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**The Organization of Agricultural Exports:
Lessons from Reforms in ISrael**

by

Israel Finkelshtain and Yael Kachel

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P.O. Box 12, Rehovot 76100

ת.ד. 12, רחובות 76100

The Organization of Agricultural Exports: Lessons from Reforms in Israel

Israel Finkelshtain and Yael Kachel*

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1. Introduction

The organization of the agricultural export sector in Israel has changed dramatically in the last decade. Motivated by government policy to decrease public intervention in the economy and to privatize state monopolies, the agricultural export sector was reformed. The two main aspects of these reforms were (1) the abolition of statutory export monopolies, and (2) the privatization of export operations. Exports were opened up to competition by granting export licenses to private firms while parastatal monopoly exporters either ceased export operations or had to begin competing with these private firms.

The liberalization of the agricultural export sector caused a drastic change in industry structure with potentially far-reaching consequences for conduct and performance. Economic theory does not provide an unequivocal answer to the question of how to best organize exports from the welfare point of view of a single country. Both centralized and competitive systems have their advantages and disadvantages. Theoretically, centralized marketing by a statutory organization may maximize the welfare of the export country if the centralized organization is able to exercise market power on export markets and to exploit economies of scale. On the other hand, there are certain potential losses associated with control and incentive problems in organizations that are not exposed to competition. If the losses from centralization are greater than the gains that can be realized, the 'free market' alternative is optimal. The far-reaching reforms in the Israeli agricultural export sector offer the opportunity to analyze the performance of alternative forms of agricultural export organization.

The reforms in the organization of agricultural exports were introduced gradually, taking a few years to encompass most agricultural exports. Before the reforms, two State Trading Enterprises were responsible for all horticultural exports from Israel: the

* Department of Agricultural Economics and Management, The Hebrew University of Jerusalem.
Corresponding author: Yael Kachel, e-mail: kachel@agri.huji.ac.il.

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Citrus Marketing Board of Israel (CMBI) exported all citrus fruit while Agrexco (a company owned by growers and by the government) exported all other fruits and vegetables. Reforms commenced in 1991 with a comprehensive reform of the citrus sector, including the abolition of single-desk exports and the privatization of export operations. Agrexco and a few commercial companies took over citrus exports. The CMBI continued to exist and perform some regulatory functions, generic promotion and R&D but it ceased selling operations. In 2004, the CMBI was united with three other boards to form the Plant Production and Marketing Board. Starting from 1992/93, exporters could apply for export licenses for specific fruits and vegetables in addition to Agrexco, but only if they were able to demonstrate that they would export at least 30% of total exports of the specific product. Later on, this condition was abolished, but Agrexco continued to export a large share of Israeli fruits and vegetables. For flowers, the export monopoly had already been abolished more than 20 years prior, but the Flower Board had kept the exclusive concession for exports to the main market, the flower auctions in Holland, while Agrexco provided the logistic services for flowers sold through the auctions. At the end of the 90s, the flower sector was also reformed and exports to the auctions were opened to additional exporters.

There are other countries which have abolished agricultural export monopolies. The South African Ministry of Agriculture commissioned a report to investigate the marketing of agricultural products under various marketing boards. The Kassier Report (1992) - named after the chairman of the inquiry committee - concluded that the activities performed under the authority of the Marketing Act did not achieve the goals and objectives of the act, e.g. efficient production was not promoted and producer prices were stabilized in certain industries but income was not. Vink and Kirsten (2000) argue that the deregulation of South African agriculture has resulted in a net welfare gain to the commercial agricultural sector and present empirical evidence in support of this argument. Mather (2003) investigated the attempts made by South African citrus growers to cooperate and establish voluntary regulations after liberalization of exports in 1997. According to this report, the impact of liberalization for growers has been mixed. Although growers can select an exporter as a result of the liberalization, returns have declined and appear to have become more volatile. Monopoly exports of citrus and tomatoes from Morocco were abolished at the end of the 80s, but some cooperation in exports continued afterwards. Moroccan exporters cooperate in export logistics and even export together to more distant markets (Kachel 1996). Aloui (not dated) argues, in a comparative analysis of Moroccan strawberry and tomato exports, that one of the main reasons for the success of tomato exports is the high integration of export operations after the abolition of monopoly exports.

The experience of other countries with export liberalization is mixed. In Israel, different sectors also developed differently after the reforms. Previous research shows that in the citrus sector, main performance indicators continued to decline after the reform (Kachel 2003). On the other hand, vegetable exports have increased

substantially in recent years following the liberalization of exports. Differences in the reform process and in the resulting market structure might be one reason for these observed differences in performance. In all sectors, exports are now carried out by private exporters and by Agrexco. But sectors differ in (1) arrangements customary before the reforms, (2) market structure in export markets, and (3) horizontal and vertical (for example the ownership of packing stations) market structure in the market for “export services” in Israel.

In this paper, we report a study of the success of reforms in the agricultural export sector in Israel. A detailed analysis of the changes in the export regime and their consequences focuses on a few main export products: grapefruit (the main citrus fruit exported), avocado (the main fruit exported beside citrus) and pepper (the main vegetable exported). We begin with a short description of the development of agricultural production and exports. We then compare economic indicators describing the structure and performance of the selected agricultural export sectors preceding and following the reforms. The evaluation of each product is followed by an econometric analysis to examine the claim that centralized exporting can increase growers’ revenues. Finally, we analyze the functioning of the market for export services after the reforms.

2. The Development of Agricultural Production and Exports¹

The value of agricultural production declined in the 80s as a result of a large decline in output prices paralleling a substantial increase in production. During the 90s, the value of agricultural production was more or less steady - around 15 billion NIS (in 2004 prices). Recent years have witnessed an increase in the output value to about 19 billion NIS in 2005 (Figure 1). Main outlets for agricultural production are the local market and the processing industry. Exports account for 25% of agricultural output (in 2005). Increasing agricultural exports are responsible for nearly half of the output value increase observed since 2000. Favorable exchange rates in the main export markets (a strong Euro) account for part of the increase in export value. It is likely that the liberalization of exports has also contributed to the increase.

Crops comprise about 60% of total agricultural output, with horticultural crops (fruit, vegetables and flowers) being the main products. Fruits (including citrus) and vegetables account for 43% of the agricultural output (Figure 2).

¹ Data source for all data presented in this section: Central Bureau of Statistics (CBS). All nominal values were deflated by the CPI (Consumer Price Index) and are reported in 2004 prices. The figures present the agricultural output value according to use (domestic market, export, industry, other). "Other" stands for "intermediate produce" which is agricultural produce that re-enters the agricultural production process (e.g., locally grown barley used for livestock feed). Data on intermediate produce also include data on the destruction of agricultural produce and, as of 1986 - sales to Judea, Samaria and the Gaza Area.

Figure 1

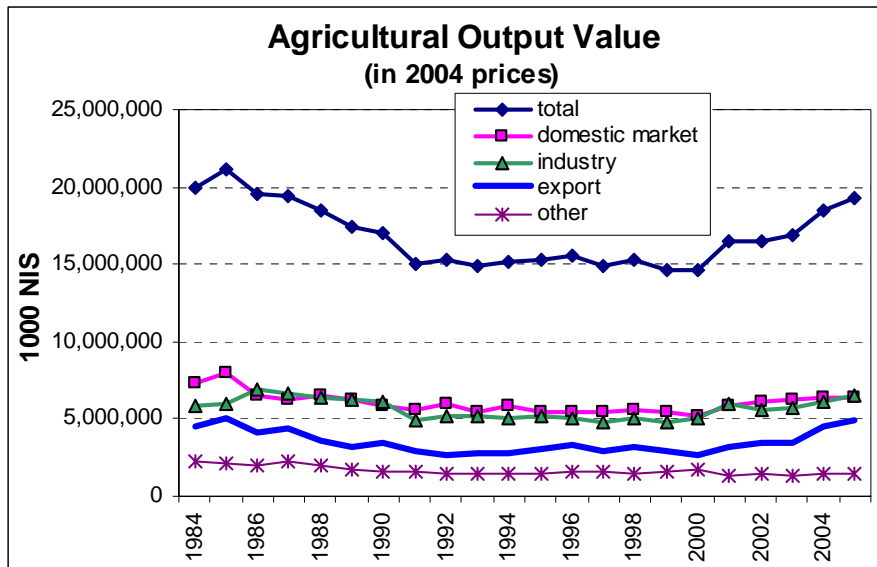
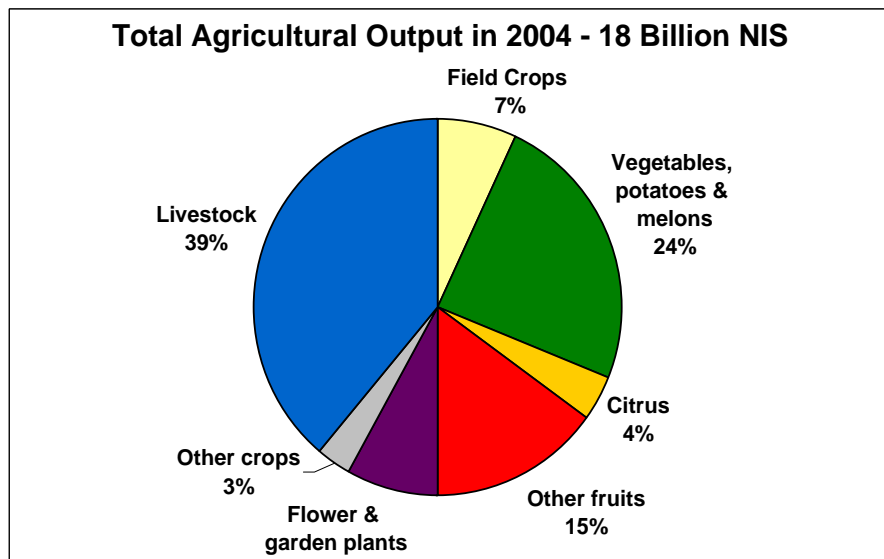
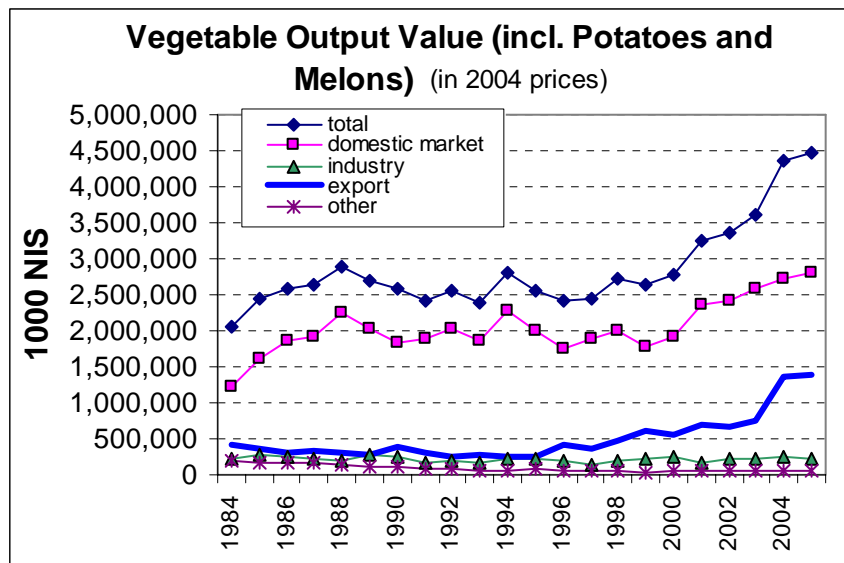


Figure 2



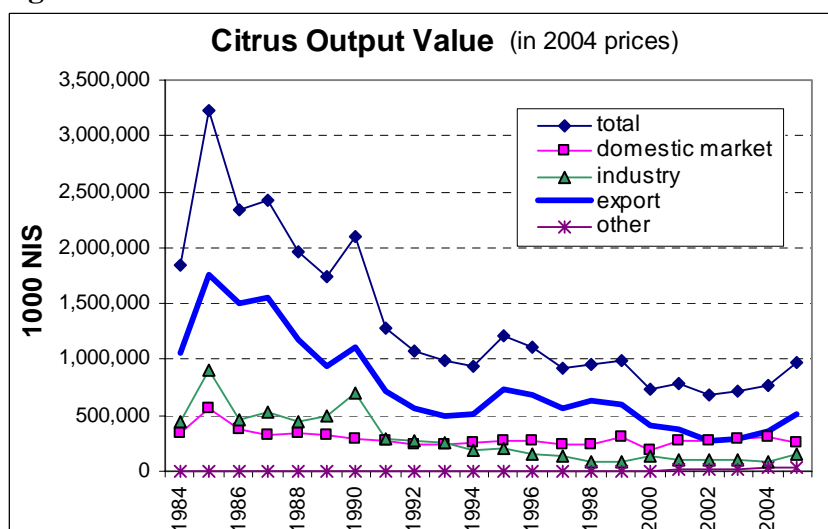
The various horticultural sectors are characterized by different structures and development. The **vegetable** sector produces mainly for the domestic market which generates 63% of the output value (2005). Exports account for 31% while only a small share of vegetable production is supplied to the processing industry. In recent years, the vegetable sector has undergone very rapid development, driven by an increase in sales to the local and export markets (Figure 3).

Figure 3



In the past, **citrus** had been one of the main agricultural sectors and one of Israel's main export products. In 2004 however, citrus accounted for just 4% of the agricultural output and 9% of agricultural exports. The output value of citrus fruit declined markedly in the 80s, reflecting a decline in production and exports and a crisis in the sector, which led to the extensive reforms. After the abolition of centralized export operations by the CMBI in 1991, citrus exports (and output value) increased somewhat but in the mid-nineties, the trend of decline in output and exports resumed. In recent years, citrus exports have recovered somewhat, influenced by favorable exchange rates and especially by an increased demand for Israeli grapefruit following extensive hurricane damage to grapefruit production in Florida (Figure 4).

Figure 4

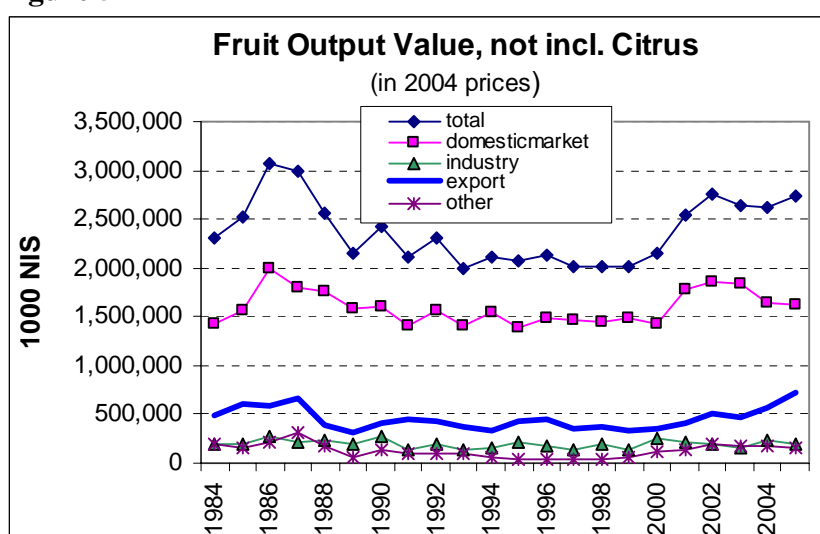


Remark: For citrus, each year relates to the season beginning the year before, e.g. 1984 = season 1983/84.

In the past, the citrus sector was very much export-oriented. In the second half of the 80s, less than 10% of citrus production was sold in the domestic market. Citrus fruit that did not satisfy the standards of the fresh fruit market were processed. In recent years, the value of citrus fruit sold in the domestic market is approaching that of citrus fruit exported as fresh fruit.

In contrast to citrus, **other fruits** are produced mainly for domestic consumption while the processing industry accounts for a very small share of total production. Output values for fruits stagnated in the 90s but have increased in recent years. Fruit exports have also begun to increase after a long period of stagnation (Figure 5).

Figure 5



Flowers are an export product. Until recently, exports accounted for about 85% of the output value. Since 2000, the local market for flowers has developed substantially, and the share of exports in the total output value of flowers has decreased to 77% (2005). The value of flower exports declined at the end of the 90s after a period of stagnation, but has recovered in recent years (Figure 6).

Israeli exports of unprocessed agricultural products are comprised almost exclusively of horticultural products. Here, we focus on citrus, fruit and vegetable exports and provide a detailed analysis of the most important export product in each product category. Exports in each of these sectors have developed very differently. Citrus exports have declined markedly, exports of other fruits are more or less stable with an increase in recent years, and vegetable exports have increased substantially (Figure 7). In recent years (avg. 2003-2005), avocado has accounted for about 35% of total fruit exports (not including citrus), a decline from 65% at the end of the 80s. The most important vegetable exported is pepper, accounting for 31% of the export value of vegetable exports and even more than that in the last two years. The export of vegetables in recent years has increased mainly due to the increases in pepper and potato exports. Grapefruit exports account for 48% of total citrus exports.

Figure 6

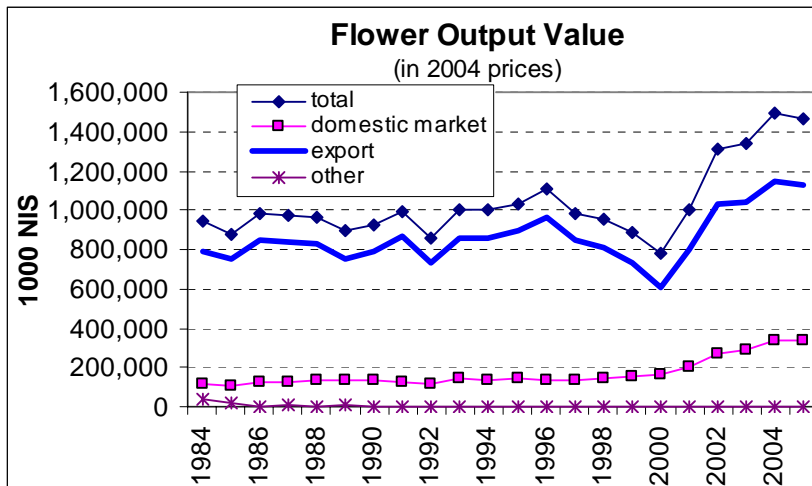
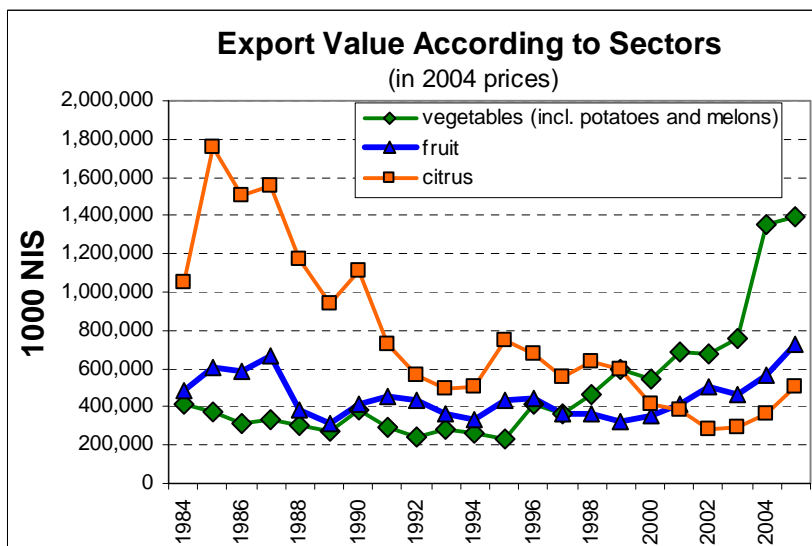


Figure 7



3. Comparative Analysis over Time

In this section, the development of the avocado, pepper and citrus sectors is studied. We compare economic indicators in the decade before the reforms to the decade afterwards. Our objective is to evaluate the success of the reforms in the different sectors.

The analysis is based on output data (source: CBS) and import data of the European Union (source: EUROSTAT). Output quantities and values are reported according to output use (domestic market, export, industry, intermediate produce = other). We calculate unit values (value per metric ton of production) and use these unit values as an indicator for prices received by growers. These data are based chiefly on monthly reports from wholesalers, production boards, and industrial enterprises. The agricultural output value usually excludes board fees and marketing commissions

(CBS). For output supplied to the domestic market and to the processing industry, values are reported at farm gate, whereas exports are reported as FOB (Free On Board) value. The CBS collects these data on a monthly and yearly basis. However, while the yearly data are verified and updated, the monthly data are not, and there are years in which there are substantial differences between the yearly and aggregated monthly data. Whenever possible, we use yearly data.

EUROSTAT collects trade data from EU member states based on customs data supplied by the member state and data collected from trading firms for the trade between EU countries. We use import data to the EU15 - that is, total imports to the 15 member states of the EU before the recent enlargement to 25 member states. We calculate unit values from data on import quantities and values. These unit values are an indication of import prices on a CIF (Cost Insurance Freight) basis. Note that these data may not be reliable because of the nature of the fruit and vegetable trade. Sales are often on a consignment basis and therefore, the final price is not known at the time of the customs declaration. In addition, unit values calculated for suppliers from the EU depend on the reliability of the data reported by traders.

In this section, we compare output data and EU import data for Israel before and after the reforms in the selected sectors. In addition, we compare Israeli import quantities and prices to those of main competitors. To evaluate whether export liberalization has led to cost savings, we compare the difference between import prices (unit values on a CIF basis) and export prices (unit values on a FOB basis) before and after reforms. This difference only accounts for part of the marketing costs (mainly transportation and insurance).

All nominal output values were deflated by the CPI and are reported in 2004 prices. EU trade data are presented in Euros and in real NIS. We use Euros for the comparison of import prices for Israeli products versus those of competitors in order to evaluate the effect of the liberalization on relative prices in export markets.

3.1. The Avocado Sector

Development of the Avocado Sector

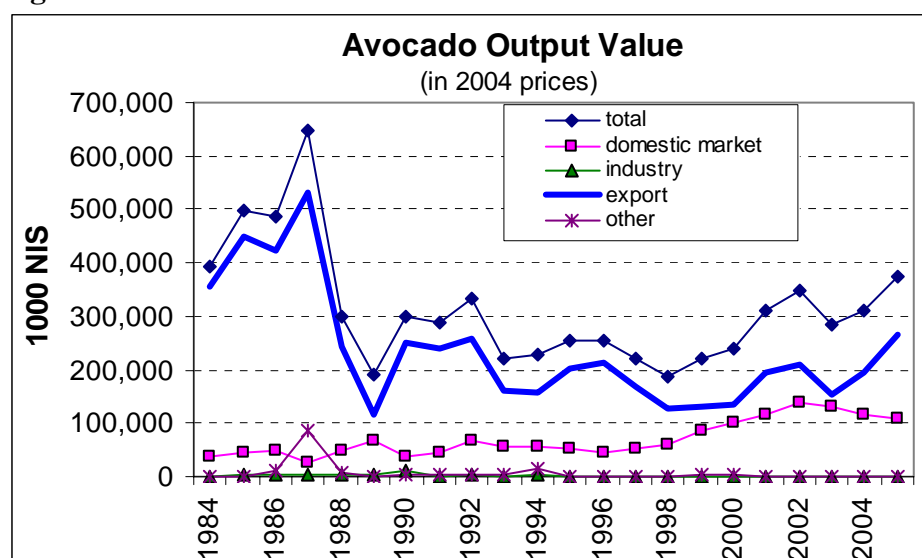
The avocado sector is characterized by important changes in the last decade. Agrexco was the only avocado exporter till 1998.² From export season 1998/99, additional companies began to export avocados. Nevertheless, exports are still very concentrated, with Agrexco accounting for about 70%, and two additional exporters for the balance.

The avocado sector was in a crisis in the second half of the 80s. After a record harvest in 1986/87 (135,000 ton), production declined, parallel to a decrease in avocado prices

² Till the mid-80s there was an additional avocado exporter (Hilron) competing with Agrexco.

in export markets. As a result of the large drop in production, the output value also declined (Figure 8).

Figure 8



Data Source: CBS.

A comparison of output quantities and prices in the decade before the opening of exports to the seven years passed since the reforms reveals the following changes (see Table 1):

- Average export quantities are slightly lower (-3%), contrasting with an increase in domestic consumption of 112%. The increase in domestic consumption is caused by a large increase in per capita consumption (from 3.5 kg to 6.2 kg per year) in addition to the population increase.
- Avocado production increased (+34%) parallel to the increase in domestic consumption.
- Average output values per metric ton for exported avocados are nearly identical in both periods. Average output values for avocados sold on the domestic market also did not change. The value of 1 mt exported is substantially higher than the value of 1 mt sold on the domestic market.
- Overall, average grower prices (as indicated by the unit output value) are somewhat lower in the period after liberalization (-11%). This decline may be overstated because data indicate that there was no collection of price information for avocado sold to the processing industry and to intermediate uses in most of the period before liberalization; instead, the much higher price of the domestic market was used to derive the value of avocado supplied to these uses.
- The total value of avocado production increased by 20%.

Table 1: Development of the Avocado Sector (Average per Season)

	Production	Domestic Market	Industry	Export	Intermediate
Quantity in mt					
Avg. 88/9-97/8	57,756	19,011	715	36,991	1,039
Avg. 98/9-04/5	77,663	40,339	1,081	35,763	481
Change in %	34%	112%	51%	-3%	-54%
Real Value in 1000 NIS					
Avg. 88/9-97/8	248,400	53,770	2,290	189,194	3,147
Avg. 98/9-04/5	297,917	113,556	403	182,813	1,146
Change in %	20%	111%	-82%	-3%	-64%
Real Unit Value in NIS/mt					
Avg. 88/9-97/8	4,301	2,828	3,202	5,115	3,027
Avg. 98/9-04/5	3,836	2,815	373	5,112	2,384
Change in %	-11%	-0%	-88%	-0%	-21%

Remark: Till 1994, no separate price was collected for avocado supplied to the processing industry and to intermediate uses. Reported prices were identical to those in the domestic market. This explains the large decline in the price of avocado for processing.

Data Source: CBS.

Avocado Imports to the European Union

The EU (EU15) is the main market for Israeli avocados, accounting for about 96% of the export value (CBS). Israel is one of four main avocado suppliers to the EU; the others are Spain, South Africa and Mexico. There are a few additional, smaller suppliers, which have increased their market share in recent years - Kenia, Chile and Peru. The Israeli export season is from October to April. The main competitors in this period are Spain and Mexico. Israel's market share in this period is 40% (average 98/99-2004/05), higher than those of Spain (33%), and Mexico (13%) in the same period.³

A comparison of avocado import data to the EU for Israel and its main competitors in the decade before reorganization of exports and in the years afterwards enables preliminary conclusions about the influence of this reform on export performance (Table 2). We compare the period after the opening of exports (Oct 1998 to Apr 2005) to the decade prior to it. The data are monthly averages for the Israeli export season (Oct-Apr) in both periods.

³ Total avocado imports to the EU are calculated as the sum of imports from extra-EU countries and imports from Spain. According to FAO (Food and Agriculture Organization) data, Spain is the only commercial avocado producer in the EU. We therefore assume that imports from other EU countries are re-exports.

Table 2: Avocado Imports to the EU in Oct-Apr (Monthly Average)

	Spain	Israel	Mexico	Extra-EU	Extra- EU + Spain
Quantity in mt					
10/88-4/98	2,811	4,419	1,739	7,363	10,174
10/98-4/2005	4,133	4,948	1,624	8,374	12,508
Change in %	47%	12%	-7%	14%	23%
Value in 1000 Euro					
10/88-4/98	3,140	5,111	2,030	8,640	11,780
10/98-4/2005	5,460	6,477	2,545	11,630	17,090
Change in %	74%	27%	25%	35%	45%
Euro/mt					
10/88-4/98	1,117	1,157	1,167	1,173	1,158
10/98-4/2005	1,321	1,309	1,567	1,389	1,366
Change in %	18%	13%	34%	18%	18%
Real Value in 1000 NIS					
10/88-4/98	18,220	30,291	11,836	51,125	69,344
10/98-4/2005	26,428	30,983	12,516	56,368	82,796
Change in %	45%	2%	6%	10%	19%
Real Unit Value in NIS/mt					
10/88-4/98	6,483	6,855	6,807	6,943	6,816
10/98-4/2005	6,394	6,261	7,707	6,731	6,620
Change in %	-1%	-9%	13%	-3%	-3%

Unit values are weighted monthly averages. Extra-EU = Imports from countries not belonging to the EU15.

Data Source: EUROSTAT (the data are for EU15 countries).

Avocados supplied to the EU originate mainly in countries outside the EU. The only EU country producing substantial quantities of avocados for export is Spain. The increase in average monthly EU avocado imports by 23% suggests an increase in avocado demand (Table 2). The imports from Spain increased by 47%, compared to an increase of only 12% of avocado imports from Israel. In contrast, avocado imports from Mexico declined. Imports from Mexico complete the avocado supply during periods with low supply from Spain and Israel. In recent years, imports from additional suppliers (Chile, Peru) in the counter-season have increased, and may have caused the decline in imports from Mexico.

Unit values provide an indication of import prices. The average unit value in Euros for EU avocado imports increased by 18%. Mexico managed to increase import prices for its avocados by a third while prices for Israeli and Spanish avocados increased much less (13% and 18%, respectively). A translation of import values to real NIS reveals a decline in real import prices for Israeli avocados (-9%).

A comparison of Israeli import prices to those of its main competitors in the period before and after the opening of exports to competition does not indicate a relative change in prices that may be attributed to competition among Israeli exporters and a resulting decline in bargaining power. Unit values for Spanish and Israeli avocados

are similar in both periods with slightly higher average prices for Israel (the differences are not statistically significant at the 5% level⁴). Unit values for Israeli and Mexican avocados were similar in the first period while Mexican prices are significantly higher in the second period. We cannot explain the reason for this change without further research (a possible reason is an increase in Mexican avocado quality). It is not reasonable to attribute this change to increased competition among Israeli exporters - in that case we would expect a similar change in relative prices compared to Spain.

Table 3: Comparison of Unit Import Values for Avocado in Euro/mt
(Simple Average, Oct-Apr)

	Spain	Israel	Mexico	Diff. w/ Spain	Diff. w/ Mexico	Number of Obs.
10/88 – 4/1998	1,168	1,236	1,181	68	55	70
10/98 – 4/2005	1,353	1,378	1,504	25	-126	49

Remark: For the price comparison with competitors we use simple monthly averages to compare price levels during the Israeli export season without taking into account differences in the monthly distribution of supplies (e.g. higher supplies of Mexican avocado at the beginning of the Israeli season when prices are generally high). Only the price difference with Mexico is statistically significant (printed in bold).

Data Source: EUROSTAT (the data are for EU15 countries).

We examine the development of the margin between FOB export prices and CIF import prices for a first indication of possible cost savings in export operations resulting from liberalization. For Israeli avocados, the price difference declined 22% in the second period (Table 4). This may indicate success of the reform in increasing efficiency of export operations and a corresponding decline of marketing margins.

Table 4: Comparison of Unit Values (CIF and FOB) for Israeli Avocados
(Weighted Average, Oct-Apr)

	Real CIF Prices in NIS/mt	Real FOB Prices in NIS/mt	FOB/CIF	CIF-FOB
10/88 – 4/1998	6,855	5,332	0.78	1,522
10/98 - 4/2005	6,261	5,079	0.81	1,182
change in %	-9%	-5%	4%	-22%

Remark: We also performed the comparison of CIF and FOB unit values based on yearly CBS data which are updated and probably more accurate than monthly data. In this case, the data indicate an even larger decline in the CIF-FOB margin after liberalization.

Data Sources: EUROSTAT, CBS.

⁴ All reported statistical tests were performed at the 5% significance level.

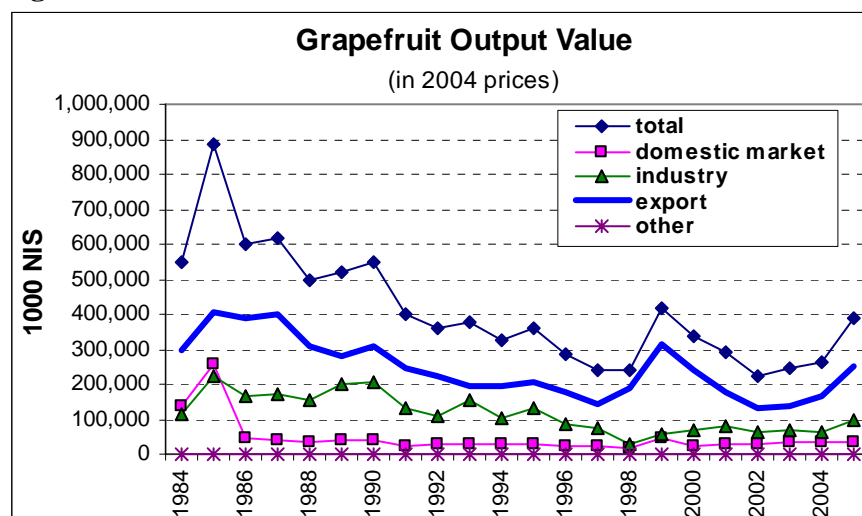
3.2. The Citrus Sector

Development of the Citrus Sector

After the establishment of Israel, citrus production expanded rapidly to a record production of 1.7 million mt in the mid-seventies. Production was export-oriented. The domestic market consumed only a small percentage of the production while fruit not suitable for fresh consumption was diverted to the processing industry. During the '80s, citrus exports declined by more than half (see Figure 4). The steep fall in exports and shrinking profitability of citrus growing led to increasing criticism of the operations of the CMBI. As a result, it was decided to cancel the Board's export and domestic marketing monopoly. In the 1991/92 season, the Board ceased selling operations and several commercial companies began exporting Israeli citrus for the first time. The domestic market was opened to competition in April 1991.

The development of grapefruit production mirrors that of total citrus production: the decline in exports and production is simply smaller (Figure 9). Florida grapefruit production was hit hard in 2004/05 by hurricanes which caused long-term damage to the sector and, in turn, increased the prospects for Israeli grapefruit exports.

Figure 9



Data Source: CBS (Each year relates to the season beginning the year before, e.g. 1984 = season 1983/84.)

We compare the last five seasons before the reform of the citrus sector to the average of the 14 seasons since then (Table 5). Because of the rapid decline of production and exports in the decade before the liberalization, we chose the short period of only five seasons immediately before liberalization.

Table 5: Development of the Citrus Sector (Average per Season)

	Production	Domestic Market	Industry	Export	Intermediate
Total Citrus					
Quantity in mt					
Avg. 86/7-90/01	1,221,050	111,050	686,590	422,730	680
Avg. 91/2-04/05	759,397	150,442	360,738	244,011	4,206
Change in %	-38%	35%	-47%	-42%	519%
Real Value in 1000 NIS					
Avg. 86/7-90/01	1,904,969	313,757	491,461	1,099,343	408
Avg. 91/2-04/05	918,871	262,020	147,681	499,552	9,618
Change in %	-52%	-16%	-70%	-55%	2256%
Real Unit Value in NIS/mt					
Avg. 86/7-90/01	1,560	2,825	716	2,601	600
Avg. 91/2-04/05	1,210	1,742	409	2,047	2,287
Change in %	-22%	-38%	-43%	-21%	281%
Grapefruit					
Quantity in mt					
Avg. 86/7-90/01	369,010	14,420	241,980	112,610	0
Avg. 91/2-04/05	319,090	19,372	203,139	96,573	7
Change in %	-14%	34%	-16%	-14%	
Real Value in 1000 NIS					
Avg. 86/7-90/01	517,343	35,813	172,959	308,571	0
Avg. 91/2-04/05	310,251	29,725	84,401	196,115	10
Change in %	-40%	-17%	-51%	-36%	
Real Unit Value in NIS/mt					
Avg. 86/7-90/01	1,402	2,484	715	2,740	
Avg. 91/2-04/05	972	1,534	415	2,031	1,361
Change in %	-31%	-38%	-42%	-26%	

Data Source: CBS.

The following are the main changes observed in the citrus sector after liberalization:

- The decline in production continued - citrus production after liberalization is lower by almost 40% compared to the five seasons immediately before liberalization.
- Production declined as a result of the decline in exports (in parallel, the supply to the processing industry also declined, as this is a by-product of fresh fruit production).
- Production supplied to the domestic market increased by 35%. Per capita citrus consumption hardly increased (from 24.6 kg to 25.2 kg), despite a substantial decline in citrus prices on the domestic market (as indicated by the unit values in Table 5).
- Unit output values declined substantially for all main uses (export, domestic market, industry). The percentage decline is lowest for export unit values (-21%).

- The percentage of production supplied to the processing industry declined (from 56% to 48%), the percentage supplied to the domestic market increased (from 9% to 20%), while the percentage exported declined slightly (from 35% to 32%).
- The changes in the grapefruit sector mirror those observed for all citrus. The main difference: the decline in production and exports for grapefruit is smaller.

Overall, the performance of the Israeli citrus industry did not improve after liberalization. Production, exports and grower prices continued to decline. To investigate the reasons for this development and the role of export liberalization we chose grapefruit exports for a more detailed analysis. Grapefruits accounted for 28% of exports (value) before liberalization, and today, it is the main export product in the citrus sector with an average share of 39% in the period after liberalization and nearly 50% in recent seasons. In addition, Israeli grapefruit accounts for significant market shares in export markets.

Grapefruit Imports to the European Union

We compare average import quantities and values to the EU during the supply season of the Israeli grapefruit (Sep-Jun). Monthly EU import data are only available from 1988, therefore the period before liberalization comprises only four seasons (without the beginning of the first season).

EU countries receive their grapefruit supplies mainly from countries outside the EU, with the exception of Spain which grows grapefruit for export. Additional EU imports from other EU countries are probably mainly re-exports. Total EU grapefruit consumption (Extra-EU + Spain) is slightly lower in the second period (Table 6). Imports from the two main suppliers, the US and Israel, declined – with a much larger decline in imports from Israel. The average market share of Israeli grapefruit decreased from 25% to 18%. On the other hand, imports from Turkey and Spain increased. The import unit value for Israeli citrus increased in Euro but decreased in real NIS.

Unit values indicate that import prices for Israeli citrus are mostly lower than those of its main competitors, although the difference with Spain and Turkey is small (Table 7). In contrast, US grapefruit obtained significantly higher prices in the period before liberalization. In the second period, the price premium for US grapefruit compared to Israeli grapefruit declined considerably but is still significant. The price for Israeli grapefruit also improved compared to Turkish grapefruit and Israeli import prices are higher in the second period. The price comparison indicates that there was an improvement in Israeli grapefruit prices relative to those of competitors in the period after liberalization of exports.

Table 6: Grapefruit Import to the EU in Sep-Jun (Monthly Average)

	Turkey	USA	Israel	Spain	Extra-EU	Extra-EU + Spain
Quantity in mt						
1/88-6/91	1,507	12,571	9,459	749	36,394	37,142
9/91-6/2005	3,126	11,663	6,490	1,557	34,106	35,663
Change in %	107%	-7%	-31%	108%	-6%	-4%
Value in 1000 Euro						
1/88-6/91	714	7,529	4,323	382	18,729	19,111
9/91-6/2005	1,711	6,536	3,420	886	18,187	19,073
Change in %	140%	-13%	-21%	132%	-3%	0%
Euro/mt						
1/88-6/91	474	599	457	510	515	515
9/91-6/2005	547	560	527	569	533	535
Change in %	15%	-6%	15%	12%	4%	4%
Real Value in 1000 NIS						
1/88-6/91	4,860	51,699	29,555	2,589	127,657	130,246
9/91-6/2005	8,523	33,690	17,649	4,532	93,847	98,379
Change in %	75%	-35%	-40%	75%	-26%	-24%
Real Unit Value in NIS/mt						
1/88-6/91	3,225	4,113	3,125	3,459	3,508	3,507
9/91-6/2005	2,727	2,889	2,720	2,910	2,752	2,759
Change in %	-15%	-30%	-13%	-17%	-22%	-21%

Unit values are weighted monthly averages. Extra-EU = Imports from countries not belonging to EU15.

Data Source: EUROSTAT (the data are for EU15 countries).

Table 7: Comparison of Unit Import Values for Grapefruit in Euro/mt (Simple Average, Sep-Jun)

	Turkey	USA	Israel	Spain	Diff. w/ Turkey	Diff. w/ USA	Diff. w/ Spain	Number of Obs.
1/88-6/1991	497	636	464	495	-33	-172	-31	30
9/91-6/2005	534	585	540	570	16	-45	-30	122

Remark: The price difference with Turkey is not statistically significant in either period, the difference with the US is significant in both periods, while the difference with Spain is significant in the second period only (significant differences are printed in bold).

Data Source: EUROSTAT.

A comparison of CIF import prices and FOB export prices for Israeli grapefruit in both periods points to an increase in the margin (Table 8). This result contradicts those reported by Kachel (2003) which indicated a decline in the margin after liberalization of exports. Different observation periods and different data sources (CMBI instead of CBS) are probably responsible for the divergence.

Table 8: Comparison of Unit Values (CIF and FOB) for Israeli Grapefruit

	Real CIF Prices in NIS/mt	Real FOB Prices in NIS/mt	FOB/CIF	CIF-FOB
Avg. 86/7-90/1	3,234	2,740	0.84	514
Avg. 91/2-04/5	2,685	2,031	0.76	654
Change in %	-17%	-26%	-10%	27%

Remark: The calculation of unit values is based on seasonal data for FOB prices because monthly FOB data did not look very reliable. CIF prices are based on yearly data because monthly data for EU imports are only available from 1988.

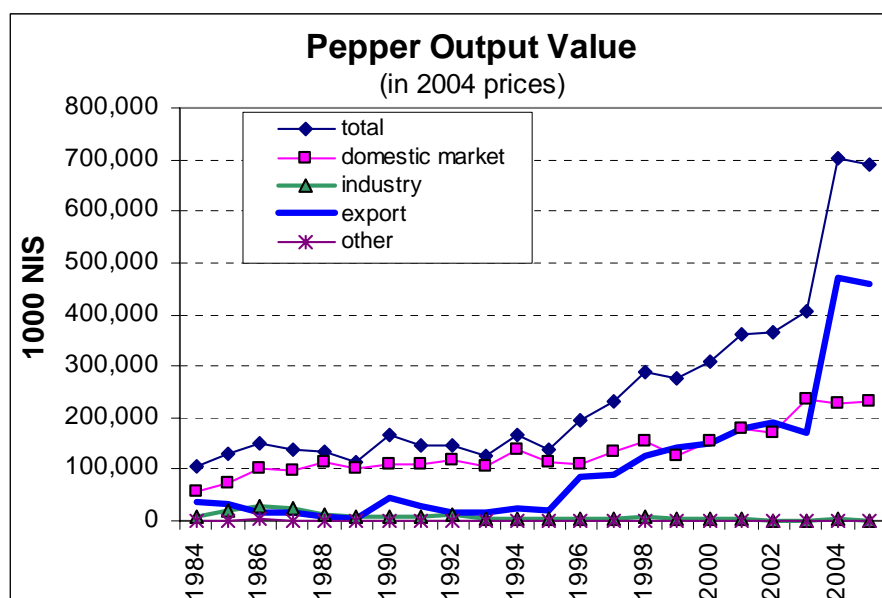
Data Sources: EUROSTAT, CBS.

3.3. The Pepper Sector

Development of the Pepper Sector

The pepper sector has expanded impressively in the last decade, due to an increase in domestic consumption and especially exports (Figure 10). For pepper, exports were opened to competition gradually: in as early as 1991, a grower group in the south of the country (The Arava Growers) received an export license and started to compete with Agrexco. Exports were completely opened in the 1999/2000 season, inducing substantial entry into the pepper export business. Today, in addition to Agrexco, tens of export companies are exporting pepper and Agrexco's export share has declined to about 50%. In the following analysis, we compare these three distinctive periods.

Figure 10



Data Source: CBS

The main changes in the pepper sector are summarized below (see Table 9):

- Production increased substantially (from 48,000 mt in 1988-91 to 114,000 mt in 2000-05).
- Total domestic consumption of pepper increased, as did per capita consumption. In contrast, quantities supplied to the processing industry declined.
- Exports increased impressively from only about 3,000 mt in 1988-91 to 40,000 mt in 2000-05. The increase in exports continues, with exports in 2005 reaching 62,000 mt.
- The unit output value for exports is substantially higher than those obtained for other uses.
- The real unit export value has declined from period to period. The decrease from the first period (one exporter) to the second period (two exporters) is small (-3%). In the last period (many exporters), average real export prices declined an additional 6%.
- Despite this decline, average unit values for pepper production increased substantially as a result of the large increase in exports.

Table 9: Development of the Pepper Sector (Average per Season)

	Production	Domestic Market	Industry	Export	Intermediate
Quantity in mt					
Avg. 88-91	47,760	36,369	7,877	2,854	660
Avg. 92-99	72,282	55,865	5,642	9,085	1,690
Avg. 2000-2005	114,111	70,723	2,483	40,347	558
Change 92-99 / 88-91	51%	54%	-28%	218%	156%
Change 00-05 / 92-99	58%	27%	-56%	344%	-67%
Real Value in 1000 NIS					
Avg. 88-91	140,024	109,530	8,881	21,010	602
Avg. 92-99	196,019	124,803	5,642	65,003	571
Avg. 2000-2005	472,543	199,554	2,641	270,245	102
Change 92-99 / 88-91	40%	14%	-36%	209%	-5%
Change 00-05 / 92-99	141%	60%	-53%	316%	-82%
Real Unit Value in NIS/mt					
Avg. 88-91	2,932	3,012	1,127	7,363	912
Avg. 92-99	2,712	2,234	1,000	7,155	338
Avg. 2000-2005	4,141	2,822	1,064	6,698	183
Change 92-99 / 88-91	-8%	-26%	-11%	-3%	-63%
Change 00-05 / 92-99	53%	26%	6%	-6%	-46%

Data Source: CBS.

Pepper Imports to the European Union

A comparison of import quantities and prices of Israeli pepper in main export markets to those of its main competitors provides additional information on the performance of this sector. The EU is the main export market for Israeli pepper while the main competitors in this market are Spain and the Netherlands. We compare average import quantities and prices in the months November to May, which is the export season of Israeli pepper (Table 10). EU pepper imports from Israel increased substantially. Nevertheless, Israel is still a small pepper supplier to the EU market, with a share⁵ of about 8% in total EU pepper imports in November to May. EU import quantities from Spain and the Netherlands increased even more than those from Israel, despite the large growth rates in Israeli exports.

Table 10: Pepper Imports to the EU in Nov-May (Monthly Average)

	Netherlands	Israel	Spain	Total Imports
Quantity in mt				
(1) 1/88 - 5/91	5,035	213	19,897	28,890
(2) 11/91 - 5/99	8,570	1,069	30,531	44,056
(3) 11/99 - 5/2005	12,892	4,395	37,984	65,110
Change (2) / (1)	70%	402%	53%	52%
Change (3) / (2)	50%	311%	24%	48%
Value in 1000 Euro				
(1) 1/88 - 5/91	9,412	285	20,671	34,595
(2) 11/91 - 5/99	17,191	1,634	33,619	57,186
(3) 11/99 - 5/2005	27,173	7,773	50,789	99,156
Change (2) / (1)	83%	473%	63%	65%
Change (3) / (2)	58%	376%	51%	73%
Euro/mt				
(1) 1/88 - 5/91	1,869	1,338	1,039	1,197
(2) 11/91 - 5/99	2,006	1,528	1,101	1,298
(3) 11/99 - 5/2005	2,108	1,768	1,337	1,541
Change (2) / (1)	7%	14%	6%	8%
Change (3) / (2)	5%	16%	21%	19%
Real Value in 1000 NIS				
(1) 1/88 - 5/91	63,447	1,949	141,803	236,337
(2) 11/91 - 5/99	91,578	8,205	180,041	304,974
(3) 11/99 - 5/2005	131,031	38,758	245,669	481,857
Change (2) / (1)	44%	321%	27%	29%
Change (3) / (2)	43%	372%	36%	58%
Real Unit Value in NIS/mt				
(1) 1/88 - 5/91	12,602	9,136	7,127	8,181
(2) 11/91 - 5/99	10,686	7,673	5,897	6,922
(3) 11/99 - 5/2005	10,163	8,818	6,468	7,401
Change (2) / (1)	-15%	-16%	-17%	-15%
Change (3) / (2)	-5%	15%	10%	7%

Unit values are weighted monthly averages.

Data Source: EUROSTAT (the data are for EU15 countries).

⁵ Israel's actual share in imports is probably somewhat higher because total imports include re-exports. On the other hand, part of the EU pepper consumption is produced locally and not imported; therefore import shares are higher than actual market shares.

Prices obtained for Israeli pepper (as indicated by unit import values) are lower than the prices for Dutch pepper but higher than prices for Spanish pepper (Table 11). Over the years, the price difference relative to Dutch pepper has declined, while the price difference relative to Spanish pepper has increased. All price differences are statistically significant. The price comparison indicates that the prices of Israeli pepper relative to those of its main competitors have improved. There is no indication of a price decline caused by increased competition among Israeli exporters.

Table 11: Comparison of Unit Import Values for Pepper in Euro/mt
(Simple Average, Nov-May)

	Netherlands	Israel	Spain	Diff. w/ NL	Diff. w/ Spain	Number of Obs.
1/88 - 5/91	1,649	1,181	1,141	-468	40	20
11/91- 5/99	1,853	1,398	1,107	-455	291	55
11/99- 5/2005	2,056	1,728	1,332	-317	407	42

Data Source: EUROSTAT.

The evidence from a comparison of FOB export prices and CIF import prices for Israeli pepper is inconclusive (Table 12). The margin is highest in the first period with Agrexco as the only exporter, declines by more than half in the second period, but increases again markedly in the third period. However, these large differences in margins are not statistically significant. Monthly margins for pepper display a high variability, casting doubt on data reliability.

Table 12: Comparison of Unit Values (CIF and FOB) for Israeli Pepper
(Weighted Average, Nov-May)

	Real CIF Prices in NIS/mt	Real FOB Prices in NIS/mt	FOB/CIF	CIF-FOB
(1) 1/88 - 5/91	9,136	7,602	0.83	1,534
(2) 11/91- 5/99	7,673	7,010	0.91	663
(3) 11/99 - 3/2005	8,810	7,517	0.85	1,293
Change (2)/(1)	-16%	-8%	10%	-57%
Change (3)/(2)	15%	7%	-7%	95%

Remark: Margins were also calculated based on yearly data. The main difference in the results compared to those presented in the table is a larger margin in the last period because of a lower FOB unit value.

Data Sources: EUROSTAT, CBS.

4. Market Power in Export Markets – Econometric Analysis

In the discussions preceding the reforms it was argued that the abolition of centralized exports would lead to “wild” competition among Israeli exporters, a decrease in prices for Israeli products, and shrinking grower profits. In this section we estimate residual import demand functions for main Israeli fruits and vegetables. Our objective is to examine these claims.

4.1. The Citrus Sector

In previous research (Kachel and Finkelshtain 1999, Kachel 2003), we analyzed the possibility of exercising market power in Israeli citrus exports. The objective was to examine whether centralized exports by the CMBI had succeeded to increase export revenues. The research focused on orange and grapefruit exports to the UK and Germany. It was based on monthly import data for the years 1978 to 1992 for the German market and 1978 to 2002 for the British market.

The methodological approach belongs to the school of “New Empirical Industrial Organization” (NEIO), that is, firms’ actual behavior is inferred from market data. Time series of prices and quantities are analyzed in order to evaluate both the potential for market power and the actual exercising of it (Bresnahan 1989, Carlton and Perloff 1990). The estimation procedure proceeds as follows. The first step is the estimation of the inverse residual import demand functions for different markets and different products. This provides the information regarding the possibility of exercising market power in the various export markets. If demands are not perfectly elastic, there is scope for the exporting firm to use market power and the analysis should proceed to the next step. In the second step an equation representing the exporter’s behavior is estimated.

We estimated a system of simultaneous equations, employing the method proposed by Fair (1970, 1984) to account for simultaneity and serial correlation of residuals. Estimation results (Table 13) show that the CMBI as a centralized export institution had little scope to exploit its organizational structure to increase revenues in export markets. Import demands for Israeli oranges and grapefruits in both the UK and Germany are very elastic and provide a very limited potential for exploiting monopolistic market power. For Israeli oranges, we estimated an import demand elasticity of -4.4 in the UK market and an elasticity of -30 in the German market.⁶ For Israeli grapefruit imports, the UK demand is more elastic ($\eta = -14.6$) compared to the demand of the German market ($\eta = -5.9$). These differences are consistent with differences in market share and with previously published studies of consumer preferences in the two markets. The results imply that the CMBI could employ third-degree price discrimination between the German and British markets. Nevertheless,

⁶ The coefficient for Israeli orange quantities in the German market is not significant.

the estimation of behavioral equations shows that the CMBI did not exploit this potential.⁷

To summarize, we find that despite conditions supporting the presence of market power, such as substantial market shares and high brand awareness, the hypothesis that the market conduct of the CMBI was competitive is not rejected. These results question the claim of supporters of centralized exporting as a means of increasing growers' revenues.

Table 13: Demand for Israeli Citrus in the UK and Germany

Explanatory Variables:	Oranges - UK (Linear Specification)		Oranges - Germany (Linear Specification)	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Constant	373.2	16.58	960.0	7.93
Quantity Israel	-0.0080	-7.83	-0.0034	-1.37
Quantity Other Suppliers	-0.0075	-9.23	-0.0038	-2.64
Quantity Easy Peelers	-0.0075	-10.23	-0.0016	-0.63
Quantity Grapefruit	-0.0074	-3.71	-0.0068	-1.03
Quantity Israeli Grapefruit	-0.0004	-0.09	0.0020	0.23
Expenditure Citrus	1.96*10⁻⁵	10.45	2.59*10 ⁻⁶	1.54
Explanatory Variables:	Grapefruit - UK (Logarithm. Specification)		Grapefruit - Germany (Logarithm. Specification)	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Constant	5.15	7.84	4.38	6.73
Quantity Israel	-0.0685	-3.44	-0.1706	-4.81
Quantity Other Suppliers	-0.0603	-2.38	-0.1173	-3.13
Quantity Easy Peelers	-0.0385	-2.76	-0.0347	-3.60
Quantity Grapefruit	-0.1352	-3.32	-0.2061	-3.40
Quantity Israeli Grapefruit	0.0006	0.07	0.0368	2.55
Expenditure Citrus	0.2126	3.96	0.3929	4.61

Dependent variables: import prices for the respective market and fruit. Coefficients significant at the 5% level are printed in bold. Regressions included additional explanatory variables (Dummy and Trend variables) not presented in the table. The R² for the presented results ranged from 0.76 to 0.90. For more details see Kachel (2003).

4.2. The Avocado Sector

We employed a similar methodology to analyze Israeli avocado exports. We estimated the following inverse demand function for Israeli avocado imports to the EU15, based on monthly import data for 1988 to 2005:⁸

$$p_t^I = \beta_0 + \beta_1 q_t^I + \beta_2 q_t^S + \beta_3 q_t^M + \beta_4 D^{lib} + \beta_5 D^{lib} q_t^I + \beta_6 p_{t-1}^I + \beta_7 D^{89/90} + \varepsilon_t$$

where t is the date, p_t^I is the import price (unit value) for Israeli avocados, q_t^I , quantities of Israeli avocados imported in t , q_t^S and q_t^M , quantities of avocados from

⁷ Estimation results are not presented here, for details see Kachel (2005).

⁸ The estimations are based on data for the months October till April, the main supply season of Israeli avocados.

main competitors (Spain and Mexico, respectively), D^{lib} , a dummy variable for the period of liberalized exports, and $D^{89/90}$, a dummy accounting for an exceptional season characterized by extremely low yields in Israel as a result of weather damages.

The regression was estimated with the 2SLS estimation procedure to account for simultaneity. Regression results (Table 14) show that Israeli avocado quantities have a significant negative influence on the price obtained. The coefficients for quantities of competitors are also negative and significant, as expected. The own-price elasticity at the sample average is about -5. This suggests a quite elastic demand for Israeli avocados and consequently, a limited potential to increase export revenues by exercising market power.

Table 14: EU15 Demand for Israeli Avocados

Explanatory Variables	Coefficient	t-value
Israeli Quantity in mt	-0.061	-4.64
Dummy for Liberalization (Constant)	-30.24	-0.20
Dummy for Liberalization (Slope)	0.024	0.90
Quantity of Spain	-0.04	-2.65
Quantity of Mexico	-0.03	-2.33
Lagged Israeli CIF Price (t-1)	0.58	8.36
Dummy for Season1988/89	89.77	0.81
Constant	975.3	6.65
R²	0.83	
Number of Obs.	105	

Dependent variable: import prices for Israeli avocados. The equation was estimated using instrumental variable regression (2SLS) with robust STD. We tested for autocorrelation of residuals with the Breusch-Godfrey Serial Correlation LM Test; test results indicate that residuals are not correlated.

Coefficients significant at the 5% level are printed in bold.

To account for possible changes in residual import demand as a result of export liberalization, we included a dummy for liberalization as fixed effect and as a slope shifter. For example, the demand for Israeli avocados might decrease after liberalization as a result of granting export licenses to additional exporters because of increasing transaction costs or decreasing expenditure for promotion. Regression results indicate that there was no significant change in the level or slope of the residual demand function after liberalization.

Overall, conclusions are similar to those obtained for citrus exports. Despite large market shares, the price elasticity for Israeli avocados is high, limiting the scope to exploit market power. Also for avocados, the estimation of a behavioral equation indicates that the existing market power was not exploited by the single-desk exporter.⁹

⁹ Estimation results are not presented here because of space constraints but can be obtained from the authors upon request.

4.3. The Pepper Sector

Regression results for Israeli pepper exports to the EU did not show any evidence of Israeli supply quantities influencing prices obtained. This is not surprising given that the market share of Israeli pepper in the EU market is small. This result provides evidence that no gains are to be expected from one-hand exports with regard to the possibility of price discrimination and an increase in export revenues. On the other hand, it indicates that Israeli pepper exports can still be increased with no negative influence on the price level in the EU export market. There are indications that EU import data for Israeli pepper may not be completely reliable, hence the results for pepper have to be interpreted with caution.

5. The Market for Export Services – Econometric Analysis

One of the dangers of privatization in general, and particularly in the market for export services for agricultural products, is the possibility that the state monopoly will be replaced by a private monopoly or oligopoly which can exploit its power to decrease grower revenues. In this case, the efficiency gains from privatization may be smaller than the damage caused by the noncompetitive market structure of the privatized sector. We use econometric methods to analyze the functioning of the market for export services after the reforms.

In the econometric analysis for avocado and pepper, FOB prices (collected by the CBS) are explained by CIF prices (EUROSTAT unit values) and additional variables. CIF and FOB prices differ mainly by the costs of shipping the product from the border of the export country to the border of the import country. These costs are largely fixed on a per unit basis and do not depend on the price of the product. There are some costs (e.g. insurance) which are calculated as a percentage of the price but these costs account only for a very small share of the price. Under perfect competition, we expect the changes in CIF prices to be transmitted in full to the growers; hence the coefficient of the CIF price is expected to be close to one. In this case, the constant is expected to be negative and indicate transportation and insurance costs. If the coefficient of the CIF price is significantly smaller than one, this is an indication that changes in CIF prices are not fully translated to changes in FOB prices. For the period before liberalization, this may be an indication of cross-subsidization practiced by the monopoly exporter. For the period after liberalization, this may be an indication that the market for export services is not competitive.

5.1. The Avocado Sector

Avocado CIF and FOB prices were analyzed with the help of three regressions, one for all observations (1988-2005), one with data for the period before export liberalization (1988-Apr 1998), and one for the period since liberalization (Oct 1998-2005). High R^2 values (0.6 to 0.7) indicate that a large part of the variation in FOB prices is explained by the variables included in the regressions (Table 15). The

estimated coefficients for the CIF price for all three regressions are smaller than 0.7 and statistically significantly different from 1. This result indicates that changes in CIF prices are not fully translated to FOB prices. Regression results suggest that the reform did not much influence the way CIF prices are related to FOB prices. Constant and slope dummies for the regression, including all observations, are not significant. In addition, the coefficients of the CIF price are identical in the second and third regression.

Table 15: Price Equation for Avocado from Israel

(Dependent Variable: FOB Price)

Explanatory Variables	OLS		AR(1) Correction	
	Coefficient	t-value	Coefficient	t-value
All Observations (10/88 - 3/05)				
CIF Price	0.64	11.64	0.67	7.45
Dummy for Liberalization (Constant)	156.7	0.20	790.1	0.74
Dummy for Liberalization (Slope)	-0.003	-0.03	-0.08	-0.56
Constant	876.6	2.06	602	0.90
R ²	0.61		0.68	
DW	1.23		1.45	
Before Liberalization (10/88 - 4/98)				
CIF Price	0.63	10.2	0.66	6.01
Constant	876.6	1.81	709	2.12
R ²	0.61		0.70	
DW	1.07		1.12	
After Liberalization (10/98 - 3/2005)				
CIF Price	0.63	8.68		
Constant	1,033	2.08		
R ²	0.62			
DW	1.69			

5.2. The Pepper Sector

In contrast to the avocado sector, the R² for the estimated pepper price equations is much lower (less than 0.2). One reason for the large unexplained variation in FOB prices may be changes in the transportation technology (a move to sea transport from air transport), or changes in transport costs; however, the main reason is likely to be problems with the quality of the price data in the pepper sector. In the case of pepper, the coefficients for the CIF price are lower than 0.5, an even larger departure from the expected value close to 1. It is important to note that the price coefficient increased in the last period, which is characterized by significant entry into pepper export operations. This result suggests an increase in competition in the market for pepper export services.

Table 16: Price Equation for Pepper from Israel (Dependent Variable: FOB Price)

Explanatory Variables	All Observations (1/88-3/05)		First and Second Period (1/88-5/99)		Third Period (11/99-3/05)	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
CIF Price	0.337	4.75	0.304	3.60	0.416	3.09
Dummy for "Arava" exporter	435	1.05				
Dummy for additional exporters	-264	-0.82				
Constant	4,439	6.69	5,027	7.57	3,970	3.44
R ²	0.18		0.16		0.20	
DW	1.7		1.75		1.62	

5.3. The Citrus Sector

The Israeli citrus industry after liberalization is characterized by a highly concentrated export sector. In the first years after liberalization, three or four main exporters exported about 90% of all Israeli citrus. In recent years, there has been a duopoly of two main exporters responsible for about 90% of exports, and in addition, a number of small exporters. The high concentration of the sector for citrus export services raises concerns that exporters may exploit market power in their transactions with citrus growers.

Contracts offered by exporters differ in the degree of information provided to growers about the final price for their fruit. For example, exporters may agree to pay a certain price, or they may pay growers just after selling the fruit abroad without any guarantee on price (consignment contract) and with very limited possibilities for growers to evaluate the performance of exporters. In contrast to textbook contract theory which predicts contracts with profit-sharing, during most of the 90s, the common contract in the Israeli citrus industry was consignment-based. In recent years, it has become common to offer a minimum price.

In previous research, we developed a model characterizing contract choice in the Israeli citrus industry (Kachel et al. 2003, Kachel 2003). The citrus market for export services is modeled as a two-stage game. In the first stage, each of the exporters chooses, noncooperatively, the type of contract offered to growers. In the second stage, given the contract type chosen in the first stage, exporters engage in price competition. The model shows that exporters may decrease price competition among themselves by limiting the amount of price information provided to growers in the offered contracts.

Empirically, we find that there is a very weak relationship between the price that export firms pay growers and the share of each exporter in citrus fruit supplied by growers. Low price elasticities are characteristic for a market with very little price information where growers choose exporters randomly or based on factors other than price. In addition, the analysis of price margins in grapefruit and orange exports indicates a substantial oligopolistic markup of exporters, decreasing grower prices and contributing to a decline in citrus production in the longer term.

6. Summary and Conclusions

We studied the influence of far-reaching reforms in main agricultural export sectors in Israel on the performance of those sectors. The reforms included the abolition of statutory export monopolies, and the privatization of export operations. A comparison of the three sectors studied shows differences in the development of exports. Citrus exports continued to decrease after the reforms, and the overall performance of the sector did not improve. Avocado exports decreased slightly after the reforms, while other fruit exports have begun to increase in recent years. In contrast, pepper exports increased markedly after the reforms, which induced the expansion of pepper production and the entry of numerous new exporters.

It seems that the differences in performance are mainly related to demand conditions in export markets. In addition, entry barriers influence the speed of adaptation to changing market conditions. The vegetable sector is characterized by low entry barriers to production (annual growing cycle) and export (packing operations are mainly owned by growers). In contrast, fruit production is characterized by a multi-annual production cycle and higher investments, which slow the speed of the adaptation process. In addition, packing stations in the citrus sector were initially owned mainly by export companies - creating an additional entry barrier into citrus exports. In the avocado sector, growers (kibbutzim) own the main packing stations. A large segment of the avocado growers are organized in a common organization and may be able to obtain higher revenues through joint bargaining. A relatively higher price transmission in avocado exports compared to citrus and pepper exports may be an indication of this.

Results are clear-cut with regard to the question of whether the opening of export operations to competition caused a loss of market power in export markets. First, there is no indication that prices for Israeli products declined after reforms relative to those of its competitors. On the contrary, relative import prices for pepper and grapefruit improved, probably indicating an improvement in quality. In addition, we estimated residual import demand functions for Israeli products to formally investigate the possibility of exploiting market power on export markets. Estimation results show that avocado and citrus supplies from Israel have a significant but small influence on obtained prices. Import demand is very elastic and therefore, the potential to exploit market power is quite limited. Econometric results for behavioral equations indicate that centralized exports did not manage to take advantage of this limited potential. To summarize, we find that despite conditions supporting the presence of market power, such as substantial market shares and high brand awareness, the hypothesis that the market conduct of the CMBI was competitive is not rejected. These results raise some question as to the claim of supporters of centralized exporting as a means of increasing growers' revenues.

Results are inconclusive with regard to the question of whether the reforms increased the efficiency of export operations and led to a saving of marketing costs. We compared import to export prices and found that the margin decreased substantially after reforms in the case of avocado exports. For grapefruit, results obtained here contradict those in an earlier study (Kachel 2003), probably due to different time periods and data sources. For pepper, the differences observed in the margins in three distinct periods are not significant. A large variability in margins over time, especially for pepper exports, casts some doubt on data reliability. In addition, the price margin we calculated from the available unit value data contains just part of the marketing costs (mainly overseas transportation and insurance).

The high concentration of exports in the hands of just a few exporters, especially in the citrus and avocado sectors, raises some concern as to the noncompetitiveness of the export services market for agricultural products and the exporters' ability to exploit their power to decrease grower revenues. Previous theoretical research by the authors showed that exporters can use information as a strategic tool to reduce price competition among them. Our model predicts that exporters will use consignment contracts to conceal price information, reduce price competition and pay lower grower prices. Empirical research confirms that the market structure for export services in the citrus sector is noncompetitive. The analysis for avocado and pepper provides a first indication that also in these sectors, export services may be noncompetitive; however, further research is necessary.

To summarize, research results indicate that the impact of reforms on export performance and growers' revenues may have been dampened by the noncompetitive market structures for export services that developed after the reforms. In addition, performance depends on additional factors which may dominate the effects of reform. In the pepper sector, which shows an impressive export performance in the years after the reform, exports are relatively less concentrated than those in the less successful citrus and fruit sectors. But it appears that the main reason for success in this sector was the introduction of production methods for high-quality pepper which can be supplied to European markets during periods of lower domestic supply.

There is a need for further reforms to increase competitiveness in the market for export services. These reforms should include abolition of the partial exemption for wholesalers (including exporters) from the enforcement of antitrust laws, if these wholesalers are not owned by growers. In addition, regulations are necessary to increase transparency and fairness in the exporters' transactions with growers.

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