INTENSIFICATION OF AVOCADO TRADE IN THE EUROPEAN COMMUNITY

Helmke Sartorius von Bach[1] & Ulrike Grote[2]
[1] *Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, Pretoria 0001*
[2] *Department of Agricultural Economics, University of Kiel, Germany.*

1. INTRODUCTION

During the last decade, increasing world trade opportunities led to rapid growth of exotic fruit exports to Western Europe. Many reasons like intensive contacts to diverse ethnic origins, increasing travel activities of West-Europeans into tropical and subtropical countries or expanded marketing activities and improved technologies have contributed to the growing importance of many exotic fruits. Some studies analysed the impact of the enlargement of the European Community (EC) on markets for fruit and vegetables (Alvensleben, Behr and Jahn, 1986), but little has been done on the avocado market in the EC.

Out of the huge exotic fruit sortiment, i.e. mangoes, papayas, lychees, rambutan, starfruit, kiwano etc., avocados can be considered as one example of successful product establishment in the Western markets. The consumption of avocado grew from an unknown fruit to 0.5 kilogram per capita within the European Community (EC), which is equal to a growth rate of almost 15 percent. On the supply side, the world production increased by almost 3 percent per annum. Israel with its "green gold" has become the most important avocado supplier of the Western countries. South Africa also advanced to an important avocado exporter. However, growing competition from other avocado producers like Spain has appeared. Therefore, the perceived promises of the expanding avocado markets during the past decade are analysed. The objective is to present new prospects for the market.

In the first part of this paper, the structure and development of inter and intra-industrial trade are analysed. It is investigated to which extent the ex- and imports are regionally concentrated or diversified. Furthermore, trade flows between the most important avocado traders within the EC and the determining factors of avocado trade are examined. It is shown how prices and quality influence the trade developments. The second part deals with the trade intensities between avocado trading countries. Special emphasis is put on the two EC-countries France and Spain. While France is the most important avocado importer, Spain advanced to a significant avocado producer. The third part analyses the future trends on the avocado market.

2. PROFILE AND DEVELOPMENT OF THE AVOCADO TRADE IN THE EC

To give an idea of the size of the European avocado market: A total of almost 105,000 tons or about 140 million ECU of avocados have been imported by the EC in 1992. In

terms of values, this is equal to about 10 percent of the total EC banana imports.

In order to investigate the profile and development of the avocado trade in the EC, it is important to analyse market access. Market access of a particular country to the EC is determined by the combined effects of border measures and trade preferences (Alvarez-Coque and Bautista, 1993). Trade preferences are determined by comparative advantages, while border measures protect domestic producers from all foreign suppliers as a consequence of political pressures.

Several different coefficients have been calculated for identifying the main basic trends of the avocado inter- and intra-industrial avocado trade. The basis for the calculations is given by a trade matrix of the bilateral trade streams existing on the world market. The data are taken from national and international statistics[1].

2.1. Inter-industrial trade

First, the inter-industrial trade has been investigated with the help of the Gini-Hirschman coefficient (Burmester, 1990)[2]. The more a country has concentrated its exports on a region, the higher the Gini-Hirschman coefficient. If the avocados are only exported to one country, then the coefficient will reach 100. Correspondingly, a low Gini-Hirschman coefficient indicates a high diversification of the exporting country. If the export volume is equally distributed to 'm' destinations, the coefficient will be $100/\sqrt{m}$. Assuming that there are 12 importing countries, the coefficient will be 29.

Avocados within the EC are mainly supplied by five producing countries, namely Israel, South Africa, Spain, Mexico and Kenya. The sequence of the countries reflects their relative importance. From the view of the exporters, the following trends are shown in Table 1.

The coefficients indicate relatively high regional concentration of avocado-exports over time. Israel has reached a Gini-Hirschman coefficient of 95 in the nineties which means that the avocado exports are designated to almost only one country. This is also true for Spain and Mexico.

Kenya and South Africa are comparatively more diversified. However, in all the listed countries, regional concentration has increased over time.

A reason for this concentration may be that exporters are increasingly faced by a demand for larger batches of uniform supply and more continuous deliveries. These requirements have to be fulfilled by those exporters who want to supply such customers in order to cope with organizational needs as closely as possible.

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[1] European Community, Eurostat, Brussels, diverse years. FAO, Trade yearbook, Rome, diverse years. Interfel, Bilan 1992-Fruits et légumes. Supplément à Fel actualités hebdo., Paris 1993. ZMP, ZMP Bilanz-Obst, Bonn, diverse years.
[2] The Gini-Hirschman coefficient is defined as follows:
with X_{ij} = Exports from country **I** to country **j**, X_j = Total Esport volume of country **I**, **i**= 1…n

$$G_i = \left[\sum_{i=1}^{n} \left[\frac{x_{ij}}{x_{i,}} \right]^2 \right]^{1/2} * 100$$

TABLE 1: Regional concentration of avocado-exports, 1984-1992

Year	Gini-Hirschman Coefficient				
	Spain	Kenya	South Africa	Mexico	Israel
1984	87.0	57.5	67.0	-	75.9
1988	88.2	52.6	71.9	76.1	62.2
1989	83.7	54.9	78.1	69.8	85.0
1990	86.5	56.0	84.6	76.3	95.6
1991	92.0	42.9	75.6	93.6	90.6
1992	87.4	73.7	67.8	93.6	94.5

Source: Own calculations.

Hörmann and Will (1987) interviewed 50 importers in the EC and found that most (90 percent) of these companies imported exotic fruit in general from Brazil, three quarter from Israel, Peru, South Africa and Venezuela. Other countries which supply about two thirds of the importers are Ivory Coast, Kenya, Mexico and Mali of which the latter two were regarded as frequent suppliers. Evaluating the supply source, using criteria as familiarity of export requirements, uniform, shipments, continuity, packaging and labelling, trust between parties and settlement of complaints, the result showed that Israel, South Africa, USA and Mexico were rated best of all countries. In the same sequence, the countries were rated for their quality. Apart from the USA, these countries are also the main avocado suppliers for the EC. In repeating a similar survey in 1993, by interviewing five major importers in the important EC fruit and vegetable market al Rungis (Paris), the above was supported. The survey showed that fruit quality forms most developing countries was generally rated as lower and that some importers lost interest in trade with countries being irregular and unreliable in supply.

Figure 1 gives a detailed picture of the trade development from the view of selected EC countries. The growth of the avocado market took place during the period of 1980 to 1987. The over-supply in 1987 resulted in price reductions of 20 percent, even with Israel destroying 23,000 tons of production in that year (The Economist, 1987). Until 1990, the avocado market recovered again, showing significant growth rates. Since 1990, the market in the four important EC import countries is slightly stagnating, shown in Figure 1.

Most avocado designated for Europe go to France (92 percent), followed by the United Kingdom, Germany and the Netherlands. In 1992, France imported nearly 75,000 tons of avocados. The avocado imports of the United Kingdom amounted to 14,000 tons. The third largest market for avocados in size is Germany with an import volume of 9,100 tons in 1992.
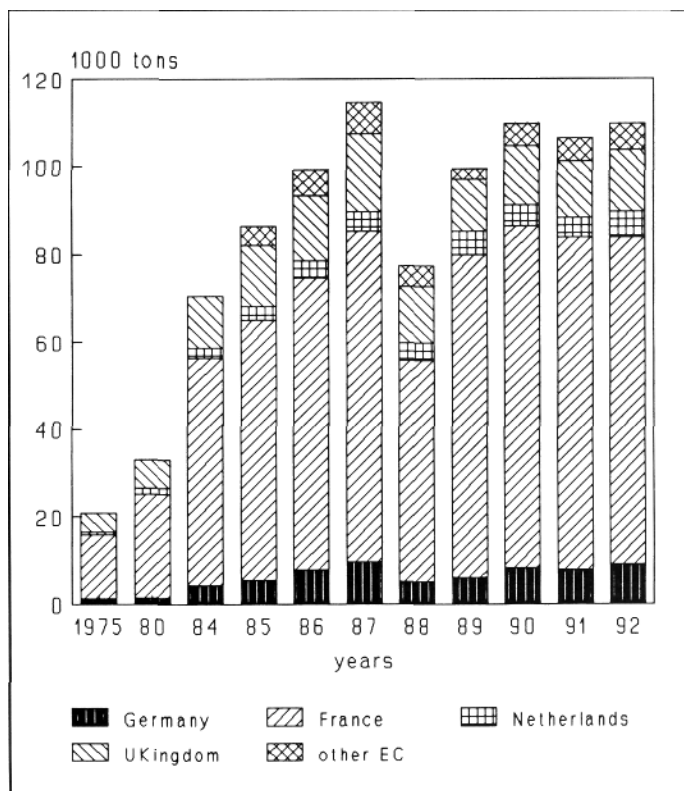
FIGURE 1:

Avocado imports of various EC countries, 1975-1992

Source: Own presentation.

The Netherlands reached a volume of almost 6,000 tons at the same time. Hence, the avocado trade is also concentrated to a large extent on a few markets within the EC. Concentration of import activities resulted in increased economies of scale of major fruit trade companies. The increased size of avocado imports has led to an intensification of trade relations, i.e. a few big volume avocado exporters are preferred to many small volume exporters from developing countries. This again is shown by results of Table 1.

2.2. Intra-industrial trade

A common European market connected with a relatively high per capita income results in growing product differentiation and thus, intra-industrial trade is induced among the EC member countries.

The intra-industrial trade coefficient IIT[3] (Grubel and Lloyd, 1975) has been calculated for identifying the main trends in intra-industrial trade, namely between the major avocado trading EC countries: France, the Netherlands, the United Kingdom and Germany.

In case, the trade coefficient becomes 0, there are either only imports or exports registered for a country. A coefficient of 100 indicates that the import volume is equal to the export volume. A coefficient of 50 means: Given an export surplus, one third of the export volume will be imported, and not 50 percent as might be assumed.

From Table 2, it is clear that the Netherlands have reached relatively high trade coefficients with values of almost 90 percent. This means, that a relatively high share of the import volume is re-exported again. In fact, the Netherlands re-export about 75 percent of their total avocado import volume.

On the contrary, it can be stated that Germany having reached a coefficient of 0 over time, is a pure avocado importer. A similar result can be observed for the United Kingdom since 1991. From 1988 to 1990 however, significant re-exports of avocados have also been identified for the United Kingdom.

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[3] The intra-industrial trade coefficient IIT is defined as :
with
X_i = Export volume of the product i
Y_i = Import volume of the product i

$$IIT = \frac{\left[(X_i + Y_i) - \left|X_i - Y_i\right|\right]}{(X_i + Y_i)} * 100$$

TABLE 2:
Trade coefficients for the intra-industrial trade with avocados, 1980-1992

Year	France	Netherlands	United Kingdom	Germany
1980	2	62	0	0
1984	3	53	8	0
1988	7	82	13	0
1989	10	73	26	0
1990	25	88	36	0
1991	23	87	6	0
1992	17	87	2	0

Source: Own calculations.

France has reached values of up to 25 percent, indicating substantial import volumes compared to re-export volumes. The re-exports of France amount to only 10 percent of its total imports. A slight decrease of the trade coefficient has been observed for the last few years, being equal to an increase of export volumes relative to import volumes.

Expressed in absolute terms, the following can be stated:

In the middle of the eighties, France re-exported up to 1,000 tons while at the beginning of the nineties, only 5 years later, the export volume even exceeded 10,000 tons. The re-exports from the Netherlands with trade coefficients of almost 90 percent did not even reach half that volume. Until the end of the eighties, the Netherlands still used to be the major supplier for selected West-European avocado markets. Presently, France has become the major distributor of avocados within the EC.

Before any further attention is paid to the structure and development of trade intensities, determinants of the above identified intra-and inter-industrial trade flows are described.

2.3 Determinants of avocado trade

Trade is favoured by a number of factors (Rose, 1981). Reasons for inter-industrial trade arise from the non-availability of products, as is in the case of avocados, which are produced to a large extent in other climatic regions. The avocado originates from the tropical and subtropical Central America. Today, apart from America, it is cultivated in many African countries as well as in Israel and Spain. Even with the expanding production of EC growers, most West European countries still have to import avocados from abroad to cover the increasing demand. It can be assumed that the situation of the EC as an importer with a relatively low degree of self-sufficiency with regard to avocados will not change in the near future.

Comparative advantages resulting from different cost structures also lead to foreign trade streams. Costs arise from the fulfilment of the different functions such as production, sorting, packaging or transportation. The production costs heavily depend

on the cost of the labour factor, since avocado growing is a labour-intensive enterprise. Therefore, many developing countries have comparative advantages with regard to avocado growing.

Transportation costs are determined by the choice of transport modes. Spanish avocados reach their final destinations by truck. From Israel and South Africa, avocados are transported by container-ship to the main European harbours and then forwarded by road and rail to their destinations. Due to improved technologies to change transport modes from air to sea-transport, South Africa was able, especially since 1985, to increase its avocado exports magnificently. The share of air-freight for avocados decreased in only two years (1985 to 1987) from about 40 percent to only 5 percent, resulting in reduced costs. Consequently, air-freighted avocados have become of minor importance. Only at the beginning of a season, relatively high market prices allow the transport by aeroplane. Kenya who is transporting its fruits mainly by aeroplane due to inefficient infrastructure, is an exception to this. The transportation costs especially, determine the efficiency of the marketing process for the exporting country which can lead to comparative advantages for an exporting country.

In addition to this, product differentiation leads to transactions between similar developed countries being characterized by very differentiated Sortiments. These are based on different preferences of the consumers and induce infra-industrial trade streams. Significant differences with regard to consumption levels and preferences can be found between different EC countries. While the average consumption of avocados in France and Spain amounted to about 1 kilogram per capita in 1992, the consumption levels in Germany, the United Kingdom and the Netherlands are still relatively low. They did not even reach 0.3 kilogram (equal to one fruit) per capita in 1992 as can be seen in figure 2.

Consumer resistance typically is the result of unfamiliarity with a product and can be interpreted as a trade barrier (Roman, 1989). According to an investigation from von Alvensleben and Meier (1989), in Germany, the degree of fame avocados has reached 91 percent in 1988. Ten years before, only 47 percent of the people interviewed, had heard of the fruit. In spite of this high degree of "fame" reached nowadays, the percentage of people having tasted the avocado is still relatively low. It has reached 60 percent in 1988 compared to 21 percent in 1978. In France however, promotion and intensive contacts to diverse ethnic origins which emigrated to France, resulted very early in a confrontation with unknown exotic fruits in general and avocados especially. Foreign consumption patterns were adopted and thus, high volume avocado imports from avocado producing countries were induced.

Different preferences in varieties have also been observed in several EC countries. Preferences exist due to a different assessment of the quality of a product. According to Kader (1984), quality can be defined as a combination of attributes that give each commodity a value in terms of human food. The consumer judges the quality of a fruit on the basis of the external appearance including shape, size and colour of the fruit as well as the firmness at the time of purchase. Empirical evidence of this observation is given by the fact that the dark coloured, coarse-skinned avocado variety "Hass" is, due

to its appearance, not very popular in Germany, irrespective of its taste[4]. Consumers in other EC countries however judge avocado varieties in a different way. In France for example, "Hass" has become a very popular variety.

FIGURE 2: Avocado consumption in the EC, 1975-1992
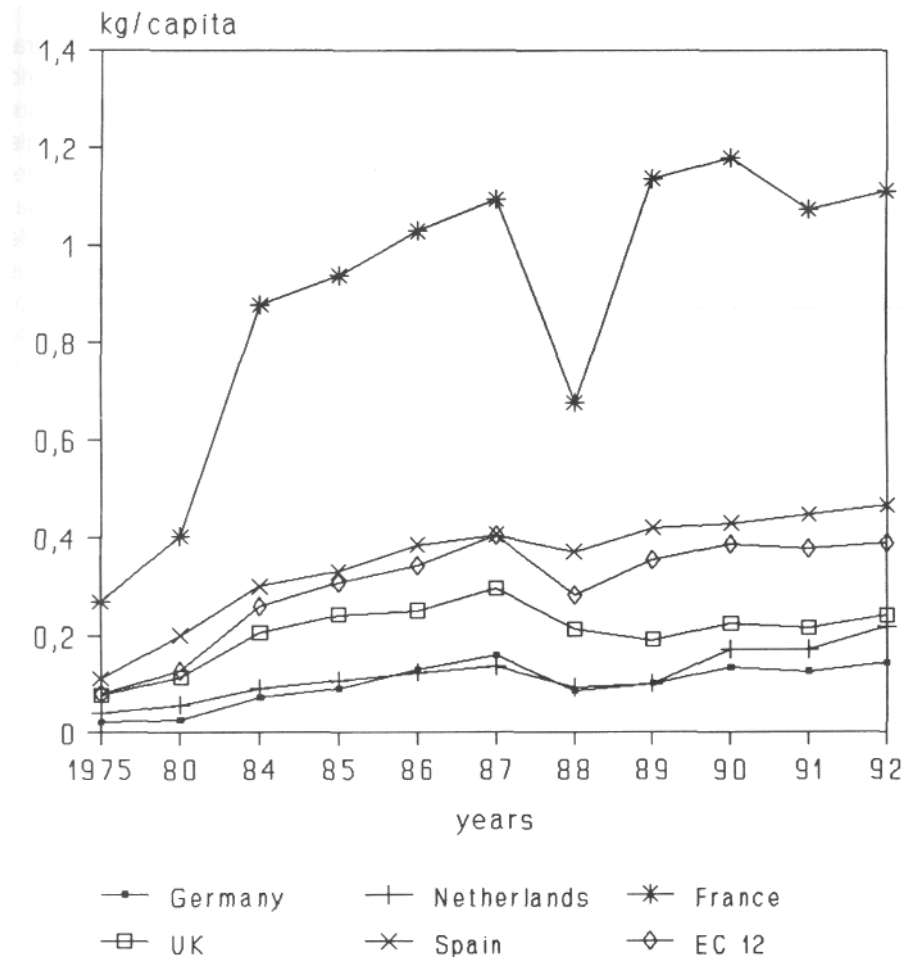
Apart from the consideration of the external quality characteristics, the internal values of the products comprising taste, texture as well as the composition in terms of valuable components such as minerals and vitamins are increasingly important. Consumers also pay attention to food safety, i.e. toxicity and contamination with chemical residues or heavy metals. However, trends towards healthier food, i.e. fruits or vegetables and the consciousness for the internal quality of a product are quite differently developed and are responsible for different consumption patterns and levels within the EC.

Analysing the relationship between the price and the consumption for exotic fruit in a formal way is problematic, due to a paucity of statistical information. The lack of adequate time series data of relevant variables does not allow any econometric analysis. Blanco Redio (1984) derived estimations of price elasticities of demand for the EC as a whole. However, his estimations did not portray consumer demand, but rather

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[4] This is the result of a questionnaire, carried out by one of the authors at the end of 1992.

a miss-specified import demand (Hallam and Molina, 1988); this illustrates the difficulty of econometrically analysing the exotic fruit demand. However, from figures derived for France and Germany, it is clear that avocado prices are very trade volume responsive.

It must be noted that results from any demand analysis for a relatively unknown exotic fruit cannot be seen as replica of the true situation. As long as consumers do not recognize what the "right" price is, they may not respond to price reductions. A survey showed that 50 percent of supermarket customers were unaware of fresh fruit prices (The Grocer, 1985). In general, the green grocers and street traders feel that they can ask "any" price, since few constant consumers are prepared to pay "anything". Only when the idea of the "right" price will develop, econometric analysis, testing for price, income, regional differences and cross-price effects become viable.

3. STRUCTURE AND DEVELOPMENT OF TRADE INTENSITIES

From the above, a high concentration in avocado trade has been identified with France playing a major role as an importer and a distributor. Little is, however, said about the intensities of trade relations between individual countries and their developments. In this section, the structure of trade intensities is presented and specific focus is given to the important role

France is playing in the market. Furthermore, some aspects of recent changes with regard to avocado production in the EC are given.

3.1 Structure of trade intensities

For analysing bilateral trade intensities, different methods can be used, i.e. the Markov Model describing probabilities of changing market shares (Wilson, Koo, Carter and Tedros, 1987), the Constant Market

Share analysis to determine relative market shares (Richardson, 1971), the Iterative Proportional Fitting Procedure (IPFP) and the Delta Coefficient of which the latter two measure the trade intensity.

From the above methods, the IPFP coefficient has been chosen to present the trade intensities between the most important avocado trading partners, because the structure of trade is best analysed with this method (Becker, 1988).

An IPFP-coefficient larger than 1 indicates relatively intensive trade relations between the importing and the exporting country while a coefficient smaller than 1 indicates the opposite trend[5].

Average coefficients for the years 1990 to 1992 have been calculated for the most important EC countries involved in avocado trade (Table 3).

It can be seen that Germany has very intensive trade relations with re-exporters of avocados, namely the Netherlands and France. Geographic proximity might be the reason for these relatively high trade intensities. Besides this, Kenya is a close trading partner for Germany. The Netherlands, however, encouraged closer trading relations

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[5] Further details as regards the calculation and the importance of different coefficients will be given in the following chapter 3.2. It should be noted however, that the IPFP coefficient is no measure of absolute values but of relative trade intensity.

especially to South Africa and Mexico followed by Kenya and the United Kingdom. Worth mentioning is also France as an exporting trading partner of the Netherlands in avocado trade. France has very close relations with Israel. Further partners in avocado trade are Mexico and South Africa. Within the EC, only Spain has gained some importance. The United Kingdom has intensive trade relations with countries summarized under the term "others" which include the USA, Brazil, Canary Islands, Jamaica and Australia. Apart from Spain, the non-EC-countries Israel, South Africa and Mexico are of some relevance in avocado trade for the United Kingdom.

TABLE 3: IPFP measurements of EC avocado importers and exporters, 3-years-average (1990-1992)

Export country	Import country			
	Germany	Netherlands	France	U.K.
France	2.36	1.25	0.00	0.46
Netherlands	3.33	0.00	0.60	0.29
Spain	0.57	0.99	1.85	1.44
Kenya	1.70	1.61	0.59	0.99
South Africa	0.36	2.28	1.15	1.21
Mexico	0.01	1.97	1.40	1.08
Israel	0.49	0.20	2.75	1.33
U.K.	0.00	1.61	0.29	0.00
Other	0.17	0.56	0.36	2.18

Source: Own calculations.

From Table 3 it can be summarized that each one of the listed EC countries shows preferences regarding close trading partners. Some of the intensive trade relations are based on geographic proximity while others exist for traditional reasons. From the above it is clear, that France plays a major role in the avocado market. This is the reason why further analysis only discusses France and not the Netherlands, the United Kingdom or Germany.

3.2 The importance of France on the European avocado market

Special emphasis must be laid on France playing a crucial role in avocado trade. Different coefficients have been calculated for presenting the trade relations between France and other main trading partners. The results are summarized in Table 4.

For each country, the first line (trade) indicates the development of trade volumes in absolute terms. The other lines describe different coefficients which will be explained below.

The alpha-concept sets the bilateral trade flow in relation to the total world trade. Probability statements about the relative importance of each single import or export flow

can be made. However, this concept contains relatively little information about the trade structure. Additional information is needed about the total export or import volume of a country in order to be able to estimate the relative importance of each single flow.

TABLE 4:
Development of trade intensities between France and other countries over time, 1975-92

| Export country | Measurement | Avocados for France | | | | | | | | CV[1] |
		1975	1980	1984	1988	1989	1990	1991	1992	
Spain	Trade[2]	1	1552	5136	12800	8556	15377	14144	17003	0.65
	Alpha	0.00	0.02	0.07	0.16	0.11	0.20	0.18	0.22	0.64
	Beta	0.00	0.07	0.10	0.25	0.12	0.20	0.19	0.23	0.57
	Beta*	3.31	16.51	23.89	27.19	19.02	22.31	20.99	18.33	0.38
	Gamma	0.50	0.72	0.86	0.88	0.83	0.86	0.91	0.86	0.16
	IPFP	0.30	1.48	2.07	2.45	1.71	2.01	1.88	1.65	0.35
	Delta	0.00	2.36	1.28	1.35	0.87	0.86	0.93	0.90	0.58
	Gamma*	6.08	29.71	43.03	48.94	34.24	40.16	37.60	33.00	0.35
South Africa	Trade	3026	6755	4277	12915	22292	17638	16700	14245	0.53
	Alpha	0.04	0.09	0.06	0.17	0.29	0.23	0.22	0.18	0.52
	Beta	0.20	0.29	0.08	0.26	0.30	0.23	0.22	0.19	0.29
	Beta*	20.60	13.38	6.44	15.72	17.03	13.41	8.61	16.47	0.32
	Gamma	0.59	0.64	0.59	0.68	0.76	0.84	0.72	0.63	0.12
	IPFP	1.85	1.21	0.58	1.41	1.53	1.21	0.77	1.48	0.31
	Delta	3.11	2.11	0.88	1.04	0.80	0.83	0.74	0.65	0.20
	Gamma*	37.00	24.12	11.60	28.24	30.62	24.12	15.48	29.64	0.31
Israel	Trade	9996	11556	31387	9184	18455	30760	32672	27224	0.45
	Alpha	0.13	0.15	0.44	0.12	0.24	0.40	0.42	0.35	0.45
	Beta	0.68	0.49	0.60	0.18	0.25	0.39	0.43	0.36	0.37
	Beta	29.20	23.93	9.58	9.68	21.66	35.18	38.81	17.81	0.44
	Gamma	0.75	0.82	0.74	0.58	0.85	0.96	0.95	0.94	0.15
	IPFP	2.63	2.69	0.86	0.87	1.95	3.17	3.49	1.60	0.43
	Delta	3.97	2.70	1.10	0.89	0.89	0.99	0.97	0.98	0.69
	Gamma	52.80	53.82	17.24	17.40	38.99	63.33	69.84	32.04	0.43
Mexico	Trade	0	465	0	5996	6221	8117	7235	8577	0.77
	Alpha		0.01		0.08	0.08	0.10	0.09	0.11	0.77
	Beta		0.02		0.12	0.08	0.10	0.09	0.12	0.72
	Beta*		29.86		18.72	8.34	12.12	20.31	14.26	0.53
	Gamma		0.92		0.75	0.67	0.74	0.93	0.93	0.60
	IPFP		2.68		1.68	0.75	1.09	1.83	1.28	0.73
	Delta		3.02		1.14	0.70	0.74	0.95	0.96	0.94
	Gamma*		53.75		33.69	15.01	21.82	36.56	25.67	0.74
Kenya	Trade	70	207	490	1294	1194	1252	2022	4010	0.90
	Alpha	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.05	0.91
	Beta	0.00	0.01	0.01	0.03	0.02	0.02	0.03	0.05	0.80
	Beta*	5.87	1.31	1.47	5.12	4.37	4.11	5.25	10.37	0.60
	Gamma	0.25	0.37	0.39	0.41	0.42	0.44	0.59	0.72	0.30
	IPFP	0.53	0.12	0.13	0.46	0.39	0.37	0.47	0.93	0.56
	Delta	1.32	1.21	0.58	0.62	0.44	0.45	0.61	0.75	0.42
	Gamma*	10.60	2.34	2.64	9.22	7.86	7.38	9.46	18.66	0.56

1. CV: coefficient of variation as indicator of instability   Source: Own calculations.
2. Trade volume in tonnes

The next two concepts calculate market shares:

The beta-concept sets the bilateral imports or exports of a country in relation to the total imports or exports of that country. Thus, statements can be made about the relative importance of an individual exporting country for the importing country. By this standardization, the importers are put on an "equal importer basis" since the interconnections are only measured on the import side.

The gamma-concept is equal to the beta-concept, however, referring to the export side. Information about the relative importance of individual importing countries for the exporting country is given. The exporters are put on an "equal exporter basis".

All three concepts are one-sided orientated and can be summarized to the **delta coefficient**[6] which is defined as the ratio between actual bilateral trade and the trade which would occur if source and destination were statistically independent. Like the IPFP, a coefficient bigger than 1 indicates relatively intensive trade relations between an importing and an exporting country, while a coefficient smaller than 1 indicates the opposite trend.

The alpha-, beta-, gamma-and delta-coefficients can be interpreted as traditional and very popular methods for analysing trade flows. However, Becker (1988) determined that the delta coefficient is not suitable to measure trade intensities over time, because they are not all distributed over the same range. He proposed the use of the IPFP method.

The **IPFP coefficient** can be interpreted as the relatively bilateral trade intensity. The method calculates the ratio between the iteratively determined "normalised" trade flow and the iteratively determined "normalised" flow which would occur if the source and destination countries were statistically independent. The latter can be interpreted in the same way as the delta coefficient, but has the advantage that they can be compared with each other, and can therefore be used to analyse the development of the structure of trade (Becker, 1989) of exotic fruit with the example of avocados in the EC. For a detailed discussion of the IPFP method, refer to Becker (1988).

The following two coefficients have been calculated on the basis of the IPFP method:

Firstly, the **beta* coefficient** has been developed. It indicates the relative importance of an individual exporting country for an importing country like the beta-concept but its calculation is based on the IPFP method.

Secondly, the **gamma* coefficient** equally considers the export side and can be compared with the gamma-concept.

Finally, the **coefficient of variation** (CV) has been calculated for each value line. Being a relative measure, it allows the comparison of variations of characteristics with different means to illustrate the importance of continuity.

Considering, for example, the trade relations between South Africa and France

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[6]

The delta coefficient summarizes the alpha-, beta-, and gamma-coefficient as follows: $\delta_{ij} = \dfrac{\beta_{ij} * \tau_{ij}}{\alpha_{ij}}$

compared with other countries, the following statements can be made:

South Africa is one of the main avocado exporters to France with an export volume of about 14,000 tons in 1992. Since 1975, the export volumes of South Africa increased significantly with a peak in 1989. Since then, a continuous decline of exports, due to drought, can be observed.

Similarly, the alpha coefficient indicates that with a probability of almost 20 percent, one unit of the considered trade will go from South Africa to France. Compared with other exporting countries, the exports developed rather steadily and the alpha coefficient varied relatively little over time with a coefficient of variation reaching a value of 0.5. For Kenya, for example, a variation coefficient of 0.9 has been calculated indicating relatively strong variations of the export volumes over time. However, export volumes in absolute terms must be considered too, because the export volume of Kenya is on a much lower level than the one from South Africa so that relatively little variation already affects the results significantly.

The beta coefficient also reaches a value of almost 20 percent in 1992, but with a much lower variation (CV: 0.29) than the alpha coefficient. This means that the relative importance of South Africa as an exporting country to France, varied less than the development of the avocado export volumes over time. A deviation between the alpha- and beta-coefficient can also be found for most of the other countries, although it is less distinct.

The value of the beta* coefficient, being of a similar meaning as the beta-concept but being calculated on a different basis to compare changes over time, indicates a slightly higher variation for South Africa and Israel. For the other exporting countries, the opposite can be identified. It cannot be concluded that the CV of the beta* coefficient is generally lower or higher than of the beta coefficient. However, considering the calculation process of the beta* coefficient based on the IPFP, it is assumed that its CV yields a more realistic picture of the situation.

The gamma and the gamma* coefficients can be interpreted simultaneously with the beta and beta* coefficients while the delta coefficient is comparable with the IPFP.

Finally, the development of the IPFP coefficient is of interest. Considering trade intensities over time, the following conclusions can be drawn:

Trade relations between France and South Africa used to be quite intensive over time, ignoring the exceptional years like 1984 and 1991. A similar trend can be observed for Israel and Mexico. Trade intensities with Spain and Kenya are still slightly lower than 1, but they increased in the last decade until 1992. The trade intensities of Spain are very high and its role in the avocado trade will be discussed in the next section.

3.3 The role of Spain

Considering the impact of avocado growing in Spain, being a member of the EC since 1986, the following statements can be made:

Since the beginning of the eighties, Spain entered the avocado market as a producer. Since then, the production in Spain increased significantly. Today, Spain has become a major participant in the avocado markets. In the past three years, Spain's contribution to

the supply of the EC market was 20 percent and it imported, especially from France, more than one percent of the EC avocados in its own off-season. Besides France, Spain's second partner is the United Kingdom. Trade with other countries is very limited. From the IPFP analysis for Spain (not presented), it is evident that the Spanish trading intensities increased towards France, while those to the United Kingdom decreased.

The competitiveness of an avocado exporting country, having a determining influence on the trade intensities, does not only depend on factors like geographic distance, the existence of related social and cultural as well as trade, political and economic systems. It is also determined by natural factors like the seasonality of production.

So far, no attention has been paid to the seasonality of production. The main season for avocado production in Spain ranges from October to April. A similar season can be found for Israel from October to May. Mexico and Kenya, however, supply the West-European markets mainly at the beginning and in the middle of the year, namely from March to August. In South Africa, avocados are produced during the period of March to December. Considering these different seasons, Spain is in direct competition with Israel. However, a strong impact on the supply of avocados from Israel cannot be found. Instead, increasing export volumes from both countries can be observed over time. Cuts in supply appeared in the countries but only due to drought. It can be observed that the producing countries try to find new varieties, to fill their production gaps during the year. Israel has already successfully supplied some markets with six different varieties during the whole year (Liebster, 1990).

Favourable for the position of Spain are not only the relatively low transportation costs, but also the status of being an EC member. Spain and Greece as EC producers are exempt from any tariffs. As a matter of fact, no tariffs have to be paid on Spanish avocados being marketed within the EC. Besides EC producers no import tariffs have to be paid by ACP countries and from Israel, if a certificate of origin can be produced. Further preferences exist for a number of developing countries. According to the 'Generalized System of Preferences', about 130 countries have to pay 6 percent. Normally, an import tariff of 8 percent is raised on avocados, i.e. from South Africa. Apart from these tariffs, non-tariff barriers regarding prescribed quality standards regulate the avocado import. The establishment of further barriers for avocado trade in order to protect EC avocado growers against further competition from non-EC-countries (i.e. countries competing in the same season) cannot be completely excluded, considering the trends in the CAP, i.e. the edict of the recent banana market regulation.

In the long run, Spain is expected to strengthen its position as an avocado grower and exporter. Depending on the development of future demand, other countries will most likely be affected by the increasing supply from Spain.

4. PROSPECTS FOR THE AVOCADO MARKET IN THE EC

As could be seen from Figure 2, the upward trend in avocado consumption slightly weakened in the last few years. In some EC countries, the per capita consumption even seemed to stagnate. However, significant differences with regard to consumption levels exist between various EC countries. Therefore, prospects for further growth of the per capita consumption are generally considered to be favourable in a number of EC countries. Due to the wider interest in healthier eating, i.e. fruit and vegetables, it is

expected that consumption of all fresh fruit will grow, but it seems likely that an increasing proportion of this will be accounted for by exotic's including avocados. In fact, the avocado already belongs to the basic fruit sortiment.

Two changes, namely a further decreasing price and/or intensified promotion might stimulate the consumption of avocados again. Supposing that the growing production of avocados will continue, the avocado prices are likely to decrease in the future. However, it cannot be expected that a slightly lower price will lead to an increased per capita consumption. Many consumers still feel uncertain with regard to ripeness and use of the fruit. Therefore, to stimulate the demand, avocado promotion will play an important role in the future.

On the supply side, a positive import trend is expected. According to the results of a questionnaire of almost 30 fruit importing and trading companies being held in Germany at the end of 1992, a growth rate of up to 5 percent on the avocado market is likely to appear in the future. A problem of availability of fresh avocados is even mentioned by the importers interviewed. It can be assumed that Spain will expand its avocado production and will become a dangerous competitor to other exporters. As a consequence, the viability of producing avocados for the EC market in distant countries might be reduced. Next to Spain, it is expected that France being a major consumer of avocados within the EC will strengthen its position as an avocado trader due to geographic and traditional reasons.

5. SUMMARY

The consumption of avocados is mostly influenced by economic growth, cultural factors and nutritional knowledge. The European population has shown increased consciousness of health and nutritional values associated with fruits and vegetables. The demand for avocados within the EC is mainly supplied by five producing countries, namely Israel, South Africa, Spain, Mexico and Kenya. It has been found that these countries export their avocados to a small number of countries. Regional concentration seems to even increase over time. Most of the avocados designated for Europe go to France. Worth mentioning are also the United Kingdom, Germany and the Netherlands. Until the end of the eighties, the Netherlands still used to be the major supplier for selected West-European avocado markets by re-exports. Now, France has become the major distributor of avocados within the EC.

The limited availability of avocados in the EC, different cost structures and varying consumption patterns have been identified as factors having determining influence on the intra-and inter-industrial trade. Furthermore, the structure and development of trade intensities have been investigated by means of different coefficients. Special emphasis has been put on France and Spain, both playing a crucial role in the avocado trade. For France, close and growing relative trade intensities have been identified with several exporting countries. Spain was taken in consideration in order to determine its present and future role in avocado trade. In the long run, Spain is expected to strengthen its position as an avocado grower and exporter. Depending on the development of future demand, other countries are likely to be more or less affected by the increasing supply from Spain.

Revealed EC preference for avocados depends on the accessibility on the EC market

and is affected by (1) the self-sufficiency of the domestic (EC) production, (2) the interest in tropical and off-season fresh fruit and (3) the ability of the marketing system to make product deliveries on required schedules and at given quality standards. Growth of exports to the EC could not be associated with EC trade policy, i.e. border measures. The prospects for the West European avocado market are generally still considered to be favourable.

REFERENCES:

ALVAREZ-COQUE, J.M.G. & BANTISTA, R.M. Sources of EC horticultural import growth from developing countries. *Unpublished note.* Department of Economics and Social Sciences. University of Valencia, Valencia.

ALVENSLEBEN, R.V. & MEIER T. 1989. erbrauchereinstellun-gen zu Obst, insbesondere zu exotischen Früchten und Äpfeln. Hannover

ALVENSLEBEN, R.V., BEHR, H.C. & JAHN, H.H. 1986. Fruits and vegetables in the European Community. In: *M.D. Bale (ed) Horticultural trade of the expanded EC: Implications for Mediterranean countries.* World Bank. Washington D.C.

BECKER, T. 1989. Die Weizenexportpolitik der Europäischen Gemeinschaft. *Agrarwirtschaft, Sonderheft 121,* Hamburg,

ECKER, T. 1988. Zur Analyse von Handelsstruturmatrizen. *Staff paper No.63,* University of Kiel, Kiel

BLANCO-REDIO, E. 1984. An analysis of the future markets for tropical fruits in the EC. University of Cambridge, Cambridge

BURMESTER, B. 1990. Analyse des innergemeinschaftlichen Handels mit Milch und Milcherzeugnissen. Kiel

European Community, *Eurostat.* Brüssels, diverse years.

FAO, *Trade yearbook.* Rome, diverse years.

GRUBEL, H.G. & LLOYD P.J. 1975.Intra-industry trade. *The theory and measurement of international trade in differentiated products.* London, New York

HALLAM, D. & MOLINA J.P. 1988. The United Kingdom market for fresh exotic fruit. *ODNRI, Bulletin No.13,* London

HÖRMANN, D.M. & WILL M. 1987. The market for selected fresh tropical fruits from Kenya in Western European countries. Hannover

Interfel, Bilan 1992 1993. Fruits et légumes. *Supplément é Fel actualités hebdo.,* Paris

KADER, A.A. 1984. Quality in relations to marketability of fresh fruits and vegetables. In: *Marketing California food commodities in the future.* University of California, Davis

LIEBSTER, G. 1990. Warenkunde Obst und Gemüse, Hamburg

RICHARDSON, J.D. 1971. Some sensitivity tests for a constant market share analysis of export growth. In: *Review of Economics and Statistics. Vol.53, No.3,* p.300 - 304.

ROMAN, F.L. 1989. Barriers to agricultural exports and the high-value product: Problems and opportunities for the Philippine mango industry. Harvard University

ROSE, K. 1981.Theorie der Außenwirtschaft. Munich

The Economist, 10/87. Avocados, World production. In: *The Economist.*

The Grocer, 30/11/1985, *The grocer.* p.50.

WILSON, W.W., KOO, W.W., CARTER, C.A. & TEDROS, Y. 3/1987, Import locality in international wheat markets. In: *Canadian Journal of Agricultural Economics. Vol.34,* p.295 - 305.

ZMP, *ZMP Bilanz-Obst,* Bonn, diverse years.