 Israeli government policies to encourage exports were described and the question of the degree of success of these policies was left unanswered. The analyses of commodity and market concentration of Israel's exports in the present section provide alternative hypotheses to explain Israel's export performance. The growth of Israel's exports may have been hampered by her concentration on a small number of goods and markets and her failure to expand sufficiently into new goods and markets. Alternatively, Israel's exports may have been aided by this concentration, if it was located in rapidly growing areas of world trade. An attempt to evaluate

¹² U.N. Handbook of International Trade and Development Statistics 1972, pp. 211-3. The only LDCs not mentioned in the text with Hirschman index values lower than Israel were Mexico, Argentina and Malta.

Table XI: ISRAEL'S EXPORTS BY COUNTRY OF DESTINATION, 1949, 1959 and 1972
(percentages)

	1949	1959	1972
U.K.	53.7	18.9	9.7
U.S.A.	15.5	15.4	19.7
W. Germany	0.1	9.9	9.0
Switzerland	2.2	5.4	5.4
Belgium	0.2	5.2	4.1
Turkey	0.2	5.0	0.2
Netherlands	6.9	4.4	5.7
Yugoslavia	0.3	3.0	0.7
Hong Kong	0	2.8	5.3
Italy	0.2	2.5	2.7
France	0.6	2.3	4.8
Sweden	6.2	2.2	1.1
Finland	0.8	1.7	0.7
Denmark	1.1	1.3	0.6
Canada	0.2	1.3	1.7
Norway	1.0	1.3	0.4
Cyprus	0.2	1.2	0.6
Rumania	1.0	1.1	0.9
Greece	0	1.0	1.6
Japan	0	0.9	6.2
Other	9.6	13.2	19.9
	100	100	100

Source: Statistical Abstract of Israel 1949/50, pp. 78-9;
Ibid. 1959/60, p. 286; Ibid. 1973, p. 210.

these alternative hypotheses will be made in the next section.

4. Constant Market Shares Analysis of Total Commodity Exports

Israel's export growth rate has been considerably larger than that of most LDCs and is thus a phenomenon requiring explanation. At first sight it appears that exports have been responsive to government policy. The slowdown in export growth in the mid 1950s occurred when government emphasis was on import substitution and the export boom which started in 1958 was reasonably well correlated with movements in effective exchange rates (which suggests that Israeli exporters are in aggregate price responsive). It is more difficult to identify such a correlation in the 1960s, although Michaely has proposed a strong relationship between government investment policy and export growth (Michaely (1973), ch. 6; cf. Table IV above). The argument in favour of a positive relationship between export growth and government policy is convincing, but also begs the question of the quantitative significance of the relationship. There were clearly other factors at work. The rapid growth in world trade since 1950 would explain some of Israel's export growth, although this could not explain why her export growth was faster than that of other countries. Given the concentration of Israeli exports, the rate of growth of the citrus and diamond markets and of the American and West European markets would be especially significant for the growth of her exports.¹³ It is also possible that Israeli producers were becoming more efficient for reasons unrelated to government trade policy, and were thus better able to compete abroad.

¹³ It should perhaps be emphasised that concentration of exports in a small number of commodities is not per se harmful to the growth of export earnings. Commodity concentration has in the past had a "bad press", because it has in fact led to many disasters, especially in the interwar years, and it does represent an increased risk as reliance is placed on one or two commodity markets. It can, however, lead to spectacular gains as the oil producers found in 1973. Finally, it should be noted that this does not deny that commodity concentration may have deleterious non-trade effects on the social or economic structure which reduce its desirability, but such effects are not relevant to the current argument. Similarly, concentration in a small number of markets is not necessarily harmful to export growth, although it has been shown that market concentration is negatively correlated with sales stability (Hirsch & Baruch).

The method used here to estimate the relative quantitative importance of the various factors working on Israel's export growth is constant market shares analysis (CMS).¹⁴ The increase in Israel's exports between 1960 and 1969 ($X^2 - X^1$) is divided into four component parts:

$$(2) \quad X^2 - X^1 \equiv r \cdot X^1 + \sum_i (r_i - r) X_i^1 + \sum_{ij} (r_{ij} - r_i) X_{ij}^1 + \sum_{ij} (X_{ij}^2 - X_{ij}^1 - r_{ij} \cdot X_{ij}^1)$$

where the subscripts refer to the i^{th} commodity group and j^{th} destination for Israeli exports. The r variables represent growth rates for world trade and thus the first expression on the right hand side indicates what Israel's exports would have been in 1969 had they expanded at the same rate as total world trade. The final term on the RHS also has a clear interpretation in that it represents the difference between the actual increase in Israeli exports and what the increase would have been if Israel had maintained a constant share in the market for each commodity at each destination. The other two terms separate out the commodity and market distribution effects. The second term indicates the effect on Israel's exports of differences between the growth rates of world trade in her commodities and of total world trade. The third term shows the corresponding effect with regard to export destination, the commodity composition effect having been taken into account. An alternative formulation of equation (2) would take account of the market distribution effect before the commodity composition effect:

$$(2a) \quad X^2 - X^1 \equiv r \cdot X^1 + \sum_j (r_j - r) X_j^1 + \sum_{ij} (r_{ij} - r_j) X_{ij}^1 + \sum_{ij} (X_{ij}^2 - X_{ij}^1 - r_{ij} \cdot X_{ij}^1)$$

Identity (2) has been the form used in most previous studies but, since the two forms yield different estimates and there is no logical reason

¹⁴ The first use of CMS was by Tyszynski. For a clear presentation of the mechanics of calculation see Leamer and Stern, ch. 7.

for preferring either one, we will provide estimates using both formulations.

The limitations of the CMS method are well-known. The model is based on an identity and can thus provide no causal explanation. It has no stochastic basis and is useless for projection purposes, i.e. it provides only an ex post evaluation of past performance. The model is sensitive to the choice of time period and the level of aggregation of commodities and markets, but provides no guideline as to the appropriate time period or aggregation levels. Since base period weights are used, there is an index number problem. Finally, the CMS model implies a normative judgement that retaining a constant share of world markets is the relevant yardstick for judging a country's export performance. In spite of these limitations the CMS model may point to the areas in which an explanation of export performance can be found and is therefore useful provided that the precise values of the estimates obtained from it are not overemphasised.

The CMS estimates of the sources of changes in Israel's exports in the 1960s are given in Table XII. The commodity and market concentration of Israel's exports appears to have had little effect on their growth rate. The concentration of commodities and perhaps of destination was in areas of slower than average growth, but the total negative effect of the commodity and market structure of Israeli exports was only equal to 3-4 % of the actual growth of exports. The positive sources of Israel's export growth were the increase in total world trade and improved performance within commodity and regional markets. The last term is usually referred to as increased "competitiveness", although in economic terms it is a residual, cover-all term. The size of the "competitiveness" effect suggests that Israeli exports became more efficient or enjoyed an improvement in their terms of trade, both of which could have been in consequence of government policy (either of Israeli or of other governments). The conclusion regarding the positive influence of Israeli government policy is limited by the fact that other forces work on the "competitiveness" effect, e.g. domestic demand in Israel may independently affect the volume of exports without any increase in efficiency or any

Table XII: SOURCES OF CHANGES IN ISRAEL'S EXPORTS 1960-9

	Identity (2)		Identity (2a)	
	Value (\$ m.)	Percentage	Value (\$ m.)	Percentage
Israeli exports in 1969	724		724	
Israeli exports in 1960	245		245	
Increase in Israeli exports due to:-	479	100	479	100
- increase in world trade	277	58	277	58
- commodity effect	-9	-2	-39	-8
- market distribution effect	-9	-2	22	5
- "competitiveness"	220	46	220	46

Note: (a) $i=1, \dots, 6$ the groups being SITC 3, (0+1+2+4), 5, (6+8), 7, 9.
 (b) $j=1, \dots, 7$ the markets being North America, EEC, EFTA, Comecon, Other Europe, Asia and Africa and the Rest of the World.

Sources: U.N. Handbook of International Trade and Development Statistics 1972; U.N. Commodity Trade Statistics, 1961, 1969.

government policy influence. The final evaluation of the effect of Israeli government policy must be agnostic; the CMS analysis suggests that it was positive and may have been significant, but further analysis is required to break down the "competitiveness" effect.

Comparison of the CMS estimates for Israel with those for other countries yields the expected conclusions. Banerji's estimates for all LDCs for 1955-62 and 1962-70 reveal that their exports grew more slowly than world trade and that the major negative effect was the commodity composition of their exports. The "competitiveness" effect was negative, but was very small in the 1960s (Banerji (1974), p. 459). This suggests that Israel was relatively favoured among LDCs by the commodity composition of her exports, but that she also made far more

substantial within market gains than the LDCs as a whole did.

Two main conclusions can be drawn from the CMS analysis. First, the concentration of Israel's exports by commodities and by markets had little effect on her aggregate export growth rate. In this she was fortunate in comparison with other LDCs, which in general had to contend with a large negative commodity effect. Second, since the "competitive-ness" effect is the source of a significant part of Israel's export growth, the hypothesis that government policy played a major role in fostering this expansion is not refuted. In weighing these conclusions the limitations of the CMS method (see above) must be borne in mind. From an economic point of view the choice of time period was arbitrary and the results may be biased by the choice of end years. Furthermore, the choice of commodity groups was based on data availability rather than relevance to the Israeli case. If the latter criterion were to be used, it would clearly point to the separate identification of SITC groups 051 (citrus) and 667 (diamonds).

The question must now be posed as to what is the optimal direction for proceeding with research into Israel's export performance and prospects. Clearly there is some advantage to carrying out CMS analyses for different time periods and different market groupings in order to test the sensitivity of the present estimates to the dates and regions used. It appears, however, that the major weakness of the above CMS estimates lies in the commodity groupings which are used. Israel's exports are not highly concentrated according to SITC one digit categories, but are concentrated within these categories. Thus if world trade in SITC categories 0+1+2+4 increased rapidly this would be of little help to Israel unless category 05 (citrus) grew; since the latter only forms a small proportion of the former it is quite possible that their growth rates might differ widely. To establish the true nature of the commodity effect on Israel a minimum requirement would be to examine citrus and diamonds as separate categories. In the absence of such a disaggregation of commodity groups, rapidly diminishing returns would be encountered in carrying out further CMS analyses for Israel.

The procedure to be followed in the next section will be to undertake separate case studies of citrus and diamond exports. These differ from most of Israel's other export goods in that, since Israel has a significant share of their world markets, demand conditions loom much larger in considering citrus and diamond exports than they do in considering other exports. Tourism will also be given separate treatment since it is, for religious reasons, a differentiated product and thus Israel is in a monopoly or monopolistic competition situation. Some other agricultural and mineral products provide export earnings but these will always be marginal in view of Israel's restricted endowment of natural resources, including arable land and supply is inelastic in the long-run. Thus most of Israel's future export earnings not provided by citrus, diamonds and tourism will have to come from industrial exports other than diamonds. This last category will be the focus of section 6. It is within this context that further CMS estimates will be made, i.e. applied only to SITC categories 5, 6 (minus 667), 7 and 8.

5. Israel's Traditional Exports and Other Non-Manufactured Exports

In this section Israel's past performance and future prospects for exporting diamonds, citrus fruit, tourism and other non-manufactured goods and services are analyzed. The diamond polishing industry is also studied for possible lessons regarding export promotion policy towards industry. It should be emphasised that our aim is not to provide forecasts of future Israeli exports, but rather to indicate the central role which our main object of later study (manufactured exports other than diamonds) will have to play in Israel's export expansion programme for lack of alternatives.

(a) Diamonds

The diamond-cutting industry possesses several unique features which have made the traditional determinants of industrial location (i.e. location of raw materials, power and fuel availability, capital

availability, market access, etc.) inapplicable to it (Berman, p. 316). Thus, although diamond mining is heavily concentrated in Africa and the USSR, the major trading centre is London and the major processing centres are Belgium and Israel. The explanation of the location patterns is largely in terms of non-economic forces. The development of the diamond trade in the Low Countries was a consequence of the religious toleration granted to the Jews from the fifteenth century on, which permitted them to settle there although they were not allowed to join guilds and their choice of occupation was limited to a few activities (of which the diamond trade was one).

In more recent times a further factor affecting the location of the diamond industry is the control of the raw material market by the 'Syndicate'. In the early twentieth century the De Beers group, operating from South Africa, had a virtual monopoly of the sale of diamonds on the world market. After 1918, however, a series of new strikes in South West Africa, Angola, the Belgian Congo and Sierra Leone led to competitive selling and low prices in an excess supply situation which culminated in a large price drop in 1929. In the wake of the depression the chairman of De Beers convinced the African producers and the world's traders and cutters to agree to a controlled market in order to stabilize prices. The Central Selling Organization (known as the Syndicate) then controlled the buying and selling of some 80 % of all rough diamonds until the 1950s¹⁵, when the South African based Syndicate clashed ideologically with the increasingly important central African producers and when an excess demand situation removed the need for artificial price supports. Despite the reduction in the Syndicate's monopoly position, it still retains a dominant role since pricing policies in the market remain under a price leadership pattern (Szenberg, pp. 19-20).

The stimulus for the start of the modern diamond industry in Israel was the German occupation of the Low Countries in 1940. In

¹⁵ There are no aggregate data on world diamond trade and, because of the unknown degree of diamond smuggling, all estimates are no more than rough approximations.

view of high output per man and low amount of fixed equipment, personal contact by the mayor of Netanya with a small number of Jewish diamond-cutters in Belgium was sufficient impetus to start five small factories by the end of 1940. This example, deteriorating conditions for Jews in the Low Countries and expanding US demand led to the rapid increase of Palestine's diamond industry during World War II (Table XIII).¹⁶ After the war, however, a group of skilled workers returned to Belgium and the industry was disrupted by political events in Palestine. In 1947 the Syndicate discontinued all diamond allotments to Palestine in order to meet Belgium demand and in 1948, after 1200 of the industry's labour force had been called up for military service, employment in the industry fell to 800 workers.

Table XIII: DEVELOPMENT OF THE DIAMOND INDUSTRY 1940-8

	Factories	Workers	Exports (£ 000)
1940	5	200	25
1941	12	1,200	200
1942	23	2,500	925
1943	33	3,750	2,600
1944	33	3,750	3,300
1945	33	4,000	5,900
1946	34	4,000	5,490
1947	45	2,000	600
1948	30	800	300

Source: Government of Israel, Ministry of Commerce and Industry: Israel's Industrial Future 1960-5 (Jerusalem, 1960), p. 229.

¹⁶ There was no problem in obtaining uncut diamonds from the Syndicate, which was willing to supply the Palestinian industry from its accumulated stocks on hand.

In the years following Israeli independence the new government attempted to reestablish the diamond industry in spite of heavy Belgian competition. A crucial step in this direction was the securing from the Syndicate of a quota of raw diamonds sufficient to provide employment for some 1500 workers. The quota constituted about 70 % of Israel's raw diamond imports, and the industry sustained 2,300 workers in 1955. At the end of 1955 the Ministry of Commerce and Industry took the initiative in promoting the industry's growth, and the promotion effort was strengthened in 1958 with the establishment of the Diamond Import Corporation. The aims of government policy were to establish new factories in development areas as a part of regional policy and to discover sources of raw diamonds other than the Syndicate. The first goal was not very successfully met because of the existence of externalities from proximity of trading and cutting establishments, and today some 70 % of diamond workers are concentrated in the cities of Tel Aviv-Yafo, Ramat Gan and Netanya. Greater success was achieved towards the second goal as, after some trial and error, new sources of supply were found in central Africa and Latin America. These new supplies provided the basis for rapid expansion after 1958 (Tables XIV and XV) and in 1961 the Syndicate recognized the importance of Israel as a producer by increasing its allotment. The Israeli producers soon established a monopoly in their own speciality, i.e. cutting melees (medium-sized stones), and in 1964 Israel bought 83 % of all melees sold by the Syndicate. Since then the Israeli industry has grown with increased world demand, and has even increased its share of the market by vigorous marketing practices, especially with regard to the rapidly growing east Asian market. In the early 1970s it appears that Israel has overtaken Belgium as the world's leading producer, although it is not yet as important as a trading centre.

If the traditional determinants of industrial location are inapplicable to the diamond industry (see above), how is the establishment of a diamond industry in Israel and its subsequent expansion to become the world's leading producer to be explained? The initial inflow of Belgian craftsmen was a consequence of the

historical importance of Jews in the European diamond industry. The maintenance of a diamond industry in the difficult years following Israeli independence and the rapid expansion after 1958 are directly attributable to government actions. Government assistance to the industry has consisted of some financial inducements (in the 1950s) and provision of low interest credit (which is important because all purchases of raw diamonds are on an immediate payment basis), but most significantly the government has provided a unified front where size is important¹⁷, i.e. in securing supplies of raw diamonds and markets for the finished product. The government also provided help in financing training and established R & D facilities (Szenberg ch. 6, especially pp. 160-170 on government help in manpower recruitment).

Table XIV: EMPLOYMENT IN THE DIAMOND INDUSTRY
1949-62

	Number of workers
1949	800
1955	2,300
1956	2,600
1957	3,000
1958	3,600
1959	4,300
1960	5,000
1961	6,000
1962	7,100

Source: Levhari and Sheshinski, p. 240.

The contribution of the diamond industry to Israel's export growth, especially since 1958, indicates a successful case of export promotion.

¹⁷ There do not appear to be significant economies of scale in production (Levhari and Sheshinski), which would explain the continued existence of many small establishments in the industry. This view is also to be found in many publications of the Diamond Institute. Szenberg holds the opposing view that the minimum optimal scale is 50 workers and that constant returns only hold above this size (Szenberg, ch. 4).

Table XV: ISRAEL'S EXPORTS OF DIAMONDS AND AGRICULTURAL PRODUCTS
1949-1972 (\$m.)

Year	Diamonds	Citrus Fruit	Non-Citrus Agriculture	
			Total	Eggs
1949	5.2	18.0	0.1	0
1950	8.8	16.8	0.2	0
1951	11.7	15.9	0.2	0
1952	11.5	16.5	0.2	0
1953	12.8	21.6	0.5	0
1954	15.7	33.5	2.3	0.2
1955	20.2	31.6	2.6	0.2
1956	24.7	40.2	3.4	0.7
1957	35.3	48.4	6.0	0.6
1958	34.3	48.4	8.4	4.9
1959	46.8	45.9	12.2	6.7
1960	60.9	46.6	16.5	10.7
1961	70.3	40.5	22.1	12.2
1962	89.3	49.2	19.2	8.6
1963	116.0	74.7	14.3	5.2
1964	137.6	52.8	13.9	5.9
1965	153.7	71.2	15.3	5.0
1966	189.5	74.7	20.2	3.9
1967	193.0	85.3	22.6	5.1
1968	229.3	88.4	24.7	2.9
1969	254.4	91.5	26.7	2.2
1970	245.8	86.1	43.5	2.5
1971	306.4	113.8	41.0	2.5
1972	430.4	109.0	51.9	2.6

Source: Statistical Abstract of Israel 1965, p. 261; Ibid. 1970, p. 221; Ibid. 1973, p. 209.

This success follows from the correspondence of the attributes of diamond production with Israel's endowments. The high value-weight ratio of both the raw materials and the finished product is ideal for a country with few raw materials, a small domestic market and no trade with her neighbours. The low capital and energy requirements also correspond to Israel's scarce resources, and the foreign exchange requirements are short term since no expensive machinery and equipment must be imported. The insufficient quantity of skilled labour was overcome by devising a system of specialization whereby six individuals are required to complete the work on one stone, but each requires only a six month apprenticeship. The entrepreneurial expertise required to organize this division of labour and to fulfil the general management function was available in Israel. Thus once the functions of raw diamond supplier and marketing were taken over by the government the industry grew rapidly.

The Israeli industry should continue to grow in the future with world demand. Israel's dominant position does, however, limit the possibilities for very rapid expansion unless she can move into new lines or develop new markets. An attempt is being made to increase her product range by retaining more of the polished diamonds for the domestic jewellery industry and by turning to smaller stones, although this will encounter strong competition from India and Belgium which are the leading producers of this size of stone. The government is energetically courting prospective purchasers in the rapidly expanding eastern markets, especially Japan whose diamond imports from Israel are now second only to the USA. Some uncertainty is presented by the possibility of the development of automated cutting techniques and of improved synthetic diamonds; it is unclear how either of these developments will affect Israel's diamond industry. The biggest danger for the Israeli industry is probably that of new producers emerging. The success of Israel itself provides a stimulus to other countries to move into diamond production or (especially in the cases of India and the USSR) to expand production. Barriers to entry are low, especially if the power of the Syndicate diminishes further, and

the only real barrier is the significance of workers' experience for efficiency.¹⁸

In sum, the diamond industry has remained one of Israel's major export industries, even when it might have collapsed in the late 1940s and early 1950s, and should continue to be important in the future. This is largely a consequence of successful government policy in promoting an industry eminently suited to Israel's comparative advantage. The industry cannot, however, be expected to enjoy a greatly increased growth rate in the future, because Israel's exports are now a dominant factor in world diamond trade.

(b) Citrus Fruit

Citrus has assumed a major role in Israel's exports because part of the country is endowed with ideal conditions for producing high quality fruit. The "citrus belt" is centred on Tel-Aviv and consists of the area less than 25 kms. from the coast lying between Binyamini in the north and Gedera in the south. The climatic conditions and relative ease of irrigating with low chlorine water permit all varieties of citrus to be grown in this area, in particular shamouti oranges. The extent of these optimum growing conditions is estimated at some 300 - 350,000 dunams (1 dunam = 1000 sq. metres) and this area under cultivation was reached in the early 1960s. There is in addition to the "citrus belt" an unknown quantity of more or less marginal land capable of adaption to citrus production, and expansion in the last decade has been in these areas, especially to the south. Climatic conditions in the southern area are, however, less favourable and can lead to partial crop failure caused by low temperatures and by more intensive dry winds. Furthermore soil and irrigation conditions are inferior, because the soils are often impermeable (thus requiring more

¹⁸ Levhari and Sheshinski found average experience of workers to be easily the most important explanatory variable with respect to differences in efficiency in the Israel diamond industry. Israel may have some comparative advantage over other LDCs in that her higher level of general education may speed up the learning process within industry.

irrigation) and irrigation water is high in chlorine content. Thus as citrus production moves to the marginal lands unit costs increase rapidly. The supply curve can be pictured as being fairly elastic while expansion within the citrus belt region was possible but becoming more inelastic as production moves beyond the citrus belt, i.e. within the relevant range for future expansion. Possibilities of shifting the whole supply curve in a south easterly direction by technical change appear to be limited since Israeli citrus producers are already more efficient than other Mediterranean producers and experiments with increased use of fertilizers, etc., appear negative. In view of her increasing unit costs, Israel's citrus exports can be expected to expand rapidly only if world market conditions are favourable.

Although citrus production is spread through the world, three quarters of world trade is between Western Europe and its six main suppliers (Algeria, Israel, Italy, Morocco, South Africa and Spain). The West European market is expanding because citrus is a semi-luxury food with income elasticity greater than unity (Evans, p. 632), but the prospects of an individual supplier also depend on its competitive position. Four major factors influencing competitiveness can be identified: production costs, proximity to markets, ability to provide the type of fruits consumers' desire and preferential trade arrangements.¹⁹ Most producers have a favourable physical environment (although the extent to which Israel's competitors are already having to utilize marginal land is unclear) so the major points of difference are wage rates, which are higher in Israel than in any of its competitors, and technical efficiency, which is also higher in Israel. The size of transport costs in final landed prices makes proximity to markets an important element in competitiveness, and here Spain and Italy are greatly favoured and Morocco and Algeria somewhat less so. For Israel this disadvantage is partially compensated for by the high reputation which her shamouti oranges enjoy, especially in Britain. The quality advantage enjoyed by Israeli fruit has been the major

¹⁹ The following summary of the first three factors is based on Wolf.

force in enabling her to expand her citrus exports continuously, for even in years of reduced demand good quality citrus continue to sell and it is the producers of inferior fruit who suffer. Despite product differentiation, the price elasticity of Israeli citrus exports is quite high:

"If we assume that Israeli citrus are perfect substitutes for other exported citrus, the price elasticity facing Israel is about six for oranges and two and one half for grapefruit. Even if there is some segmenting of markets, the elasticity is still quite high and in any case much greater than unity."
(Evans, p. 632).

The possibility of a high cross-price elasticity between Israeli citrus exports and her competitors' goods places great importance on trade preferences enjoyed by these competitors in the West European market, since in order to compete Israeli exporters may be forced to lower prices or to suffer a reduced rate of expansion of sales, either of which will slow down the rate of expansion of export earnings.

During the Mandate period, Palestine's citrus exports went almost exclusively to the United Kingdom. Since the war, however, the relative importance of the U.K. as a citrus market has been declining both because of her sluggish economic growth and because of an unexplained shift in consumers' tastes there. Israel has countered the decline of her traditional market by increasing her sales to West Germany, the Benelux countries and Scandinavia. The French market remained closed because France gave preferential treatment to her North African colonies. The formation of the EEC had several consequences for Israeli citrus exports to Western Europe. The common external tariff was set at a level lower than that which France had for her non-North African suppliers but higher than that which the other consuming countries previously had. Thus the retail price of Israeli fruit was increased in West Germany and the Benelux countries, and more recently in the UK and Denmark. Furthermore Italian producers avoided the CET, as did producers in Algeria and Morocco, which enjoyed associate status. Israel's goal is membership of the

EEC and at present there are plans for a Mediterranean free trade area in conjunction with the EEC, which would improve Israel's position relative to her competitors, but the situation still retains some uncertainty for Israeli exporters.

Recent FAO forecasts of world trade flows in 1980 pointed to small surpluses in oranges and grapefruit, but they appear to have been based on conservative production estimates.²⁰ The increased supply is primarily a consequence of ambitious planting in North Africa and Italy and the entry of new Mediterranean producers into the world market. Since Israel is a major exporter with 20 % of world trade for oranges and 50 % for grapefruit, her export expansion plans are bound to be affected by a potential excess supply situation. She may be able to maintain her position because of product differentiation or may fall back because of trade preferences to her competitors, but in either case the situation is not one in which the proceeds from citrus exports can be expected to increase rapidly. The only exogenous change which could alter this picture of the medium and long term prospect would be the opening up of the East European markets, where Israel may not suffer tariff or distance handicaps. Even if this new market were available, its extent is uncertain and Israel's competitors which are not faced with diminishing marginal product of land in citrus production may take most of the market in the absence of any consumer loyalty to "Jaffa" fruit.

(c) Tourism

Since 1968 tourism has been Israel's greatest single earner of foreign currency. It also has linkages which increase foreign exchange earnings, especially via the national carriers El Al and Zim which convey almost half of the tourists visiting Israel. Israel offers tourists the sun and sand of the Mediterranean, historical sights and a view of modern Israel. The latter factors ensure a large degree of product differentiation, especially because many of the historical sights have unique religious associations and because of the uniqueness

²⁰ FAO Monthly Bulletin of Agricultural Economics and Statistics 21,
September 1972, p. 2.

of some of the social institutions of modern Israel (e.g. kibbutzim). Israel's comparative advantage in supplying tourist services is modified by her high wages relative to other Mediterranean countries, but in compensation she has a better supply of entrepreneurial abilities.

The rapid expansion of Israel's tourist trade is revealed in Table XVI. According to Evans' econometric model, the major factors explaining the pattern up to 1965 were domestic conditions, i.e. the decline in tourist earnings 1956-7 reflects the Sinai campaign and the subsequent restriction on American tourists, and world tourism. The principal determinants of world tourism are incomes and population in the tourist generating countries of North America and Western Europe (Bond and Ladman). Evans' explanatory variables do not, however, provide an adequate explanation of the boom in Israel's tourist trade since 1969, which has far exceeded the rate of increase in world tourism. One factor may be the 1967 War which made the whole of Jerusalem accessible to visitors to Israel and thus increased the country's attractiveness for Christian and Jewish tourists. A further factor may have been the increased expenditure on and effectiveness of publicity. Without knowledge of the causal factors of the tourist boom it is difficult to make projections for the future. The situation is further complicated by the unstable political position in the Middle East. Nevertheless, most forecasts for the 1970s are optimistic and predict that Israel's tourist trade should continue to expand rapidly.

Until recently few studies of tourism as an economic development strategy existed, and now that this absence has been remedied a wide gap has emerged between its advocates and opponents. The major benefit of developing a tourist industry is the foreign currency it brings into the country. It is a suitable activity for most LDCs because they have a comparative advantage in *sun vis-à-vis* many of the more developed countries and because the tourist industry is relatively labour intensive. It is also a desirable field to enter because world tourism is growing faster than world trade in

Table XVI: Tourist Arrivals in Israel and Foreign Currency
Income from Tourists,^b 1948-72

	Arrivals (thousands)	Foreign currency income (\$m)
1948	4.5	n.a.
1949	22.0 ^a	n.a.
1950	33.0 ^a	n.a.
1951	39.4	n.a.
1952	43.3	2.5
1953	37.1	3.8
1954	39.1	4.8
1955	49.9	7.2
1956	42.6	6.6
1957	42.3	5.5
1958	68.1	12.0
1959	85.1	16.2
1960	117.7	27.0
1961	159.6	30.1
1962	183.7	38.4
1963	218.5	52.9
1964	251.6	54.2
1965	296.5	54.8
1966	328.1	59.1
1967	291.1	52
1968	432.0	97
1969	409.0	90
1970	441.3	105
1971	656.8	182
1972	727.5	215

Note: ^a estimate; ^b excluding expenditure on transport to Israel.

Source: Israel Prime Minister's Office: Israel Economic Development (Jerusalem, 1968), p. 514, p. 517; Statistical Abstract of Israel 1973, p. 111, p. 180; Ibid. 1969, p. 182; Ibid. 1971, p. 202.

manufactures or primary products and because tourism is income elastic.²¹ Proponents of tourism also point to favourable domestic consequences such as (i) the stimulus to infrastructure, especially transport services, and linkage effects generally²², (ii) the pressure on weak-money countries to value their currencies more realistically and (iii) the favourable properties of the "demonstration effect". Tourism has been attacked by critics as detrimental to the quality of life in the host country since it produces enclaves within the domestic economy, emphasising differences in wealth and generating urgent aspirations which cannot be fulfilled in the near future. In many cases the basic assumption that tourism helps the balance of payments has been questioned in the light of the predominant position of foreign ownership of hotels, etc. The only existing cost-benefit analysis of tourism, an analysis of the Commonwealth Caribbean following the Little-Mirlees approach, calculated a social rate of return close to the minimum accounting rate of interest, although private returns were sufficient to attract investors, and it thus concluded that government expenditure on infrastructure and incentive schemes had been too lavish (Bryden).

The disadvantages of tourism as a leading sector in economic development may not be fully applicable to Israel. The possibility of tourists producing rising aspirations will be less in Israel than in other LDCs, because incomes are higher and many Israelis have had contact with the developed countries anyway. Also, despite the presence of international hotel chains such as Hilton, Sheraton and Hyatt, foreign investment does not dominate the hotel industry to the

²¹ An International Union of Official Travel Organisations cross-section study across all countries found an income elasticity of 1.5 (quoted in Bryden, p. 58). Bond and Ladman's estimate for US visitors to Latin America is close to unity.

²² Estimates of the "tourist multiplier", $K_t = \frac{\Delta Y}{\Delta T}$ (where ΔT = the change in tourist receipts, ΔY = the consequential change in national income), have ranged up to 4.3, but they have come under heavy criticism (cf. Bryden, ch. 5).

extent it does in many LDCs.²³ The principal difference between Israel and other LDC tourist centres is that almost half of her incoming tourists arrive under the Israeli flag, i.e. by El Al or Zim, which ensures that the linkages are substantial in terms of foreign currency earned. The major disadvantage of tourism for Israel is its sensitivity to (a) changes in conditions in the tourist-generating countries, e.g. the energy crisis and the three-day week in the UK in 1973-4, and (b) changes in Israel's security position as perceived by potential tourists. Both of these factors are largely outside Israeli control and can produce great instability of earnings. Such instability can have major economic consequences, especially for towns which have become dependent on the tourist trade (e.g. Eilat, where 40 % of the population is engaged in occupations connected with tourism).

The Israeli government clearly considers the possible costs to be outweighed by the benefits from tourism. The desire to encourage tourism is reflected in the size of the Ministry of Tourism's budget, which was I£ 37m. for 1973/4 compared to an expenditure of I£ 7.9m. in 1968/9.²⁴ Generous loans are offered for the construction of new hotels, e.g. an investor building a hotel in Eilat is entitled to a loan covering 46 % and a grant covering 20 % of the net investment, and foreign investors are also offered inducements in tax exemption and relief on import duties.²⁵ Whether such government expenditures are economically justified or could be put to better use is an open question, which will not be dealt with here. The fact that they exist should ensure that tourism remains an important foreign currency earner in the absence of any major deterioration in world tourism or Israel's security position.

²³ The hotel industry did, however, attract 19 % of all foreign investment in Israel in 1970 (The Israel Economist, April 1972, p. 93).

²⁴ Statistical Abstract of Israel 1973, p. 590.

²⁵ Article by the Minister of Tourism in The Israel Economist, April 1972, pp. 93-4.

The above survey of tourism in Israel is too brief to do the subject justice. It would be desirable to evaluate government policy more scientifically and also to study the effects of existing and alternative policies more fully. The justification for leaving the matter here is that tourism itself cannot be a complete strategy for Israeli economic development. Tourism on a scale sufficient to support her population would be intolerable in view of her small exploitable area. Furthermore, tourism in Israel will for the foreseeable future be at the mercy of exogenous shocks. This is not to deny that tourism may provide a welcome and important means of alleviating the foreign exchange constraint during the development process, but it may be unreliable and cannot serve as a long-term strategy in itself.

(d) Other Non-Manufactured Goods and Services

Israel's agricultural exports have always been dominated by citrus fruit (Tables XV), despite several attempts by the government to foster diversification. Exports of groundnuts were started in 1954, but did not expand greatly. A more substantial contribution was made by the poultry industry after a 1957 agreement whereby the government guaranteed minimum prices which made egg production profitable for the producer in both domestic and foreign markets. In 1961, however, the government reduced its support and since then eggs have not provided a very profitable export outlet. The most recent and longest lasting boom in non-citrus agricultural exports started in the mid-1960s and was more firmly based on Israel's comparative advantage. Israel's climatic conditions permit growth of flowers, fruit and vegetables in different seasons or earlier in a season than in western Europe, and air transport allows such goods to be taken to the foreign markets in fresh condition. With such goods and also some industrial crops (e.g. cotton) Israel's skilled labour force has created efficient production conditions. Non-citrus agricultural exports increased by 239 % between 1965 and 1972, and there is no reason why the specialized exports developed in this period should not continue to expand in the

future. Nevertheless, in a country of Israel's size (in terms of arable land) even highly intensive farming has its limits as a long-run growth strategy and even in the medium-term the contribution of non-citrus agricultural exports to total export growth is likely to be small in absolute terms because of the low base (cf. Table XV).

Although Israel is poor in mineral resources, there are potash deposits in the Dead Sea area and some minor deposits of phosphates and copper. These may be extended and can make a contribution to export earnings, but such a contribution is unlikely to be large.²⁶ More significant are the earnings from transportation and other services. Such exports are, however, difficult to predict independently because of their derived demand nature, e.g. exports of shipping services will depend largely on the level of Israel's trade in other goods and services.

Although the aim of my research is not to make detailed forecasts of Israel's future exports and imports, such forecasts do help to cast light on the prospective relative importance of different export sectors. Forecasts of Israel's foreign trade position in 1975 and 1980 have been made by Bruno (apparently in 1969 or 1970), and they are presented in Table XVII. The assumptions behind Bruno's predictions for the individual categories other than "miscellaneous manufactures" are in line with the discussion in the present paper. The conclusion is that the trade deficit will still remain in 1980 and the extent to which it is narrowed will depend critically on manufactured exports:

"If we can assume that with reasonable promotion policies exports of various invisible items will go on increasing at rates similar to their past performance, the main burden of supplying the gap between "required" exports and those that could be projected under "no change" assumptions falls on the "miscellaneous manufactures" group" (Bruno (1972), p. 132).

²⁶ Exports of crude fertilizers and crude minerals were \$ 5.1m. in 1972 (Statistical Abstract of Israel, 1973, p. 201).

Table XVII: Forecasts of Exports and Imports 1970-1980

	Actual	Forecast (\$m, 1968 prices)			Annual rates of growth (%)			
	1968(\$m)	1970	1975	1980	1960-8	1968-70	1970-5	1975-80
Exports:								
Citrus	88	105	134	171	8.1	9.2	5	5
Other agricultural goods	24	32	64	113	5.2	15	15	12
Polished Diamonds	194	236	332	444	15.6	10.3	7	6
Miscellaneous manufactures	290	384	879	1,768	15.4	15	18	15
Transport services	198	263	515	907	13.7	13.7	14.5	12
Tourism	96	100	201	404	17.2	2.1	15	15
Other services	231	250	503	886	20.8	15	15	12
TOTAL	1,121	1,370	2,628	4,693	15.1	10.6	13.9	12.3
Imports:								
TOTAL	1,831	2,465	3,659	5,204	12.8	16	8.2	7.3

Source: Bruno (1972), p. 118, p. 120.

The conclusion is that any attempt to use export promotion as Israel's major strategy for removing her trade deficit will have to be centred on manufactured exports. For a country with few natural resources, including a limited amount of arable land, this is an unsurprising conclusion and it is no doubt applicable to many other small LDCs.

6. Manufactured Exports

The aim of this section is to describe and analyze the growth of Israel's exports of manufactured goods other than diamonds.²⁷ It has been shown that Israel's prospects of removing her trade deficit depend heavily on the further growth of these exports and analysis of past performance may help assessment of the possibilities for future increases. Manufactured export expansion has often been proposed as a development strategy for LDCs and Israel's success in this area may also provide "lessons" for LDCs wishing to follow such a strategy.

The basic data are given in Table XVIII, which reveals the rapid growth of Israel's manufactured exports. Exports of the leading industry, food processing, are also given, since the main products (citrus-related goods) are atypical of other manufactured exports in that Israel is an important world supplier and Israel has a natural advantage not possessed by other LDCs. The commodity composition of the remaining industrial exports is examined in part (a). The sectoral origin of Israel's manufactured exports is then examined in part (b) and the contribution of different industries to Israel's foreign trade account is estimated. In part (c) an aggregate analysis of the growth of Israel's manufactured exports is undertaken to establish the role played by their commodity composition and their

²⁷ Throughout the present section the term "manufactured exports" is used exclusive of direct exports from the diamond polishing or mining sectors. In analyzing demand-side conditions (part (c)) food processing is also omitted, for reasons outlined in the next paragraph, and manufactures are defined as SITC 5-8 minus 66.

Table XVIII: ISRAEL'S INDUSTRIAL EXPORTS* (million dollars)

	Total	Food products
1949	4.9	2.8
1950	9.2	2.6
1951	16.8	4.7
1952	15.0	3.9
1953	21.3	3.1
1954	31.7	4.0
1955	31.8	3.4
1956	35.1	6.1
1957	47.6	7.7
1958	47.2	8.6
1959	67.4	13.6
1960	85.6	14.8
1961	106.1	16.2
1962	115.1	17.2
1963	139.1	24.2
1964	155.5	30.6
1965	175.4	32.7
1966	189.5	34.9
1967	218.8	36.9
1968	264.9	43.5
1969	300.5	55.6
1970	342.9	62.9
1971	431.9	78.9
1972	481.3	94.9

* Excluding polished diamonds and mining products.

Source: Statistical Abstract of Israel 1969, p. 209; Ibid. 1973, p. 209.

traditional markets. The aggregate analysis is then broadened to introduce supply-side considerations and to consider the effects of government policy towards exports. Finally, some tentative conclusions and signposts for further research are given in part (e).

(a) The Commodity Composition of Israel's Manufactured Exports

In section 2 the expansion of Israel's exports was divided into several sub-periods: (a) a period of rapid growth from a low base (1949-54), (b) a period of relatively slow growth, 1954-8, (c) the export boom of 1958-63, (d) steady growth in the mid 1960s. Such a pattern is also reflected in the pace of expansion of manufactured exports. This periodization is a useful device for analyzing the commodity composition of Israel's manufactured exports because different commodities led the way in different periods.

The early years following Israel's independence saw a rapid expansion of all exports and the trade deficit reached its smallest absolute level in 1954. In the manufacturing sector rapid expansion was accompanied by diversification as food products fell from 58 % of manufactured exports other than diamonds in 1949 to 12 % in 1954 (Table XVIII). The biggest increase occurred in motor vehicle exports, which primarily consisted of American cars assembled in Israel and sold on bilateral trade agreements. Next in importance were textiles and wearing apparel, which is unsurprising since these products often figure prominently in early industrialization and they were furthermore traditional "Jewish trades". A more interesting case is cement exports, which increased rapidly between 1952 and 1954. Cement production was originally intended as an import substitute but the establishment of two domestic factories led to a capacity in excess of domestic demand and the surplus capacity was used to produce for export; a similar phenomenon was apparent in window glass which was making a marginal contribution to export earnings in the mid 1950s. The same explanation may lie behind the emergence of exports of three other commodities which were soon to become of leading

importance: tyres and tubes, plywood and potash and chemical fertilizers. In all these cases there was some scope for import substitution in the early 1950s (and government policy supplied great incentives to utilize all opportunities for import substitution), but the minimum optimum scale of operation was significantly below the level of domestic demand. Thus, although import substitution policies will generally discriminate against exporters, they can provide a stimulus to exports in cases where the minimum optimum scale is large. How far the provision of such a stimulus is justified for a particular industry depends on the extent to which the incentives for import substitution reflect efficiency criterion such as domestic resource costs. If the DRC is low then that industry should be both an efficient import substitute producer and possess a comparative advantage as an exporter. If, however, the import substitution policies are leading to resource misallocation (i.e. not according to DRC) then the would-be exporter will be unable to compete in the world market.²⁸

The 1954-8 period saw a reduction in both the rate of growth and the absolute increase in industrial exports (compared to 1949-54; see Table XIX). The major features of this slowdown were:-

- (1) the drastic reduction in motor vehicle exports as access to the Finnish and Turkish markets was ended (and Israeli cars were unable to compete on the world market),

²⁸ The process of developing export industries via an initial import substitution phase has sometimes been advocated without specifying the need to obey efficiency criteria. This blanket advocacy has been satirised by Bhagwati and Chen (p. 185) as producing what one imports and then exporting what one produces, i.e. goods which were originally considered the least suitable for domestic production are the ones which should be encouraged as leading exports!

Table XIX:

ISRAEL'S MANUFACTURED EXPORTS 1949-58 BY LEADING COMMODITIES (I £ 000)

	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Textiles	281	5,351	7,762	5,051	4,410	4,611	5,397	5,239	7,359	6,202
- cotton manufactures (inc. yarn)	124	634	1,457	565	1,696	1,639	2,167	1,116	646	1,016
- woollen yarn	127	380	751	664	1,131	1,420	2,023	2,739	4,820	3,689
Wearing apparel (inc. shoes)	371	1,717	4,003	3,508	5,347	3,669	4,599	4,893	7,115	10,544
- nylon stockings	67	637	406	413	952	670	518	820	836	933
- raincoats	-	-	-	-	2,618	1,438	1,799	1,979	2,794	3,902
- bathing suits (elastic)	-	-	-	-	-	-	-	57	471	1,218
Iron & steel manufactures	2	2	10	9	204	1,159	2,590	1,408	2,109	995
Plywood	-	-	351	239	948	2,591	3,409	3,249	4,282	4,771
Potash & chemical fertilizers	-	-	-	-	120	861	943	2,014	5,791	6,667
Cement	-	-	-	298	2,285	4,461	4,888	5,385	6,329	2,720
Prepared drugs and medicines	112	466	1,183	349	1,060	1,188	1,534	2,597	4,792	1,573
Motor vehicles	-	-	2,904	3,967	9,520	13,146	6,754	3,220	3,504	4,003
Rubber tyres and tubes	-	-	-	15	1,614	4,063	4,548	6,665	8,735	10,295
Paper and products	0	0	-	-	0	2	143	1,188	2,864	1,733
Books	186	251	316	331	420	572	531	705	938	1,390
Postage stamps	141	160	321	542	461	392	504	867	1,929	2,512
Window glass	-	-	-	-	153	414	468	562	599	966
Artistic handicrafts and religious articles	509	317	501	407	661	910	1,208	1,759	1,730	1,988

Note: The individual commodity groups represent all groups with 1958 exports greater than \$ 1/2 m. (= I £ 900,000), excluding diamonds, mining and food products.

Sources: Statistical Abstract of Israel 1957/58, pp. 268-71; *ibid.* 1959/60, pp. 279-80.

- (2) the rise and fall of iron and steel exports reflecting the establishment of Acre steel town in the mid 1950s; this was a case of import substitution policy not following DRC criteria and when the excess output (over domestic demand) was offered abroad it did not sell readily on world markets,
- (3) the stagnation of textile exports, apart from woollen yarn,
- (4) the large reduction in cement exports in 1959; although this was a temporary setback, partly recouped in 1959, cement never again attained the importance it had previously had in manufactured exports.

At the same time exports of some commodities did expand rapidly despite the emphasis in government policy on import substitution. Most important of these was wearing apparel, where over half of the increase consisted of raincoats and bathing suits. These two items were produced largely for export (c. 85 % of output was exported) from imported fabrics, had low capital requirements per employee, used some skilled labour and had high value added. Their similar attributes and seasonal sales patterns (bathing suits were exported December-June, raincoats October-December) made them ideal complementary outputs and both products were produced by the same firms. Tyres and tubes and plywood expanded rapidly so that both became primarily export industries. Israel's ability to compete internationally with these products suggests that they corresponded to her comparative advantage at that time (both had moderate capital/labour ratios and required some skilled labour).²⁹ Exports of manufactured fertilizers also increased in this period, again probably reflecting Israel's comparative advantage, since this was one of the few products for

²⁹ Detailed analysis of where Israel's comparative advantage lay at different stages of her industrial development is delayed until a later paper. At that stage it may be possible to provide tests of some of the hypotheses advanced in the present section regarding the performance of individual exports.

which Israel was favourably endowed with raw materials. The growth of exports of paper products, primarily cardboard, was a case of a single modern factory being built (in line with the import substitution policy) and having capacity greater than domestic demand. A final category of growing export commodities was books, postage stamps, artistic handicrafts and religious articles. These all represented specialist products with less than perfectly elastic demand where Israel had some kind of absolute (e.g. with Jewish religious articles) or comparative (e.g. in foreign language books) advantage following from her people's cultural background.

The export boom of 1958-63 saw total exports grow faster than GNP or imports (the export/import ratio passed 50 % for the first time in 1963) and manufactured exports grew even more quickly than total exports. The main contributors to manufactured export growth were metal manufactures, textiles and chemicals.³⁰ The sources of export expansion were localised within these groupings (i.e. in defence equipment, textile yarn and thread, and petrochemicals), but an important point is that these were not the goods which had led the export expansion of the 1954-8 period. The fourth highest contributor to export earnings was clothing and within this sector there was a shift away from the previous export leaders, bathing suits and raincoats. A further feature of the export boom was the growth of exports of machinery, iron and steel products and electrical equipment, all of which started from a low base in 1958.

³⁰ Commodities are grouped for 1959 and after by SITC 2 digit classification (Table XX) and are not completely comparable with the commodity groupings of Table XIX, which are by the Israel Custom's tariff classification. It should be noted that the rapid increase in SITC 59, chemicals n.e.s., between 1962 and 1963 is partly a statistical artefact reflecting the reallocation of petrochemicals from SITC 33. This does not, however, affect the conclusion that chemical exports grew rapidly 1958-63 because the aggregate SITC (33 +59) increased greatly.

Table XX:

MANUFACTURED EXPORTS BY COMMODITY (\$ 000)

	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959
51. Chemical elements and compounds	28,217	22,667	18,759	13,302	10,537	9,058	6,557	6,332	5,317	3,912	1,795	2,397	3,402	1,385
52. Mineral tar and crude chemicals from coal, petroleum, etc.	0	0	0	3	0	0	3	0	0	14	5	67	-	-
53. Dyeing, tanning and colouring materials	1,169	881	896	608	596	572	768	915	807	715	743	695	1,124	453
54. Medicinal and pharmaceutical products	7,357	7,259	5,291	4,851	3,748	3,146	2,492	2,186	1,387	1,158	1,705	885	827	3,355
55. Essential oils and perfumes; cleansing preparations	2,884	2,055	1,645	1,691	1,926	1,606	1,316	1,097	1,014	790	659	498	442	492
56. Fertilizers, manufactured	29,668	29,934	25,385	14,599	13,839	13,739	12,813	13,283	8,398	5,883	5,014	5,056	8,178	7,527
57. Pyrotechnic products	322	315	25	11	23	42	5	18	24	0	0	0	-	-
58. Plastics	3,370	2,337	3,045	2,701	3,912	1,977	1,899	1,618	779	891	553	234	-	-
59. Chemicals n.e.s.	15,408	15,683	13,186	20,525	21,415	19,376	17,238	11,501	10,316	8,325	1,755	2,012	3,370	1,945
61. Leather goods	3,501	2,372	1,956	2,344	1,390	1,944	1,033	609	510	548	190	317	485	297
62. Rubber manufactures	20,702	18,728	16,800	13,815	10,948	9,780	10,075	9,135	8,792	9,174	10,318	8,627	13,881	11,524
63. Wood and cork	7,294	7,771	8,304	7,905	7,734	8,360	7,256	8,061	7,116	6,053	5,690	4,530	7,726	7,202
64. Paper and products	2,258	2,056	2,807	2,017	2,133	2,018	1,603	2,355	2,373	2,901	2,529	2,250	3,452	2,619
65. Textiles	41,970	47,552	39,316	37,185	31,074	27,443	25,490	23,636	24,527	18,464	17,128	12,045	13,635	6,290
66. Non-metallic metals	433,261	310,575	249,170	258,031	233,780	198,350	194,565	157,675	141,436	120,123	93,579	74,822	65,678	51,782
67. Iron and steel	4,974	3,606	3,976	2,036	2,360	2,577	2,888	2,455	1,754	1,687	1,444	954	1,378	447
68. Non-ferrous metals	15,609	17,263	19,485	19,301	15,230	12,972	14,683	10,128	10,140	5,396	4,931	4,918	449	30
69. Metal manufactures	42,999	40,557	25,295	29,451	31,187	11,596	13,563	12,471	10,257	18,537	11,850	9,302	3,358	3,014
71. Machinery	20,332	13,004	13,524	10,776	6,581	5,922	4,004	2,445	2,498	2,022	2,036	1,697	649	210
72. Electrical equipment	31,406	27,310	14,623	9,443	5,582	3,140	1,607	1,617	1,305	1,668	1,843	1,746	931	433
73. Transport equipment	22,911	17,113	9,946	16,180	14,307	26,540	8,607	4,513	4,501	1,690	2,681	7,578	2,974	4,824
Machinery and equipment n.e.s.	-	-	-	-	-	-	-	-	-	-	-	-	856	790
81. Sanitary fixtures, etc.	373	368	171	223	223	247	206	291	122	139	15	116	-	-
82. Furniture	4,398	2,171	1,872	1,590	577	215	214	76	33	225	34	9	-	-
83. Travel goods	1,939	1,461	477	160	199	132	61	153	322	549	2	23	-	-
84. Clothing	75,218	67,741	52,206	39,789	29,088	21,124	16,053	14,509	15,045	12,137	13,430	12,471	8,397	6,045
85. Footwear	1,641	1,342	1,285	1,280	522	172	66	48	70	46	77	120	157	54
86. Professional, scientific instruments, etc.	7,405	3,679	2,575	1,386	1,204	881	490	183	291	149	251	216	291	163
89. Miscellaneous manufactures	35,899	30,707	21,177	18,597	17,127	13,696	11,305	10,337	8,612	8,439	6,279	7,660	17,169	10,253

Note: Because of the different method of data presentation for 1959-60, i.e., by 1 digit SITC and then broken down by individual commodities rather than by SITC 2 digit classification, the miscellaneous sections (i.e., those ending in 9) are inflated for these years. There are thus some reductions in the values of other commodity classifications in 1959 and 1960, but the distribution of these reductions is unknown.

Sources: Statistical Abstract of Israel 1972, pp. 202-5; *Ibid.* 1969, pp. 202-5; *Ibid.* 1967, pp. 214-7; *Ibid.* 1965, pp. 246-55; *Ibid.* 1961, pp. 327-9.

Meanwhile the export growth products of 1954-8 were having difficulties. Exports of tyres, plywood, manufactured fertilizers and cement all fell between 1959 and 1963, as did exports of transport equipment which had been so important in the early 1950s. Exports of paper and its products rose, but only marginally. The explanation of such a thorough change in Israel's export bundle probably lies in both demand and supply conditions. The 1954-8 export goods required a relatively low degree of sophistication and when other LDCs attempted to expand their manufactured exports in the 1960s these were the type of goods they tried to produce. Thus Israel not only experienced greater difficulty in selling in the LDCs, where domestic producers now existed, but in all markets. A further demand side problem was that some of the products, plywood in particular, were being produced with the UK market in mind and this market was sluggish in the early 1960s.³¹ On the supply side the relative opportunity costs of Israel's factors of production changed after the achievement of full employment of labour in 1960. The new export goods all had higher capital-labour ratios than the 1954-8 export leaders (Ben-Bassat and Bregman, p. 33). Thus it appears that the change in the composition of Israel's manufactured exports reflected a change in her comparative advantage.

Manufactured exports continued to grow steadily after 1963, but not so rapidly as 1958-63. There were further changes in the ranking of commodities by contribution to export earnings between 1963 and 1968, but not as dramatic as in the previous period (Table XXI); clothing moved to the top of the list, while textiles fell to fifth place. A newly important export group was transport equipment; this was not due to a revival of the export of assembled cars, but to the establishment of ships and aircraft as exports. There was a resurgence in the export of manufactured fertilizers, but exports of tyres, plywood and cement grew very slowly, while exports of paper and its products fell.

³¹ This type of hypothesis will be tested in section 6 (c).

Table XXI:

EXPORT GROWTH LEADERS (RANKED BY THEIR CONTRIBUTION TO INCREASED EXPORT EARNINGS)

Period Ranking	1949 - 1954	1954 - 1958	1959 - 1963	1963 - 1968	1968 - 1972
1	Motor vehicles	Clothing	Metal manufs. n.e.s.	Clothing	Clothing
2	Textiles & clothing	Tyres	Textiles	Chemicals n.e.s.	Electrical equipment
3	Cement	Fertilizers	Chemicals n.e.s.	Metal manufs. n.e.s.	Chemicals
4	Tyres	Plywood	Clothing	Transport equipment	Fertilizers
5	Plywood	Paper & products	Non-ferrous metals	Textiles	Machinery
6	Fertilizers	Books	Machinery	Non-ferrous metals	Metal manufs. n.e.s.

Note: The ranking is by $\frac{E_i^2 - E_i^1}{\sum E_i^2 - \sum E_i^1}$, where E_i = exports of the i^{th} commodity, superscripts refer to terminal years of the time period and summations are over all manufactured goods except diamonds and food products.

Source: Tables XIX and XX.

The pattern which can be identified, albeit at an incipient stage, in manufactured exports between 1963 and 1968 is a movement towards more skill-intensive goods.³² Major examples of this were the shift from textiles to clothing and the growth of aircraft exports, but many minor examples could also be found (Bruno (1972), pp. 130-2). This trend was continued and slightly accelerated after 1968. Most dramatically, electrical equipment jumped from being the thirteenth most important category in Table XX to the fifth. Exports of transport equipment did not increase as rapidly as 1963-8, but this masks a large increase in aircraft exports³³ (offset by reduced growth of exports of ships, etc.). Especially to be noted is the emergence of new, but rapidly growing, export sectors with a high skill content, e.g. professional and scientific instruments and medical and pharmaceutical products, and with a moderate skill content, e.g. furniture. Exports of manufactured fertilizers continued to grow rapidly, reflecting increased exploitation of the Dead Sea potash desposits. Exports of paper and products grew slowly and exports of plywood fell, leading to talk of discontinuing exports as domestic demand exceeded production capacity.³⁴ A curio was the revival of exports of tyres and tubes, which had stagnated for most of the 1960s, but which doubled between 1967 and 1971.

The changing pattern of the leaders of manufactured export growth is summarized in Table XXI. It has been suggested during the discussion of these changes in the commodity composition that they

³² The same movement is found by Hirsch in microeconomic study based on a sample of 190 Israeli exporters (Hirsch, 1970).

³³ The accounts of the state-owned Israel Aircraft Industries Ltd. are kept secret but a report by the IAI President in Autumn 1973 revealed an increase in exports from \$ 6.5m. in 1968 to an estimated \$ 43m. (reported in Time (European Edition), 19 August, 1974, pp. 74-5).

³⁴ Bank of Israel Annual Report 1972, pp. 275-6.

reflect adjustments to a changing pattern of comparative advantage. This hypothesis will not be tested here (cf. fn. 29). The hypothesis that the commodity composition of Israel's manufactured exports affected their growth potential will be tested below (section (c)). To close the present section we will examine the question of how, if Israeli producers were so flexible in shifting between different export goods, could the commodity composition of her exports be sufficiently fixed at any point in time to be a positive or negative factor for future growth.

The key to answering this question is the fact that, although the leading export growth commodities changed over time, Israel's exports have always been concentrated in a few commodities and, although the ranking of these goods changed, the total bundle did not alter greatly. In every year since 1956 the eight leading manufactured exports (by 3 digit SITC classification) have accounted for over half of Israel's commodity exports other than diamonds and fresh citrus. Furthermore, this group of leading export goods consisted of the same eight commodities in every year between 1954 and 1969 except for the momentary appearance of ships and boats (SITC 735) in 1967 and refined petroleum products (SITC 599) in 1966-9. The eight leaders were canned and processed fruit (053), clothing (841), yarn and woven textiles (651), rubber products (629), metal products (698), manufactured fertilizers (561), plywood (631) and cement (661).³⁵

The conclusion from the previous paragraph is that Israel's manufactured exports are highly concentrated by commodity. This may explain the rapid growth of these exports if the concentration lay in commodities with expanding world markets. On the other hand,

³⁵ The products are ordered by their average rank 1954-69. The source is Amiel (1973), p. 54. Rankings for selected years are given in Table XXII.

Table XXII: ISRAEL'S LEADING MANUFACTURED EXPORTS* BY RANK; SELECTED YEARS

Rank	1954	1959	1963	1968
1	053	053	698	841
2	661	841	651	053
3	651	629	053	698
4	629	651	841	599
5	841	561	629	651
6	631	698	682	561
7	698	631	631	682
8	561	661	561	629
Σ (1-8) as a percentage of all exports other than diamonds and fresh citrus	45 %	50 %	53 %	51 %

* Excluding diamonds

Note: commodities are identified by SITC 3 digit code, SITC 053 = canned and processed fruit, 561 = manufactured fertilizers, 599 = refined petroleum products, 629 = rubber products, 631 = plywood, 651 = yarn and woven textiles, 661 = cement, 698 = metal products, 735 = ships and boats, 841 = clothing.

Source: Amiel (1973), p. 54.

continued reliance on export goods whose adoption was related to Israel's comparative advantage at an early stage of her development may be a brake on current export growth if Israel is no longer competitive in these goods and if their world markets are slow-growing. These questions can be tackled by the constant market shares method and the data of this section will be used for such an analysis in part (c). Before turning to this analysis we will look at an alternative dimension of Israel's manufactured exports, their sectoral origin.

(b) The Sectoral Origin of Israel's Exports

Although commodity composition is the most usual criterion for disaggregating a country's exports, it is not always the most relevant. With respect to marketing questions (such as the prospects in world markets for Israel's existing exports or the demand-side effects of concentration on a small number of export goods) disaggregation by commodities is logical, but with respect to supply side questions (such as the optimal policies for removing supply side bottlenecks or encouraging export production) disaggregation by sectoral origin is preferable. This is especially true in view of the fact that supply side problems of bottlenecks and backward linkages are best analysed in an input-output framework and I-O tables appear with an industry classification.

Israel's exports by sectoral origin in 1958 and 1968 are given in the first columns of Tables XXIII and XXIV. The distribution of exports by sectoral origin differs little from the commodity distribution. The raw export figures can, however, only provide an incomplete guide to an industry's contribution to Israel's balance of payments. The significance of industries with large import requirements is overstated. Thus in column 2 of Tables XXIII and XXIV the direct import component of exports ($m_i + e_i$) is given. A more complete measure of industries' import requirements is given in column 3 which states total (direct plus indirect) requirements

Table XXIII: DIRECT EXPORTS, IMPORT COMPONENT OF EXPORTS AND TOTAL (DIRECT AND INDIRECT) EXPORTS BY INDUSTRIAL ORIGIN, 1958 (₹ 000)

	Direct exports [E]	Direct import component of exports [m. E]	Total import component of exports [m. E]	Value added as a proportion of gross output [v]	Direct and indirect exports [E*]
1. Field crops	2,744	60	321	0.546	3,767
2. Livestock	8,819	944	1,729	0.461	6,352
3. Citrus	47,994	4,367	7,007	0.670	32,202
4. Other agriculture	1,096	28	110	0.669	1,206
5. Mining	3,802	106	475	0.571	2,549
6. Food	9,681	1,413	2,778	0.211	2,690
7. Textile and apparel	9,887	959	1,849	0.405	7,486
8. Wood and carpentry	4,408	793	1,146	0.466	3,656
9. Paper, printing and publishing	2,321	246	453	0.420	3,009
10. Leather and leather products	706	61	102	0.550	546
11. Rubber and plastic products	8,885	2,550	3,065	0.539	5,587
12. Chemicals, oil and soap	4,552	1,557	1,948	0.295	3,103
13. Oil refineries	11	8	8	0.107	344
14. Glass, ceramics and cement	2,604	247	445	0.529	1,853
15. Diamond polishing	37,719	25,347	25,573	0.290	10,952
16. Basic metals	418	147	172	0.386	458
17. Metal products	1,731	344	497	0.455	1,761
18. Machinery and vehicles	7,078	1,253	1,812	0.472	6,429
19. Construction and housing	0	0	0	0.485	139
20. Electric power	0	0	0	0.554	2,060
21. Water	0	0	0	0.380	1,848
22. Inland transportation	4,007	88	377	0.721	10,065
23. Shipping and aviation	51,193	28,822	30,511	0.261	13,547
24. Other communication	4,967	174	303	0.800	7,000
25. Services and trade	47,418	3,177	5,785	0.581	48,038
T O T A L	262,008		86,466		176,647

Source: Bruno 1962, pp. 36-7, p. 93, pp. 94-5.

Table XXIV: DIRECT EXPORTS, IMPORT COMPONENT OF EXPORTS AND TOTAL (DIRECT AND INDIRECT) EXPORTS BY INDUSTRIAL ORIGIN, 1968 (\$ m.)

	Direct exports [E]	Direct import component of exports [m. E]	Total import component of exports [m* E]	Value added as a proportion of gross output [v]	Direct and indirect exports [E*]
1. Field crops	16.4	0.2	1.4	.553	15.6
2. Livestock	8.1	0.3	1.3	.393	10.6
3. Citrus	88.3	6.5	10.7	.669	59.6
4. Other agriculture	15.6	0.3	1.1	.696	12.6
5. Mining and quarrying	32.3	2.7	5.2	.567	19.6
6. Food	43.5	7.6	12.0	.254	16.7
7. Textiles and clothing	62.7	9.2	14.3	.454	41.9
8. Wood and carpentry	8.2	1.5	2.0	.522	10.0
9. Paper, printing and publishing	6.0	1.1	1.6	.511	10.7
10. Leather and products	2.0	0.3	0.5	.488	1.6
11. Rubber and plastic products	14.4	2.5	4.0	.398	9.8
12. Chemicals	42.8	10.8	13.7	.448	28.6
13. Petroleum	25.9	16.9	17.6	.138	4.4
14. Glass, ceramic, cement and products	3.9	0.2	0.5	.568	4.5
15. Diamonds	229.3	188.7	190.8	.153	35.3
16. Basic metals	5.1	2.2	2.4	.380	6.0
17. Metal products	32.9	6.0	9.9	.415	22.0
18. Machinery	5.5	0.5	1.1	.516	10.1
19. Electrical and electronic equipment	5.2	1.2	1.7	.390	4.7
20. Transport equipment	11.6	2.9	3.8	.478	10.0
21. Miscellaneous manufactures	8.0	1.4	2.4	.413	4.7
22. Residential building	0	0	0	.554	0.8
23. Other building	0	0	0	.546	0
24. Electricity	0.6	0	0.1	.718	9.1
25. Water	0	0	0	.430	6.8
26. Road passenger transport	17.4	0.1	1.2	.783	26.8
27. Shipping and air transport	178.0	111.4	115.7	.210	37.7
28. Other transport	35.5	2.3	4.2	.731	38.0
29. Services	233.1	62.0	78.3	.463	139.1
30. Trade	22.3	0	0.8	.846	52.9
T O T A L	1,154.6	438.8	498.3		652.3

Source: Chen p. 29, pp. 30-3, pp. 46-9, pp. 50-3; Statistical Abstract of Israel 1973, p. 209.

$(m_i^x \cdot e_i)$. Thus, the net foreign exchange earnings by Israeli producers of goods and services is equal to column 1 minus column 3, i.e. $\sum_i e_i - \sum_i m_i^x \cdot e_i$.

Total exports minus direct and indirect import requirements is usually considered the optimum measure of the contribution of different sectors to the trade balance, but a better measure would be one that included output which goes indirectly as well as directly to exports.³⁶ Thus, the citrus industry contributes to Israeli exports not only by its direct sales abroad but also by its provision of inputs for the food processing industry. If the value-added by the food-processing industry were small then it would be undesirable that all of the foreign exchange earnings from its products should be ascribed to that industry and none to the citrus branch which is responsible for a large proportion of the food-processing industry's gross output. The solution to this kind of anomaly is to reallocate export earnings from a gross output to a value-added basis. If this is done properly, the total of all sectors' contributions to foreign exchange earnings will be unchanged but the relative importance of sectors may differ.

The vector of "redefined exports" as described in the previous paragraph³⁷ is derived, in matrix algebra terms, by:

$$(3) \quad E^R = V \cdot (I-A)^{-1} \cdot E$$

where E^R is the $(n \times 1)$ vector of redefined exports for the n sectors of the economy. The matrix V is a diagonal matrix whose diagonal

³⁶ This point was originally made in a slightly different context by Blumenthal. The concept has been applied to a balance of payments analysis for Yugoslavia by Chittle, who stresses the asymmetrical treatment of imports (direct plus indirect) and exports (direct only) in the conventional measure.

³⁷ Our "redefined exports" must not be confused with the concept employed by Tyler in a different context (Tyler (1973a), p. 35). His measure $E_T^R = (I-A)^{-1} \cdot E$ is greater than our E^R because (a) he uses an I-0 table which includes import requirements and (b) he does not reduce his redefined exports by the V matrix. The Tyler measure would be

elements, v_{ii} , are equal to the proportion of value-added in gross output of sector i and all other elements are zero. The $(I-A^d)^{-1}$ matrix is the Leontief inverse of an I-O table of domestic requirements. Each element $v_i \cdot s_{ij}$ of the i^{th} row of $V(I-A^d)^{-1}$ is the value-added in industry i required to produce one unit of final product of j . Thus the value-added from industry i in total exports (e_i^x) is given by:

$$(4) \quad e_i^x = \sum_{j=1}^n (v_i \cdot s_{ij} \cdot e_j)$$

which is equivalent to equation (1). Estimates of e_i^x for Israel in 1958 and 1968 are given in Tables XXIII and XXIV.³⁸

The redefined exports, e_i^x , are conceptually the ideal measure of the contribution of the various sectors of the economy to net export earnings. In practice, however, the measure is difficult to estimate because it is only strictly feasible in years for which I-O tables exist. Thus, it may be asked whether this redefining of exports makes substantial alterations to the raw export data in column 1 of Tables XXIII and XXIV. The manufacturing sectors (other than mining and diamonds) were ranked by e_i and e_i^x and the Spearman rank correlation coefficient was calculated for these two rankings.³⁹ In 1958 $R_s = 0.87$ and in 1968 $R_s = 0.71$, both of which indicate no significant difference between the two rankings.

Footnote continued from p. 64.

inappropriate for our purposes because (a) in assessing the contribution of domestic sectors to export earnings use of imports of similar goods is clearly not to be attributed to that sector and (b) redefining exports on a gross output basis leads to double counting of the sources of actual foreign exchange earned.

³⁸ The dates were determined by the availability of I-O tables for the Israeli economy, but they are also satisfactory for our purposes in that 1958 represents the start of the export boom and 1968 a fairly recent reference year.

³⁹ The sectors used were 6-14 and 16-18 inclusive in 1958 and 6-14 and 16-21 inclusive in 1968. The critical values of R_s are 0.71 for 1958 and 0.63 for 1968.

The negative results of statistical tests of the difference between the two estimates of sectoral contributions to export earnings does not tell the whole story. Although the differences are statistically insignificant, they are not random. In particular e_i understates the importance of the contribution of infrastructure branches such as electricity, water and internal communications. Within manufacturing, e_i understates the importance of the machinery and paper products sectors, both of which produce intermediate goods used in the production of final export goods, while the importance of the consumer goods industries (especially food processing with its low value-added) is overstated. Furthermore, the deviation of e_i^x from e_i increases over time, implying that the simple measure becomes less appropriate as the economy becomes more developed. Failure to use the redefined concept of exports will mask the extent of the increasing importance over time of the producer goods sector as a contributor to foreign exchange earning. Because of the biases imparted by use of e_i , the measure e_i^x will be used wherever feasible.

The relative importance of the contributions of the different manufacturing sectors to export earnings is summarized in Table XXV. In the light of the discussion in the previous section of the commodity composition of Israel's exports the data in Table XXV are unsurprising. Textiles and clothing was the most important branch in both 1958 and 1968, and the broad category "machinery and vehicles" was second in both years. The major trend among other branches was the declining relative importance of the sectors producing the big manufactured exports of the 1950s, i.e. tyres, plywood and cement. The sectors which increased in importance were metal products, basic metals, chemicals and the food processing industry.

The purpose of this section has been to identify the sectoral origin of Israel's exports. In order to do this new estimates of the sectoral contribution to total exports are made. Although the final results could have been guessed from knowledge of the commodity

Table XXV: MANUFACTURING INDUSTRIES RANKED BY CONTRIBUTION TO
FOREIGN EXCHANGE EARNINGS 1958 and 1968

	1958	1968
Textiles and clothing	1	1
Machinery and vehicles	2	2
Rubber and plastic products	3	8
Wood and carpentry	4	7
Chemicals	5	3
Paper, printing and publishing	6	6
Food	7	5
Glass, ceramics and cement	8	10
Metal products	9	4
Leather and leather products	10	12
Basic metals	11	9
Oil refineries	12	11

Source: Tables XXIII and XXIV.

composition of her exports, the separate exercise is considered worthwhile because it provides further data for analysing the supply side of manufactured exports. This is especially significant in that commodity composition breakdowns of exports and also the usual sectoral origin breakdowns overstate the importance of consumer goods industries vis-à-vis producer goods industries. This bias becomes more significant as a country becomes more economically developed and its industries more interdependent, in which case the role of industries providing inputs to the final export industries becomes increasingly critical; the producers of the intermediate inputs can help exports if by increasing efficiency they reduce their output prices or they can become the source of inelastic export supply if

they cause bottlenecks of crucial inputs.⁴⁰ For this reason the new estimates are considered superior for analysing supply side questions regarding exports and will be used in that context in section 6 (e) and in future research.

(c) Constant Market Shares Analysis of Israel's Manufactured Exports

Having described the commodity composition of Israel's manufactured exports and their sectoral origin, we will now attempt to identify the major factors responsible for their rapid aggregate growth. As a first step the importance of various demand side factors will be estimated by the constant market share method. Since CMS analysis has already been used in section 4 its mechanics and its limitations will not be repeated here. The CMS method provides an ex post division of the actual growth of manufactured exports into four parts: the world trade, commodity, market and "competitiveness" effects. The first three are demand side phenomena reflecting how far Israel's manufactured exports have grown apace with world trade in manufactured goods and how far deviations from the constant share are associated with concentration of exports in commodities or to markets with above or below average growth rates. The fourth part of the CMS division is a residual representing the difference between the actual increase in Israeli exports and what the increase would

⁴⁰ There is an interesting parallel here to the development of economists' thoughts on import substitution. In most countries early ISI was in consumer goods industries, since the LDCs could best compete with imports in these lines. It soon became clear, however, that such ISI was increasing requirements for imported inputs and that a thorough-going ISI strategy required investment in producer goods industries. The difficulty for ISI practising LDCs to carry out such a strategy successfully was one reason for the shift in economists' prescriptions towards exports, which was also a return in emphasis to consumer goods production. The present section shows, however, that opportunities for promotion of manufactured exports based solely on expansion of the consumer goods industries may be limited and as the economy develops diversification into producer goods may play just as integral a role in an export promotion strategy as in an ISI strategy.

have been if Israel had maintained a constant share in the market for each commodity at each destination. This increased "competitiveness" may be due to supply-side factors (i.e. increased efficiency in production and/or marketing) or to government policy (e.g. increasing private returns to exporters or reducing risk).

The CMS estimates of the sources of change in Israeli manufactured exports during the 1960s are given in Table XXVI. As in section 4, two alternative estimates exist depending on whether the commodity or the market effect is calculated first. Under both estimates the commodity effect is slightly more harmful than in Israel's exports as a whole, which suggests that the concentration of Israel's merchandise exports in citrus and diamonds has been beneficial. In contrast, the market distribution effect is slightly more favourable in manufactured exports than in total exports. This is probably a reflection of the fact that the difference between the import growth rate in the European and North American countries and the import growth rate in the rest of the world was larger for manufactured goods than for total commodity imports in the 1960s. Israel has well established trading links with the USA and Europe.

Although there is a small difference in the relative importance of the commodity and market distribution effects, the conclusions arrived at in examining the change in Israel's total exports in the 1960s appear true of Israel's manufactured exports too. The growth of world demand for manufactured goods accounted for 58 % of the change in Israel's manufactured exports (exactly the same percentage as for total exports) and was the most important single factor. Changes in the commodity and market composition of world demand, however, accounted for a mere one or two per cent of the increase in Israel's manufactured exports. The remaining 40 % of the increase is accounted for by improved "competitiveness".

The CMS estimates for Israel can be compared to similar estimates of the sources of manufactured export growth for some other countries

Table XXVI:

THE SOURCES OF CHANGES IN ISRAEL'S EXPORTS OF MANUFACTURED GOODS, 1960-1969

	Estimate 1 (Identity (2))		Estimate 2 (Identity (2a))	
	Value (\$m)	Percentage	Value (\$m)	Percentage
Manufactured exports in 1960	271		271	
Manufactured exports in 1969	76		76	
Increase in manufactured exports	195	100 %	195	100 %
Increase due to:				
- increase in world trade	114	58 %	114	58 %
- commodity effect	-14	-7 %	-7	-4 %
- market distribute effect	16	8 %	11	6 %
- "competitiveness"	78	40 %	78	40 %

Note: Calculations based on seven markets (North America, EEC, EFTA, Comecon, Other Europe, Asia and Africa and the Rest of the World) and three commodity groups (SITC 5, 7 and 6 + 8 - 66). Percentages do not add to 100 because of rounding.

Sources: UN Handbook of International Trade and Development Statistics 1972,
UN Commodity Trade Statistics 1961, 1969.

(cf. Table XXVII). India's adverse commodity effect is almost entirely due to the size of her textile industry in the base year and a CMS analysis applied to manufactured goods other than textiles reduced the size of the commodity effect to -4 % (Banerji (1973), p. 99). Otherwise the commodity and market distribution effects do not differ very much in magnitude between Egypt, India, Spain and Israel. The world trade effect is, however, significantly smaller and the "competitiveness" effect significantly greater for the more successful exporters of manufactured goods, Israel and Spain, than for India or Egypt (except for Egypt's 1960-5 "competitiveness" effect). The small world trade effect is a statistical consequence of success, i.e. the higher the actual growth in exports is the lower the world trade effect will be.⁴¹ The high "competitiveness" effects suggests that the reasons behind success in exporting manufactures are domestic (supply-side) factors or government policy.

Table XXVII: ESTIMATES OF SOURCES OF MANUFACTURED EXPORT GROWTH IN SELECTED COUNTRIES (percentages)

	India	Spain	Egypt	
	1960-70	1962-9	1960-5	1965-70
Increased world trade	282 %	32 %	73 %	92 %
Commodity effect	-113 %	-1 %	-9 %	-10 %
Market distribution effect	-18 %	19 %	-26 %	-8 %
"Competitiveness" effect	-51 %	50 %	62 %	26 %

Sources: Banerji (1973), p. 98; Donges (1972), p. 207; Girgis, p.136.

⁴¹ The actual growth in exports (G) is equal to the change in exports divided by base year exports. The world trade effect is therefore equal to r/G , where r is the growth rate of world trade.

Although the CMS analysis stresses the significance of the increase in world demand for manufactured goods in explaining the rapid growth of Israeli manufactured exports, it also emphasises the lack of importance of exogenous changes in the composition of that demand which might have been specifically beneficial to Israel. Almost three fifths of the expansion of these exports in the 1960s was accounted for by her keeping pace with the growth of world trade in manufactured goods. The remainder of the expansion was accounted for by her increasing her share of individual commodity and geographic markets. Since most LDCs have not even been able to retain their own share of world manufactured trade Israel's performance requires further analysis. The CMS analysis indicates that the first priority is to identify some of the separate factors which make up the "competitiveness" effect. Thus, in the next section we adopt a broader approach to analysing manufactured export performance, which will include supply-side factors and government policy as well as demand conditions.

(d) Israel's Supply Function for Manufactured Exports

Although the supply of manufactured exports is affected by many factors, it may be possible to abstract from these and concentrate on a small number of independent variables which explain a large part of the functional relationship. The procedure in this section will thus be to start from simple specifications of export supply behaviour and then build up more complete specifications.

The simplest demand and supply model of export behaviour is:-

$$(5a) \quad X_D = X_D(R)$$

$$(5b) \quad X_S = X_S(R)$$

$$(5c) \quad X_D = X_S$$

where R is the real exchange rate for manufactured exports and X_D and X_S are the quantity demanded and quantity supplied of manufactured

exports. This model is unsatisfactory for estimation purposes since (5a) and (5b) are underidentified. Even if the coefficient in (5a) were constrained by an assumption of perfectly elastic foreign demand, the supply equation would remain underidentified.

The rate of capacity utilization has been suggested as an explanatory variable in the supply equation and in previous studies of Spanish and Brazilian manufactured exports has been found important (Donges (1972), p. 203; Tyler (1973b)). The argument is that domestic sales are more profitable than exports and thus at times of high domestic demand firms will operate at full capacity and will export little. Conversely, during domestic recessions capacity utilization will be low and firms will attempt to export as much as possible. After inclusion of the rate of capacity utilization (U) in the model, a sufficient condition for solution of the identification problem is that foreign demand is perfectly elastic, which is a reasonable assumption for a country supplying a small proportion of total manufactured exports. The supply function for Israeli manufactured exports was estimated for 1952-71 as:-

$$(6) \quad \ln X_t = -9.27 + 2.89 \ln R_t + 0.09 \ln U_t \quad R^2 = 0.796$$

(1.92) (0.36) (0.14)

DW = 0.40

The coefficient for R_t is significant and has the expected sign, but otherwise the estimated equation is not very satisfactory. The coefficient for U_t is not significant (and the sign is not as expected) and the Durbin-Watson of statistic indicates significant serial correlation.⁴²

⁴² The data used in (6) and all other regression equations in this section are given in the Appendix. The bracketed figures are the standard errors of the coefficients. Other specifications of the functional form were tried for the various equations and were rejected as less satisfactory than the double logarithmic form. In an attempt to deal with the ubiquitous serial correlation first differences of the variables were taken for this and other equations, but in all cases the R^2 fell drastically and some of the coefficients exhibited wrong signs and/or became statistically

A major reason for the deficiencies of (6) is that the model on which it is based is essentially short-term, which conflicts with the necessity of acquiring maximum degrees of freedom from the available annual data. Since during this period Israel was undergoing continuous industrial growth accompanied by increased productivity, a rightward shift in her aggregate supply curve took place. This implies lower unit costs for manufactured exports and greater competitiveness. The continuous shift in the aggregate supply curve can be captured by introducing a measure of industrial production (P) into (6). The relationship is:-

$$(7) \quad \ln X_t = -5.02 + 1.36 \ln R_t - 0.32 \ln U_t + 0.71 \ln P_t$$

$$(1.55) \quad (0.40) \quad (0.13) \quad (0.15)$$

$$R^2 = 0.916 \quad DW = 1.51$$

Equation (7) represents a statistically better relationship than (6) because all coefficients are significant, R^2 is higher and significant serial correlation does not exist.⁴³

The findings of equation (7) conform to our a priori expectations. Israeli producers of manufactured goods were responsive to charges in relative prices (in export markets vis-à-vis domestic markets) and

Footnote continued from p. 73.

insignificant. Inclusion of a trend term in the dependent variable (Tr_x) in (6) raised the d-statistic into the zone where it no longer indicates significant serial correlation:

$$(6a) \quad \ln X_t = -1.80 + 1.05 \ln R_t - 0.23 \ln U_t + 0.59 Tr_x$$

$$(1.67) \quad (0.37) \quad (0.10) \quad (0.10)$$

$$R^2 = .937 \quad DW = 1.66$$

The coefficients for both independent variables now have the expected sign and the R^2 has been increased, but the economic justification for including Tr_x as an independent variable is unclear.

⁴³ The d-statistic is, however, not very satisfactory here, since with 20 observations and 3 independent variables there exists a wide band ($0.90 < d < 1.83$ for a one tail test at the 5 % level) within which the test is indecisive. The von Neumann statistic, which possesses precise significance points (Theil and Nagar), indicates significant serial correlation in (7) at the 5 % level, but not at the 1 % level. It should be recalled that the existence of serial correlation does not necessarily bias the OLS estimates, but it does invalidate the usual tests of significance of the coefficients.

this price elasticity of supply meant that the government's financial inducements to exporters had a positive effect on the value of exports. This result corroborates the descriptive account of Israel's export policies and performance given in sections 1 and 2 (cf. also p. 25 above). The strong upward trend of both manufactured output and manufactured exports in Israel makes the positive correlation between X and P unsurprising. The importance of the recession-boom effect, which was suggested in the descriptive account of Israel's exports (p. 20 above), is confirmed by (7).

A further supply-side determinant of manufactured exports may have been government policy towards producers of such goods, e.g. investment allocations and indirect promotional assistance. These factors are, however, not easy to quantify. Their omission from the present analysis can be justified to some extent by the fact that the intensity of these forms of export promotion was closely correlated with movements in the effective exchange rate and thus R_t may be considered a proxy for all government policies towards exports.⁴⁴

As a final step in our use of regression analysis to quantify the determinants of manufactured exports we will use an "aggregated industrial export function" (Tyler (1973b), cf. also Donges (1972)). This function, slightly modified to Israeli conditions, is:-

$$(8) \quad X_t = f(R_t, U_t, P_t, W_t)$$

where W = world trade in manufactured goods. This is neither a demand nor a supply function; it is rather a catchall function including quantifiable elements of both demand and supply. Thus there is a bias against non-quantifiable factors and also the function's theoretical

⁴⁴ In the light of section 6 (b) government policy which indirectly affects manufactured exports (e.g. the provision of infrastructure) may also be important, but it is difficult to quantify.

justification is rather unclear. Nevertheless, it has been justified on the grounds that it may shed some light as to which explanatory variables should be examined in greater detail by other methods.

The relationship obtained when (6) was applied to Israeli manufactured exports 1952-71 is:-

$$\begin{array}{rcl}
 (9) \quad \ln X_t & = & -7.52 + 1.05 \ln R_t - 0.36 \ln U_t + 2.63 \ln P_t \\
 & & (1.43) \quad (.33) \quad (0.10) \quad (0.59) \\
 & & -2.12 \ln W_t \quad \quad \quad R^2 = .951 \\
 & & (0.64) \quad \quad \quad DW = 1.18
 \end{array}$$

The d-statistic is indecisive⁴⁵ and all coefficients are significant at the 5 % level. For R, U and P equation (9) repeats the findings of (7). The negative coefficient for world manufactured exports, which is against all expectations, is a cause for concern. The reason for the "wrong" sign is that the specification of (8) makes multicollinearity probable, in particular between P and W which both exhibited an exponential growth trend. In the presence of multicollinearity OLS is unable to provide satisfactory estimates of the coefficients of the intercorrelated variables, and thus the estimated coefficients of both P and W are dubious.⁴⁶

For purposes of analysing Israeli manufactured exports (7) is superior to (9) because of the smaller incidence of multicollinearity. For comparative purposes, however, (9) has some value in that similar specifications have been used to analyse the performance of two other semi-industrialized countries which have been successful exporters of manufactured goods. Donges' regression equation for Spain, using

⁴⁵ The von Neumann statistic indicates significant serial correlation.

⁴⁶ The existence of multicollinearity between P and W is the reason why the coefficients for R and U are not much affected by the introduction of W, but that of P is greatly altered.

annual data for 1951-69, was (Donges (1972), p. 202):-

$$(10) \quad \ln X_t = -11.3 + 0.3 \ln R_t + 0.1 \ln G_t - 0.7 \ln U_t + 3.0 \ln W_t^x$$

(0.27)
(0.12)
(0.51)
(0.47)

$$-0.7 \ln Tr_x$$

(0.18)

$$R^2 = 0.87$$

$$DW = 2.01$$

This differs slightly from (9) in that W^x is world income, G is government export policy and Tr_x has been introduced to reduce serial correlation (although it may be expected that it has exacerbated the problem of multicollinearity). For Brazil, Tyler fitted the following regression equation using quarterly data for 1961-8 (Tyler (1973b), p. 12):-

$$(11) \quad X_t = -99082.4 + 94629.7 R_t + 90.25 G_t - 878.0 U_t + 797.5 P_t$$

(30503.5)
(39202.7)
(189.8)
(413.9)
(440.3)

$$+ 0.060 W_t$$

(153)

$$R^2 = 0.86$$

$$DW = 1.29$$

In the Spanish case the statistically significant explanatory variables are world demand and the trend in Spanish manufactured exports, which implies that Spanish manufactured exports have grown primarily in response to demand side stimuli. Policy measures have worked in the desired direction and domestic supply conditions (in the form of the recession/boom effect) have had some influence, but both these factors appear relatively weak. In Brazil, in contrast, the world trade variable was not significant. The only statistically significant explanatory variables were the real exchange rate and the utilization variable. Industrial production was positively related to manufactured exports but the coefficient was not statistically significant. The conclusion from comparison of the results for Spain, Brazil, and Israel is that government policy, especially the real exchange rate, played a positive role in stimulating manufactured exports in all

three countries. The recession/boom effect was apparent in all three countries. Other supply-side forces were weaker in Spain and Brazil than in Israel.⁴⁷ It must be borne in mind, however, that the regression equations on which these conclusions are based are far from perfect since they all suffer from lack of degrees of freedom and the problems of multicollinearity and serial correlation.

Despite the weaknesses of the econometric analysis in this section, it does throw some light on the growth of Israel's manufactured exports. Government policy, as reflected in the real effective exchange rate, was an important explanatory variable. In the short-term manufactured export performance was related to the recession/boom effect. Although this conclusion is consistent with studies of Spain and Brazil it is slightly surprising for Israel, in that the recession/boom effect is often thought to reflect a lack of export orientation and is thus expected only in countries whose entrepreneurs have no tradition of exporting or have only recently turned to export markets.⁴⁸ The other significant relationship found in the regression analysis was between manufactured exports and industrial production. The analysis itself provides no guide as to causality and economic theory too is ambivalent. On the one hand there is a body of thought which sees exports as a possible engine for industrial growth via increased demand, while on the other hand industrial growth may itself improve competitive efficiency in export markets. The large "competitiveness effect" found in section 6 (c) and the insignificant coefficient for the world trade variable in equation (9) are small pointers in favour of the latter view, but the aggregate analysis carried out so far permits no firm conclusion.

⁴⁷ In the absence of the variable P in equation (10) this conclusion is even more tentative than the others.

⁴⁸ For empirical evidence of the weakness of the recession/boom effect in an export-oriented developed economy cf. Blumenthal's study of postwar Japan (Blumenthal, pp. 628-30).

(e) Conclusions

The growth of Israel's manufactured exports other than diamonds has been described in this section. The composition of these exports has changed over time in a manner which suggests a response to changing patterns of comparative advantage. Despite these shifts in composition Israel's manufactured exports have always been concentrated in a small number of commodities - eight goods accounting for around half of the total manufactured exports excluding diamonds (Table XXII) - and despite changes in their ranking the eight leaders have remained fairly constant. Commodity concentration has, however, had little (demand-side) effect on the rate of growth of Israel's manufactured exports. The markets for these goods also tended to be concentrated - in North America and Western Europe - and this had a slight beneficial effect on their growth rate. In the absence of any major shifts in world demand for Israel's exports (vis-à-vis world demand for all manufactured exports) or in the growth rate of import demand in Israel's export markets (vis-à-vis the growth of world demand), we turned to the supply-side for an explanation of the high rate of growth of Israel's manufactured exports, in which she not only kept pace with the increase in world demand but also increased her market shares. Policy variables were found to be important. The recession/boom effect was significant, although we expect this to decline (or perhaps already to have declined) in importance as firms become more export oriented. We also found a strong positive relationship between manufactured exports and industrial production, but the direction of causality is uncertain.

Comparison of the growth of exports and the increase in the gross output of individual industrial sectors casts further light on the export/production relationship. The increase in total exports (direct and indirect) and gross output of eleven industrial sectors is given in Table XXVIII. The Spearman rank correlation coefficient (R_s) between the two sets of data is 0.82, which is

Table XXVIII: CHANGES IN TOTAL (DIRECT PLUS INDIRECT) EXPORTS AND GROSS OUTPUT BY INDUSTRIAL SECTOR
1948 - 1958

	$E_{68}^* - E_{58}^*$ (\$ million)	Rank	Change in gross output (I ± m)	Rank
Food	14.0	5	1631	1
Textiles and clothing	34.4	1	1007	3
Wood and carpentry	6.3	7	268	8
Paper, printing and publishing	7.7	6	314	6
Chemicals	25.5	2	447	5
Leather and products	1.1	11	69	11
Rubber and products	4.2	9	291	7
Glass, ceramics and cement	2.6	10	212	9
Basic metals	5.5	8	209	10
Metal products	20.2	4	673	4
Machinery and vehicles	23.0	3	1009	2

Source: Tables XXII and XXIII; Bruno (1962), p. 37; Chen, p. 29.

significant beyond the 1 % level.⁴⁹ Belief in a strong positive relationship between growth in manufactured exports and industrial production is reinforced, but the question of causality remains unresolved. It is difficult to see how this relationship can be analysed further at the aggregate level, and the direction for future research will be to examine more closely its applicability in different industrial branches.

Finally, it must be emphasised that the conclusions of the paper and the declared intention of turning to more disaggregated analysis in order to uncover the causal relationships underlying the growth of Israel's manufactured exports are not aimed at proving the existence of a single cause of this growth. The explanation of manufactured export growth may differ between products and over time. In the present paper at least three possible theories have been put forward. Firstly, in analysing the successful manufactured exports of the 1950s, it was suggested that many of these were unintended (by the Israeli government) consequences of import substitution policies, arising from the technical conditions of factory production of those goods and the small size of the domestic market. Secondly, it was found that the commodity composition of Israel's manufactured exports appeared to shift in response to changes in comparative advantage. The corollary of this is that measures which facilitate improved domestic resource allocation, permitting greater responsiveness to changing factor and

⁴⁹ Use of a non-parametric test such as the rank correlation coefficient avoids some problems of regression analysis, e.g. there is (i) no assumption of linearity in the relationship between dependent and independent variable, (ii) no problem of heteroscedasticity. The price paid for this is that R^2 only uses the ordinal properties of the data and thus sacrifices some information. Regression equations fitted to the data in Table XXVII yielded significant positive coefficients (using both linear and double-logarithmic specifications) but the R^2 values were low. The main argument against using these results is the dubious applicability of OLS methods with so few degrees of freedom.

product prices, may improve export performance.⁵⁰ Finally, increases in industrial output, which were perhaps initiated by export opportunities, may have increased Israel's international competitiveness by reducing unit costs. The implications of this abundance of theories are that the lessons to be drawn from the past growth of Israel's manufactured exports cannot be applied indiscriminately to analysis of the future growth of these exports or to other LDC's prospects of increasing their manufactured exports. On the other hand, if care is taken in respecting conditions such as the stage of economic development and the structure of industrial production, the Israeli experience can illuminate the process of increasing manufactured exports.

⁵⁰ Thus, the import liberalization policy of the 1960s may well have had a beneficial effect on Israeli manufactured exports.

A P P E N D I X

The data used in the regression analyses of section 6 (d) are given in Table A1. The sources of the various data are described in the accompanying text.

The observations for X, manufactured exports excluding diamonds and products of the mining sector, are from Table XVIII. The values of Tr_x are derived from a semi-logarithmic trend fitted to the time series of X.

The variable R is equal to the effective exchange rate for manufactured exports (for 1952-62 it is for merchandise exports excluding citrus and diamonds (Michaely (1971), p. 102) and for 1961-71 it is for exports of industrial products (Amiel (1972), p. 32) deflated by an index of relative prices in Israel and in her export markets. It is given in Table A1 in index form with 1964 = 100. Finding a suitable Israeli price index posed a major problem, which was resolved by splicing three different indexes which are increasingly inappropriate as they go back in time. For 1963-71 the CBS wholesale price index of industrial output (Statistical Abstract of Israel 1973, p. 255; Ibid. 1968, p. 239), for 1959-63 the CBS consumer price index for industrial products (Ibid. 1968, p. 234; Ibid. 1964, p. 234) and for 1952-59 Michaely's GNP price deflator (Michaely (1971), p. 94) were used. The index of prices in Israel's export markets is a weighted average of the consumer price indices in her four major markets (USA, UK, West Germany and Japan), adjusted for exchange rate changes in the pound, mark and yen against the dollar (source: UN Statistical Yearbook, 1958, 1963, 1967, and UN Monthly Bulletin of Statistics, November 1974). The four indices were weighted by the countries' shares in world trade.

A consistent series on NDP (in I £m.) in manufacturing industry excluding mining and diamonds is available for 1952-67 in Israel

Table A1:

SELECTED DATA FOR ISRAEL 1952 - 1971

Year	X	T_{r_x}	R	P	U	W
1952	15.0	18.5	42.4	367	232.3	36.7
1953	21.3	21.9	62.9	410	229.0	38.7
1954	31.7	26.0	79.8	498	265.1	40.6
1955	31.8	30.8	78.0	575	283.9	45.8
1956	35.1	36.6	93.3	603	246.7	52.1
1957	47.6	43.4	103.9	661	231.7	56.8
1958	47.2	51.4	100.3	732	220.9	56.4
1959	67.4	61.0	99.4	831	228.2	61.5
1960	85.6	72.3	99.8	947	291.4	70.2
1961	106.1	85.7	94.1	1100	279.3	74.1
1962	115.1	101.6	99.1	1256	306.4	79.7
1963	139.1	120.4	98.7	1438	343.8	86.8
1964	155.5	142.8	100.0	1681	424.9	98.8
1965	175.4	169.3	101.1	1861	423.5	109.7
1966	189.5	200.8	107.0	1775	134.2	122.5
1967	218.8	238.1	125.4	1906	37.5	131.2
1968	264.9	282.3	141.0	2276	152.2	150.2
1969	300.5	334.7	141.8	2619	209.3	176.0
1970	342.9	396.8	156.7	2963	232.9	203.0
1971	431.9	470.5	160.4	3326	236.9	226.0

Central Bureau of Statistics: National Income and Expenditure 1950-1968 (Jerusalem, 1970), pp. 110-1. This was extended to 1971 with data from various Statistical Abstracts of Israel (SAI 1971, p. 372; SAI 1972, p. 167; SAI 1973, p. 169, 435). The complete series on industrial production was put into constant (1964) prices using the price indexes described in the previous paragraph.

The recession/boom effect was measured by deviations from the exponential growth trend in industrial production. The fitted trend was:

$$\hat{P}_t = 343 \cdot e^{0.11t}$$

Since the deviations $(P_t - \hat{P}_t)$ contained negative values they were put in index form by adding a constant. Thus $U_t = (P_t - \hat{P}_t + 250)$. This is the same procedure followed by Tyler (Tyler 1973b) and has a close affinity to the Wharton method of estimating capacity utilization. For this reason U is often referred to in the text as "utilization", although it is readily conceded that it is an imperfect measure of capacity utilization.

Data on world trade in manufactured goods (in billions of US dollars) were obtained for 1952-70 in the UN Handbook of International Trade and Development Statistics 1972, p. 43. For 1971 world trade in SITC categories 5-8 was taken from UN Monthly Bulletin of Statistics, July 1973, pp. xxx-xxxiv.

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