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COMMITTEE ON COMMODITY PROBLEMS

JOINT MEETING OF THE FOURTH SESSION OF THE SUB-GROUP ON BANANAS AND THE FIFTH SESSION OF THE SUB-GROUP ON TROPICAL FRUITS

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PRODUCT SEGMENTATION AND MARKET PERSPECTIVES IN THE EUROPEAN COMMUNITY AND THE UNITED STATES AVOCADO MARKETS

I. INTRODUCTION

1. At its Fourth Session, the Sub-Group on Tropical Fruits recommended that the Secretariat prepare a study on segmentation of major avocado markets. This document analyses the main features of transactions recorded in the two major avocado markets, the European Community (EC) and the United States (US), identifying factors which affect price formation. This provides an insight into the characteristics of the markets and the grounds in which major avocado markets are segmented. In turn, this can support export promotion and the identification of export strategies. Delegates are invited to review the document, share their experiences, and indicate whether similar market studies of other fruits are required.

2. The relationship between product characteristics and price is analyzed through the hedonic price approach, which highlights the attributes that are more rewarded by the market, assuming that consumer preferences are defined in terms of attributes of the goods. The market price of the goods can be defined in terms of a combination of implicit prices of the individual attributes.

II. WORLD ADVOCATO MARKETS

A. PRODUCTION AND CONSUMPTION

3. According to FAO estimates, world production of avocados has increased more than four-fold over the last 4 decades, reaching an annual average of about 3.6 million tonnes in recent years (Table 1) and a value of over US$2.3 billion in 2007. On the supply side, major producers have shown considerable increases in yields, following the spread of hybrid varieties originating from the Mexican, Guatemalan and West Indian varieties, accompanied by enlarged growing areas, particularly in Latin America and Asia. Latin America and the Caribbean are the largest

producing regions, but growth in Asia has accelerated in recent years, particularly in Indonesia and China.

4. Major avocado consumers include some of the most important producers (Table 2). Over the last decade, world total utilization has increased by over 30 percent, due mainly to the expansion in major emerging markets, particularly Brazil, Colombia, China and Chile, as well as in many developed markets, such as the EC and Australia. Per capita consumption, however, is highest in Latin America. Market drivers on the demand side have been principally human consumption of fresh and processed products, the result of consumers' enhanced awareness of the fruit nutritional properties, together with the utilization in the cosmetic industry as a consequence of the growing demand for natural based product components.

B. INTERNATIONAL TRADE

5. Avocado exports are fairly concentrated (Table 3), with the first 10 exporters accounting for over 90 percent of the world market. Total trade has increase by more then three times since the early 1990s, due to significant increases in exports from Mexico, Chile, Ecuador, Peru, South Africa and the Dominican Republic.

6. About eighteen percent of global avocado production is traded internationally, with most of the major exporters shipping less than 10 percent of their output. Production is export-oriented especially in Chile, South Africa, Israel and Spain.

7. The market is only slightly less concentrated on the import side (Table 4), with the 10 most important players accounting for 85 percent of imports. The US is the largest importer, followed by France, the Netherlands and the UK.

C. PRODUCER PRICES

8. At the farm level, prices show a high degree of differentiation among major producing countries. Since the early 1990s (Graph 3), for instance, producer prices have been around US$500 per tonne in Mexico, while prices in the US, Australia and Spain were often 3 times higher. In Ecuador and Cameroon there has been an increase during the last years, but until the early 2000s farmers seldom received more than the equivalent of US$100 per tonne. Such differences are related to production costs, physical distance from major markets and infrastructural gaps.

9. Nominal prices in local currencies show considerable variability (Table 5). Over the last years they have been increasing in major producers, such as Mexico, Indonesia, South Africa, Israel, Ecuador, Cameroon and Australia.

III. SEGMENTATION IN THE EC AND US AVOCADO MARKETS

A. MAJOR SUPPLIERS

10. Important suppliers to the EC market are South Africa, Kenya and Israel, as well as Mexico. Spain is the largest avocado producer in the EC, followed by Greece. The EC maintains a seasonal import tariff of 4 percent from 1 December to 31 May and of 5.1 percent in the remaining months.

11. The US market is mainly supplied by domestic production, particularly from the States of California and Florida, which together account for about 60 percent of domestic consumption. Chile is among the major exporters to the US market, followed by Mexico and the Dominican Republic. The US has a long standing domestic avocado policy since the beginning of the 20th century, and in 2000, the *Haas Avocado Promotion Research and Information Act* was promulgated.

B. MARKET SEGMENTATION

12. Both the US and the EC avocado show a considerable degree of product differentiation and market segmentation. Markets are mainly segmented by varieties. Hass avocados are significantly different from other varieties, which are referred to as "green", and include Fuerte, Ettinger and Pinkerton among the most common. Hass avocados are usually larger, and highly demanded by consumers. They dominate international trade.

13. Organic avocados attract a price premium above the traditionally produced avocado, and constitute a separate market. In the EC they yield a price mark up varying from 34 percent at the farm gate level, to 88 percent at FOB; at the retail level, the average difference was reported at 56 percent. In the US, the price mark up of organic products is reported to vary from 55 percent at the farm gate level, to 87 percent at wholesale, and 61 percent at the retail level. In the EC, the organic market was estimated at about 4 500 tonnes in 2003; in the US estimates pointed to about 10 000 tonnes in the same period[1].

14. Further insights into the segmentation of the EC and US avocado markets can be gained by analyzing prices with the hedonic price approach. Within this approach, prices are considered as dependent variables in a regression whose explanatory variables are quality attributes. Details of this analysis are reported in document CCP:BA/TF 09/CRS 3. Results are summarized in Table 6, which indicates the explanatory variables employed in the analysis.

15. Prices in the US market mainly depend upon the variety, the packaging, and the area of origin and the season, while in the EC they depend on the origin, the EC destination market and the variety.

16. The size of the fruits has a relatively weak effect on the price, both in the US, and the EC. As indicated by a number of market experts, avocados are not sold by weight, but by count, especially in the US. Moreover, despite a high variability in fruit size, the price per individual fruit would explain more than 90 percent of the variability in the price per tonne, both in the EC and the US.

17. European consumers show a weak preference for large fruits, and in terms of origin, Kenyan avocados are priced below imports from Mexico, Spain and South Africa. A higher price is also yielded by products shipped by air. Among varieties, Haas receives a price premium of approximately 12 percent, while imports of Fuerte receives a price which is 5 to 10 percent below the average.

18. Sales in France imply a higher price compared to the rest of the EC. Dummy variables for the months in which sale takes place indicate that prices are slightly lower than the average in October and November, and higher in March, August and September.

19. The analysis for the EC market also considered a variable called "market share ratio", which is the ratio of the share of import from one origin in total EC imports and the share of the EC destination market in total EC imports. This indicates the relative size of the origin market with respect to the destination market, and aims at capturing the extent to which the price is affected if a sale takes place in a small market, whose characteristics resemble those of a niche. The market share ratio shows the expected positive relation with prices, indicating that smaller destination markets would yield higher prices. In the data, this accounts for a price difference which may reach 40 percent.

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[1] See evidence in Centro de Inteligencia sobre Mercados Sostenibles (CIMS), *Análisis del mercado de aguacate convencional y orgánico en la Unión Europea*, INCAE, Costa Rica, 2003, and Centro de Inteligencia sobre Mercados Sostenibles (CIMS), *Análisis del mercado de aguacate convencional y orgánico en los Estados Unidos*, INCAE, Costa Rica, 2003b.

20. In the US, the price per tonne of fruit is determined by packaging, particularly for products sold in four-fifths of a bushel compared to those traded in standard two-layer boxes. Also the one-layer packaging shows a positive and statistically significant price difference in this model.

21. Products from Florida show a lower price per tonne compared to other US origins, while products from the Dominican Republic and California, show a higher price compared to other origins. Hass avocados yield higher prices compared to *green* varieties in the US market.

22. Seasonality in the US appears more pronounced than in the EC. Higher prices appear especially from February to July and lower prices in the other months, particularly in December. Most differences range between 10 and 15 percent above the average, with a maximum of 30 percent in June.

IV. CONCLUSIONS AND RECOMMENDATIONS

23. The evidence on avocado markets over the last decade shows that this product is relatively dynamic. Output has accelerated in major producing countries, especially in developing countries. Consumption has also expanded rapidly, particularly in major developed countries, and especially in Europe. This has brought about an expansion in trade. These trends are expected to continue in the future.

24. The differentiation observed in producer prices indicates the presence of a wide array of production conditions and costs, on one hand, and of the existence of widely diversified product qualities, on the other. In turn, this implies that there may be room for improvement in production, marketing and export performances among the traditional producers, especially in the developing countries, aimed at gaining higher value shares of what consumers pay in large consumption markets.

25. The analysis of the EC and US markets has provided insights that might be useful in the definition of export strategies. In the EC, the higher price yielded by sales in France most probably reflects the quality of fruits sold. Consumers in this country value the quality of avocados more than those in other EC countries, while the tendency for prices to be relatively higher in relatively smaller markets, is probably due to the reduced familiarity of consumers in these countries, where avocado is still perceived as an *exotic* fruit, which is consumed occasionally. Other results of the analysis are consistent with this view, namely the less pronounced seasonality compared to the US market, and the smaller difference between varieties, which also can stem from the *exotic* characteristic.

26. This picture indicates the existence of a potential for widening consumption in the EC countries where it is marginal today, especially if consumers become more aware of the desirable nutritional and industrial properties of avocadoes. These properties have been major drivers of consumption growth over the last decade, and could be used for promotional campaigns to expand consumption and contribute to expanding export opportunities.

27. In the US market, Californian products together with imports from the Dominican Republic appear to fetch higher prices than avocados from Florida, which comprises mostly green varieties. Packaging also emerged as an important determinant of the price; consumers probably perceive quality in association with smaller packages and bigger fruits. In terms of seasonality, the stronger impact of seasonality on price in comparison with the EC, is consistent with the greater importance of local production in total supply.

28. A deeper analysis may be devoted to understand whether some of characteristics of the green varieties may be of interest to consumers. If so, there may be market opportunities for these varieties both in the US and the EC markets.

29. It would also be worthwhile to undertake a deeper analysis of Kenyan exports in the EC market, given the evidence showing that products from this source yield relatively lower prices.

Table. 1 World production of Avocados (thousand tons)

	1961-64	1971-74	1981-84	1991-94	2001-04	2006-07
Mexico	120.7	254.6	453.2	753.5	980.5	1138.6
Indonesia	31.3	39.9	56.9	95.2	226.5	220.5
United States of America	47.0	67.1	209.3	180.4	195.2	217.6
Brazil	94.2	151.0	141.9	107.9	168.5	159.3
Colombia	12.2	13.2	19.9	73.5	149.6	177.0
Dominican Republic	109.8	125.8	134.7	141.7	137.1	200.0
Chile	9.4	13.1	28.5	46.8	127.5	235.0
Spain	0.4	1.6	17.4	47.8	113.1	99.9
Peru	21.7	102.4	80.9	81.9	94.4	117.5
Ethiopia	n.a.	n.a.	n.a.	n.a.	80.4	44.9
China, Mainland	n.a.	n.a.	n.a.	17.0	78.6	91.0
Israel	1.3	11.7	40.6	56.1	75.5	85.4
South Africa	4.7	10.9	23.0	44.4	67.3	63.3
Congo, Dem Republic	13.0	20.3	38.5	41.3	60.9	62.7
Cameroon	13.0	17.0	26.5	41.0	51.8	55.0
Venezuela	53.9	42.6	45.6	49.3	49.6	71.0
Haiti	40.8	51.0	61.8	48.0	45.0	42.5
El Salvador	17.7	25.6	33.1	40.0	40.0	1.9
Philippines	13.7	18.3	23.2	36.3	38.3	25.3
Australia	0.5	0.8	4.4	12.8	34.8	40.8
others	136.1	154.4	171.2	184.5	207.3	433.5
total	741.1	1121.2	1610.4	2099.2	3022.0	3582.8

source: FAOSTAT

Table 2. World consumption of Avocados (thousand tons)

	1961-62	1971-72	1981-82	1991-92	2001-02	2007-08
Mexico	99.4	212.0	425.6	662.3	745.7	1100.1
United States of America	46.9	56.9	168.4	217.5	265.4	432.6
Brazil	70.5	137.8	110.6	88.6	130.7	
Indonesia	27.0	28.8	55.6	83.1	131.7	
Colombia	10.3	11.1	14.8	64.4	125.7	
Dominican Republic	87.5	99.8	109.7	112.1	95.2	
Ethiopia	n.a.	n.a.	n.a.	n.a.	79.4	
China, Mainland	n.a.	n.a.	n.a.	9.0	74.8	
Peru	17.1	85.2	46.5	47.4	66.7	
France	0.2	4.7	29.6	60.4	65.8	
Congo, Dem Republic of	11.2	15.4	30.0	32.6	48.6	
Cameroon	11.3	16.9	22.8	35.1	45.9	
El Salvador	16.0	22.8	32.6	40.5	45.1	
Venezuela	45.7	35.3	38.6	43.4	41.1	
Chile	7.6	10.8	23.8	22.7	37.9	190.5
Philippines	12.5	17.0	23.9	31.8	35.7	
Haiti	30.0	37.1	45.0	38.3	32.2	
Australia	0.4	0.9	2.9	14.0	28.0	
Costa Rica	9.7	17.6	22.2	20.8	27.2	
United Kingdom	0.0	3.4	8.2	14.7	24.3	
others	108.1	116.4	144.4	223.9	295.5	
total	611.4	929.8	1355.1	1862.4	2442.6	2621.7

sources: FAOSTAT and USDA

Table 3. World exports of Avocados (thousand tons)

	1971-73	1981-83	1991-93	2001-03	2004-07
Mexico	0.01	0.56	16.27	96.70	218.25
Chile	n.a.	0.01	12.09	77.01	163.42
Israel	6.92	34.66	36.80	44.71	43.41
South Africa	1.17	10.00	28.09	38.68	45.20
Dominican Republic	2.14	1.14	6.29	12.44	15.31
United States of Ameri	n.a.	11.55	10.48	8.85	7.18
EC-15 (excl. intra-trad	n.a.	n.a.	0.69	6.98	0.07
Ecuador	n.a.	n.a.	0.45	6.62	5.01
Peru	0.25	0.83	0.26	6.28	25.63
New Zealand	n.a.	0.05	1.77	5.86	9.51
Guatemala	1.10	3.95	1.02	4.44	4.81
Venezuela	n.a.	1.40	1.52	0.78	1.60
Argentina	n.a.	n.a.	0.21	0.71	1.48
Brazil	0.01	0.25	0.61	0.56	1.11
Dominica	0.07	0.03	0.39	0.46	0.48
Zimbabwe	n.a.	n.a.	n.a.	0.40	0.27
Australia	n.a.	n.a.	0.16	0.39	0.80
Morocco	0.05	0.09	0.02	0.34	0.29
others	1.00	1.67	3.20	3.54	114.76
total	12.74	70.71	164.16	387.89	658.59

source: FAOSTAT

Table 4. World imports of Avocados (thousand tons)

	1971-73	1981-83	1991-93	2001-03	2004-07
United States of America	n.a	1.0	16.5	111.2	237.8
France	6.0	40.6	82.0	95.8	102.9
United Kingdom	4.2	9.4	15.2	26.2	47.9
Netherlands	n.a	1.7	8.0	24.7	48.0
Japan	n.a	1.2	3.6	16.1	28.2
Canada	n.a	0.0	6.8	14.6	20.6
Germany	0.6	2.8	9.1	14.6	17.8
El Salvador	0.6	3.2	3.9	10.6	10.8
Colombia	n.a	n.a	3.1	9.4	15.6
Belgium	n.a	n.a	n.a	7.7	6.0
Spain	n.a	0.2	0.4	7.3	20.1
Costa Rica	n.a	0.1	n.a	6.2	7.3
Honduras	n.a	0.2	0.3	5.5	9.4
Sweden	n.a	1.5	4.1	5.0	7.8
Australia	n.a	n.a	1.7	4.8	8.0
Guatemala	n.a	n.a	n.a	3.9	3.4
Denmark	0.1	0.8	2.6	3.9	5.9
Switzerland	n.a	n.a	2.6	3.6	4.2
Norway	n.a	n.a	0.5	1.7	2.7
China, Hong Kong SAR	n.a	0.3	0.3	1.4	1.3
others	0.1	3.2	9.9	13.8	32.1
total	11.6	66.3	170.6	388.1	637.9

source: FAOSTAT

Table 5. Producer prices of Avocados in selected countries *local currencies, nominal, (1998=100)*

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Mexico	48	50	38	36	54	109	100	215	119	137	115	152	158	191	206
Indonesia	17	16	20	27	40	59	100	124	132	144	160	159	158	163	186
USA	68	26	114	89	83	92	100	139	125	118	136	119	115	80	98
Brazil	0	0	70	88	101	90	100	90	77	109	101	111	124	127	133
Dominican Republic	93	59	55	106	97	97	100	110	101	105	146	137	210	356	327
Chile	73	76	89	92	118	109	100	99	165	96	86		78	89	85
Spain	68	82	108	111	71	91	100	104	115	119	125	167	111	128	137
Israel	102	107	115	120	103	93	100	142	107	131	154	202	178	207	243
South Africa	93	114	103	135	109	129	100	88	87	111	127	162	162	122	148
Cameroon	109	109	123	98	104	94	100	100	78	55	127	113	130	156	163
Philippines	54	67	59	61	65	56	100	110	90	170	167	165	231	249	233
Australia	82	80	105	106	116	93	100	94	101	92	115	108	118	132	139
Ecuador	20	32	62	27	65	60	100	107	71	15	21	18	60	69	76
Venezuela,Bolivar Rep o	7	7	11	17	34	60	100	98	107	220	216	343	644	418	593

Source: FAOSTAT and IMF International Financial Statistics

Graph 1. Avocado producer prices in Us $ per ton

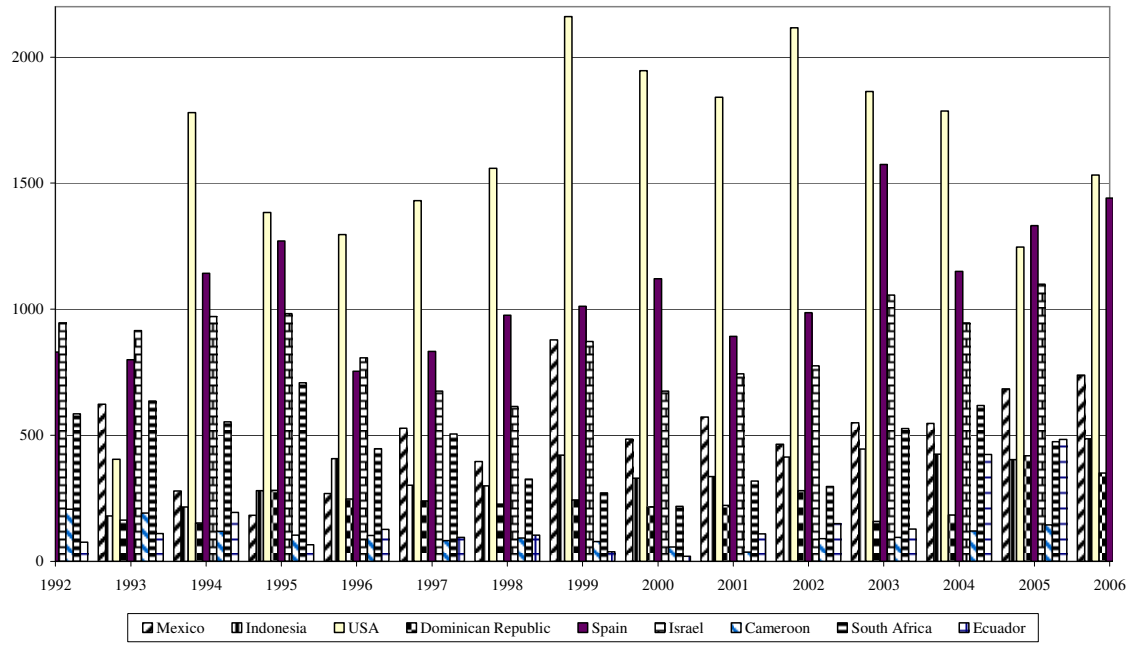

Table 6. Summary results of the hedonic model for the EU and the US

factors explaining price differences	EU market	US market
size of the price range	no effect on price	no effect on price
size of the fruit	positive effect on price	not significant
packaging	no information	higher prices for one-layer and 4/5 bushels
market share ratio	positive effect on price	no information
origin of the product	lower prices for African products, especially Kenyan	higher prices for Californian and Dominican Rep. products; lower prices for Florida products
variety	higher prices for Hass; lower for Fuerte	higher prices for Hass compared to green varieties
destination market	higer price in France compared to other countries, especially UK and Spain	no information
seasonality	slightly higher prices, especially in August and September	stronger than in the EU; higher prices during the spring and the early summer