



INTERNATIONAL COFFEE ORGANIZATION
ORGANIZACIÓN INTERNACIONAL DEL CAFÉ
ORGANIZAÇÃO INTERNACIONAL DO CAFÉ
ORGANISATION INTERNATIONALE DU CAFÉ

ICC 105-2

12 July 2010
Original: French

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Study

International Coffee Council
105th Session
22 – 24 September 2010
London, England

Relations between coffee stocks and prices

Background

In the context of its programme of activities, the Organization pays particular attention to changes in coffee market fundamentals and their influence on prices. The present study provides an analysis of the relations between coffee prices and world stocks as well as the impact of the location of these stocks.

Action

The Council is requested to take note of this document.

RELATIONS BETWEEN COFFEE STOCKS AND PRICES

INTRODUCTION

1. The world coffee industry is influenced by a number of endogenous and exogenous factors that contribute to price formation and movements. The key determining factors continue to be production, consumption and stocks, although exogenous factors can sometimes have a significant effect on prices. The purpose of this study is to investigate links between stocks and prices and explore the nature of their relations in order to assess market development prospects¹. In other words, it seeks to establish the extent to which coffee prices are influenced by stocks, and more particularly by their levels and location. The innovation in relation to the previous study is that new factors are taken into account, including the location of stocks, relations between stocks and consumption, and changes in the share of world stocks held by individual importing countries.

2. The methodology adopted uses statistical tests to determine the nature of the relationship between prices and stocks. ICO composite indicator prices were used as the reference for international coffee prices. The period 1965 to 2009 has been divided into three sub-periods to take into account exogenous factors, such as market regulation mechanisms. The first sub-period covers the years 1965 to 1989 and corresponds to the period when price controls were in effect under a series of International Coffee Agreements with economic clauses². The second sub-period, covering the years 1990 to 2009, corresponds to a free market period when regulation of the market was abandoned after the suspension of the export quota system in July 1989. A third sub-period, covering the years from 2000 to 2009, follows more recent developments which may have influenced relations between stocks and prices.

3. The following points will be covered:

- I. Evolution of world coffee stocks
- II. Correlation between world stocks and ICO prices
- III. Correlation between ICO prices and stocks in exporting countries
- IV. Correlation between ICO prices and inventories in importing countries
- V. Impact of location of stocks

¹ This study is a revised and updated version of the study published in January 2004 in document EB-3859/04.

² For purposes of this study, the whole of the 1965 to 1989 period is considered as influenced by market regulatory mechanisms, even though quotas were in effect for only part of this time (from October 1963 to December 1972, October 1980 to February 1986 and October 1987 to July 1989).

I. EVOLUTION OF WORLD COFFEE STOCKS

4. Opening stocks in exporting countries were very high during the period from 1965 to 1989, corresponding to the period of market regulation, when the volume of these stocks averaged an annual level of 53.2 million bags. Stock levels fell steadily after 1990, which marked the beginning of the free market period, going down to an average level of 43.4 million bags. This steady decline was interrupted between 1999 and 2003, a period which coincided with the crisis of low prices affecting the coffee economy in exporting countries. Between the period of controlled prices, under the export quota system and the free market period, opening stocks fell by 18.5%. Changes in opening stocks since 2000 indicate an even sharper fall of around 28% (Table 1). Over the last three years the level of opening stocks in exporting countries has fallen to below 23 million bags.

Table 1: Opening stocks in exporting countries (in 000 bags)

Location of stocks by country and by continent	Average				Percentage change	
	1965-2009	1965-1989 (1)	1990-2009 (2)	2000-2009 (3)	(2) to (1)	(3) to (1)
<i>Africa</i>	8 608	10 696	5 998	2 937	-43.9	-72.5
Côte d'Ivoire	1 485	1 791	1 103	622	-38.4	-65.2
Ethiopia	1 822	1 160	2 650	1 583	128.4	36.5
Uganda	1 643	2 026	1 165	245	-42.5	-87.9
Others	3 658	5 720	1 081	486	-81.1	-91.5
<i>Asia & Oceania</i>	2 486	2 075	3 000	2 435	44.6	17.4
India	865	905	814	737	-10.1	-18.6
Indonesia	771	792	743	402	-6.2	-49.3
Others	851	377	1 443	1 296	282.8	243.9
<i>Mexico & Central America</i>	2 582	3 215	1 791	1 653	-44.3	-48.6
El Salvador	641	976	223	111	-77.2	-88.7
Mexico	726	816	612	662	-25.0	-18.9
Others	1 215	1 423	956	880	-32.8	-38.2
<i>South America</i>	35 187	37 248	32 612	31 417	-12.4	-15.7
Brazil	29 521	30 109	28 786	30 000	-4.4	-0.4
Colombia	4 914	6 219	3 283	1 117	-47.2	-82.0
Others	752	919	542	301	-41.0	-67.3
Total	48 863	53 233	43 401	38 442	-18.5	-27.8

5. On the other hand, inventories of green coffee in importing countries have been building up steadily. From an average of 8 million bags during the period from 1965 to 1989, these stocks rose to an average level of 15.9 million bags during the free market period from 1990 to 2009, an increase of nearly 100%. Recent developments indicate an increase of 135% (Table 2). The level of inventories in importing countries at the end of December 2009 was estimated at 22.5 million bags.

Table 2: Inventories of green coffee in importing countries (in 000 bags)

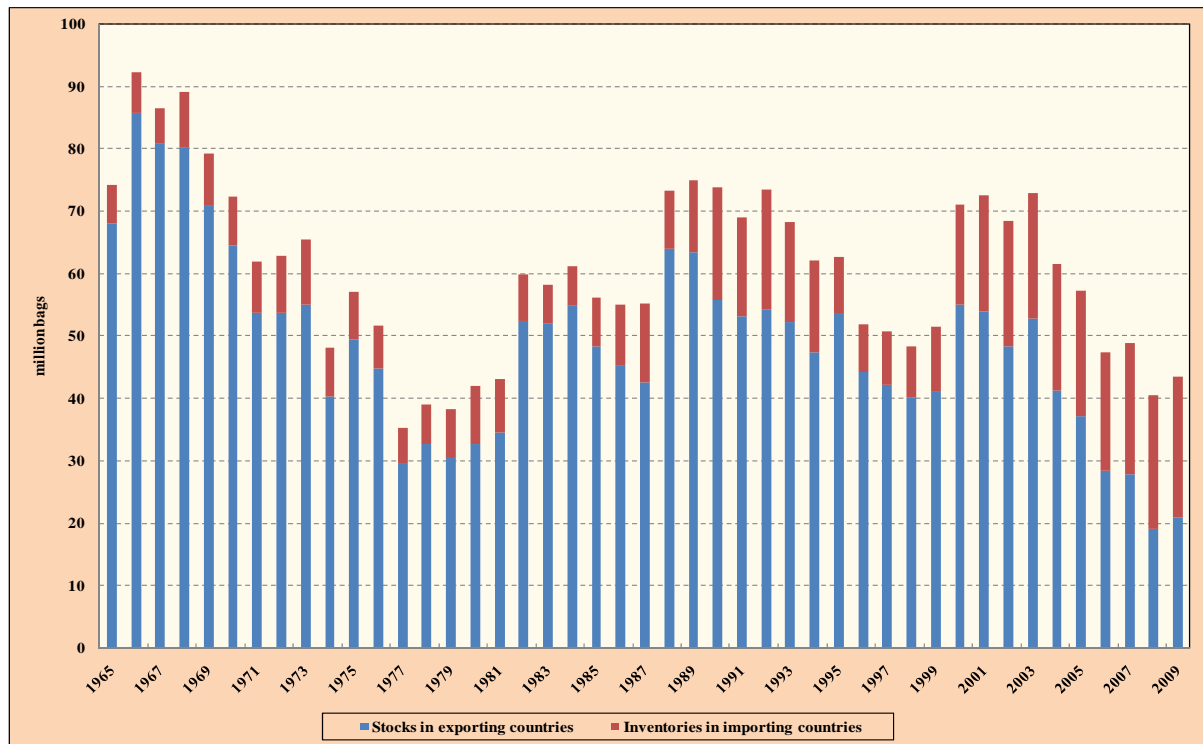
Location of stocks by country	Average				Percentage change	
	1965-2009	1965-1989 (1)	1990-2009 (2)	2000-2009 (3)	(2) to (1)	(3) to (1)
<i>European Union</i>	6 325	3 885	9 376	11 700	1.4	2.0
Belgium	1 251	195	2 572	4 242	1 216.6	2 071.6
France	404	357	463	510	29.6	42.6
Germany	1 727	1 010	2 622	3 015	159.7	198.5
Italy	968	450	1 615	1 973	259.3	339.0
Netherlands	701	564	873	707	54.7	25.3
Spain	328	297	366	463	23.1	56.0
<i>Others</i>	946	1 011	866	790	-14.4	-21.9
Japan	1 027	690	1 447	1 737	109.7	151.5
USA	3 790	3 063	4 698	5 025	53.4	64.0
All others	333	332	334	301	0.4	-9.3
Total	11 475	7 971	15 855	18 763	98.9	135.4

6. As can be seen, then, there was a build-up of stocks in exporting countries during the period when the quota system was in force and an increase of stocks in importing countries during the free market period. Consequently, world stocks as a whole fell by only 2.5% between these two periods (Table 3). Graph 1 shows world stocks comprising opening stocks in exporting countries and inventories in importing countries.

Table 3: World stocks and ICO composite indicator prices (period averages)

	Period				Change in period	
	1965-2009	1965-1989 (1)	1990-2009 (2)	2000-2009 (3)	(2) to (1)	(3) to (1)
ICO Composite indicator	(US cents/lb)					
	95.05	100.65	88.06	80.43	-12.5%	-20.1%
	(000 bags)					
World stocks	60 644	61 316	59 805	58 405	-2.5%	-4.7%
Opening stocks (EC)	48 864	53 233	43 403	38 445	-18.5%	-27.8%
Inventories (IC)	11 780	8 083	16 402	19 960	102.9%	146.9%

**Graph 1: World stocks: stocks in exporting countries and inventories in importing countries
Year commencing 1965 to 2009**



7. The relation between the volume of world stocks and world consumption is measured through the ratios indicated in Table 4. During the period of a controlled market system world stocks represented 81.2% of world consumption as against 56.6% during the free market period. Opening stocks in exporting countries represented 70.7% of world consumption compared with 41.5% for the whole of the free market period. This ratio fell further to 33.2% between 2000 and 2009. On the other hand, inventories of green coffee in importing countries, which represented 10.5% of world consumption during the quota period, rose to a level of 15% after the suspension of market intervention mechanisms.

Table 4: Ratios between stocks/inventories and consumption

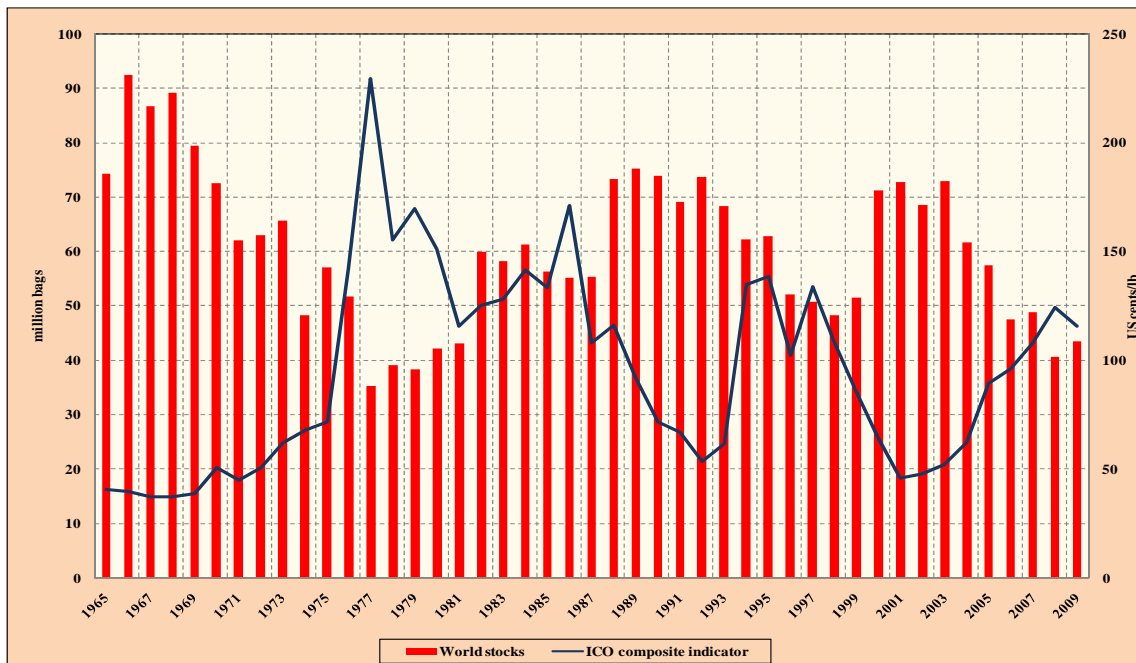
	1965-2009	1965-1989	1990-2009	2000-2009
World stocks / world consumption	70.3%	81.2%	56.6%	50.0%
Stocks in exporting countries / World consumption	57.8%	70.7%	41.5%	33.2%
Inventories in importing countries / world consumption	12.5%	10.5%	15.0%	16.8%
Inventories in importing countries / consumption in importing countries	19.6%	15.5%	24.7%	29.2%

II. CORRELATION BETWEEN WORLD STOCKS AND ICO PRICES

8. As indicated in Table 3 above, the annual level of stocks averaged 60.6 million bags with the average ICO composite indicator price at 95.05 US cents per lb during the period 1965 to 2009. During the first sub-period from 1965 to 1989 the average level of stocks was 61.3 million bags and the average ICO composite indicator price was 100.65 US cents per lb. This sub-period covers the years when International Coffee Agreements provided for regulatory mechanisms in the form of the export quota system. The composite indicator price was high despite the large volume of world stocks with the exception of the period between 1965 and 1969 when world stocks were high and prices were very weak (Graph 2). This first sub-period from 1965 to 1989 also witnessed climatic problems in some producing countries, with a significant impact on the level of their supplies. This was the case of the frost in Brazil in June 1975 and droughts in the mid-1980s which affected Brazil and other exporting countries. Price levels during this period were generally high.

9. The sub-period from 1990 to 2009 is characterized by the absence of any regulatory mechanism for controlling the coffee market. The period is also marked by the liberalization of domestic coffee marketing systems with the progressive abolition of monopolies held by stabilization funds and marketing boards. Stock levels and prices over this period were lower than in the 1965-89 period. During this second sub-period, Brazil experienced a severe frost (1994) and a drought (1999), which affected supplies and sparked off steep price rises. Stock retention programmes designed to support prices were introduced during this period in the framework of the activities of the now inactive Association of Coffee Producing Countries (ACPC).

Graph 2: World stocks and ICO composite indicator prices



10. Some symmetry can be observed in the behaviour of the ICO composite indicator prices and world stocks. High stock levels correspond to low price levels and vice versa. Between 1965 and 1975 world stock levels were consistently above 60 million bags while prices were below 60 US cents per lb. When world stocks fell to levels below 50 million bags between 1976 and 1981, the average ICO composite indicator price reached levels fluctuating between 115.42 US cents per lb and 229.22 US cents per lb. The inverse movement between the ICO composite indicator price and world stocks continued throughout the remainder of the period under observation, indicating an inverse relation between prices and world stocks.

11. The results of correlation tests show strong negative coefficients between world stocks and ICO indicator prices both for the period as a whole and for the sub-periods studied (Table 5). These coefficients are even stronger for the recent period between 2000 and 2009. It should be noted that, with the exception of Robustas, correlation coefficients for world stocks and prices are more or less identical during the two main sub-periods (1965 to 1989 and 1990 to 2009). Recent developments since 2000, however, show strong negative correlations between prices and world stocks. In other words, prices have become more sensitive to changes in stocks; indeed, high stock levels are associated with a fall in prices.

Table 5: Correlation coefficients: world stocks and prices

	1965-2009	1965-1989	1990-2009	2000-2009
ICO composite	-0.74	-0.77	-0.72	-0.96
Colombian Milds	-0.77	-0.79	-0.72	-0.87
Other Milds	-0.73	-0.73	-0.72	-0.94
Brazilian Naturals	-0.72	-0.77	-0.68	-0.92
Robustas	-0.69	-0.79	-0.58	-0.91

12. When we take into account developments in the relation between world stocks and world consumption, negative coefficients are obtained, but these are relatively weaker during the free market period than during the years when the market was regulated (Table 6). In the case of recent developments from 2000 to 2009, however, the influence of world stocks appears to have strengthened, such that the correlation coefficients are even more negative than in the 1965 to 1989 sub-period. Graph 3 shows changes in the world stocks/world consumption ratio as well as ICO composite indicator prices.

Graph 3: ICO composite indicator prices and world stocks/consumption ratio

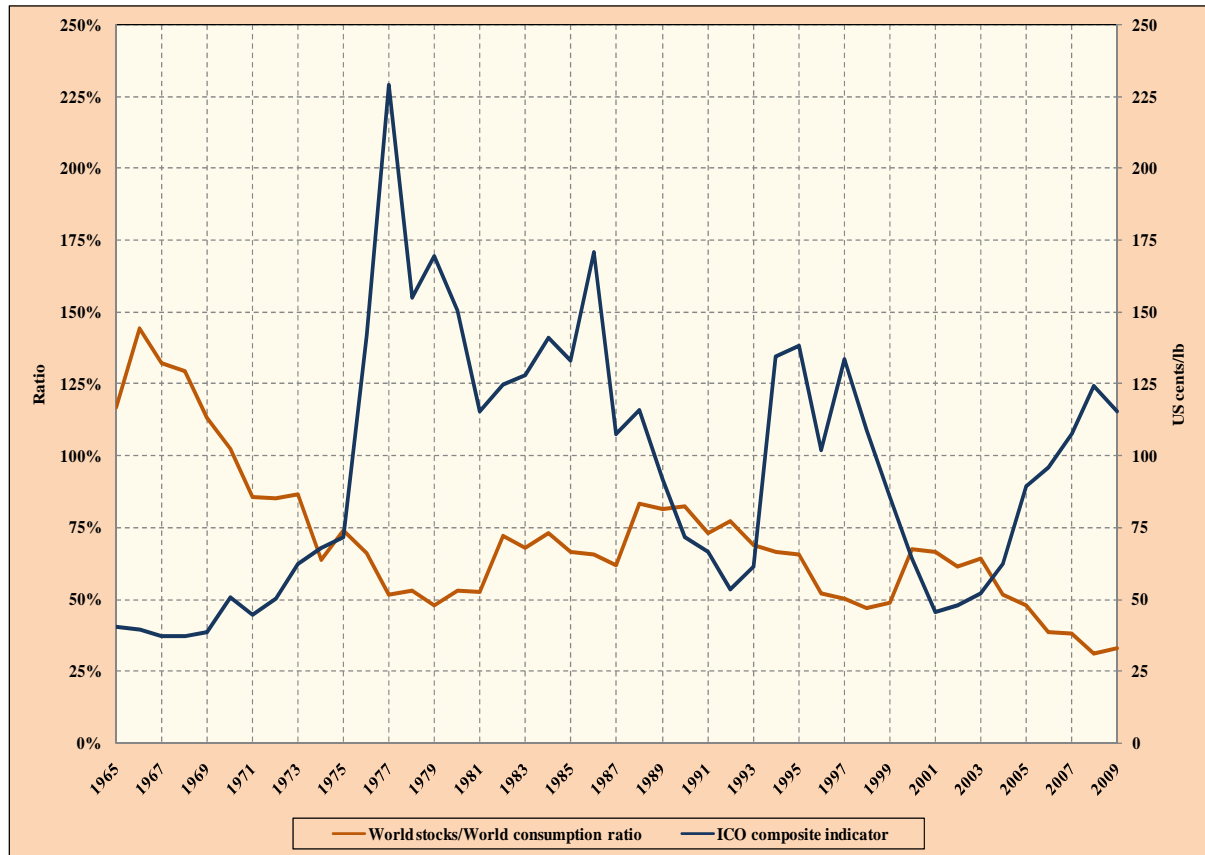


Table 6: Correlation coefficients: prices and world stocks/consumption ratio

	1965-2009	1965-1989	1990-2009	2000-2009
ICO composite	-0.57	-0.80	-0.52	-0.95
Colombian Milds	-0.65	-0.80	-0.53	-0.85
Other Milds	-0.64	-0.78	-0.53	-0.92
Brazilian Naturals	-0.53	-0.77	-0.46	-0.90
Robustas	-0.45	-0.79	-0.36	-0.90

III. CORRELATION BETWEEN ICO PRICES AND STOCKS IN EXPORTING COUNTRIES

13. Graph 4 shows opening stocks in exporting countries and the ICO composite indicator price. Table 7 shows that over the period as a whole there was a strong negative correlation between opening stock levels and prices. This negative correlation was much stronger during the period from 1965 to 1989. The correlation between prices and opening stocks weakened slightly but continued to be significant between 1990 and 2009, which corresponds to the free market period. During the most recent period from 2000 to 2009 stronger negative correlations were recorded.

Graph 4: ICO prices and stocks in exporting countries

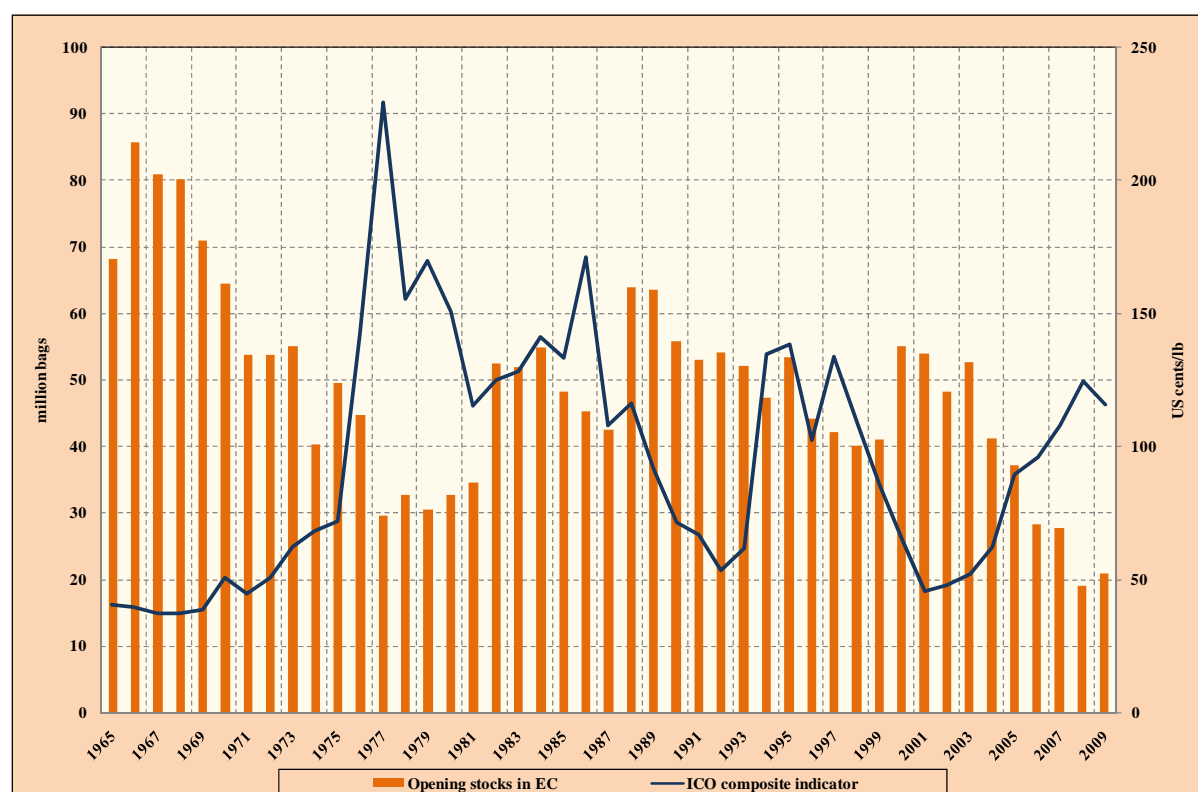


Table 7: Correlation coefficients: ICO prices and stocks in exporting countries

	1965-2009	1965-1989	1990-2009	2000-2009
ICO composite	-0.61	-0.76	-0.52	-0.95
Colombian Milds	-0.67	-0.78	-0.51	-0.86
Other Milds	-0.63	-0.73	-0.51	-0.93
Brazilian Naturals	-0.57	-0.76	-0.44	-0.90
Robustas	-0.51	-0.77	-0.38	-0.90

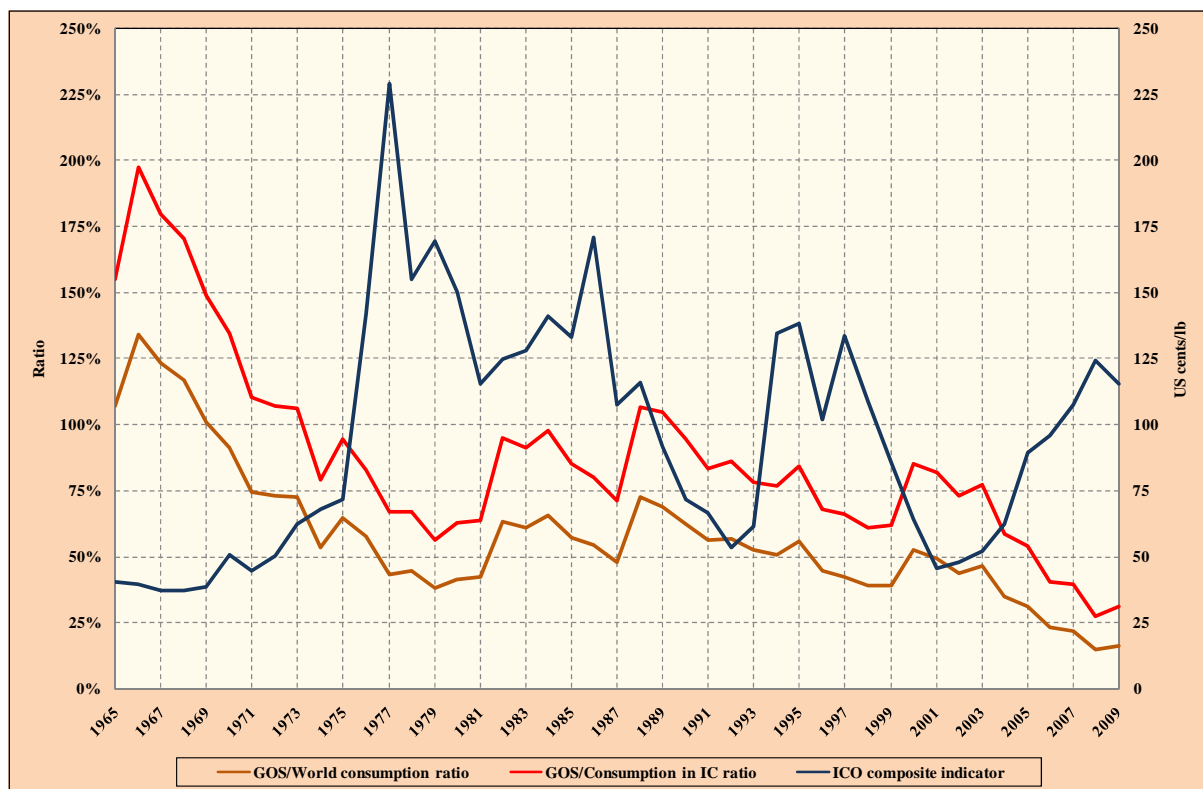
14. Analysis of the correlation between prices and opening stocks using stocks/consumption ratios gives the same results, but with more signs of a decline in the influence of opening stocks on prices during the free market period (Table 8). In fact, between 1990 and 2009 correlation coefficients were negative but also relatively weak. It was only during the 2000 to 2009 period that this correlation became stronger again, probably as a consequence of increased world consumption and recent production difficulties in some exporting countries.

Table 8: Correlation coefficients: ICO prices and stocks in exporting countries/world consumption ratio

	1965-2009	1965-1989	1990-2009	2000-2009
ICO composite	-0.50	-0.78	-0.38	-0.94
Colombian Milds	-0.59	-0.79	-0.39	-0.83
Other Milds	-0.57	-0.76	-0.38	-0.91
Brazilian Naturals	-0.45	-0.75	-0.30	-0.88
Robustas	-0.37	-0.77	-0.23	-0.88

15. Since 2000, the opening stocks/consumption ratio has had a significant impact on prices. A fall in this ratio entails an increase in prices and vice versa (Graph 5). It may be noted that the correlation between opening stocks and consumption has fallen steadily from 2003 to 2008.

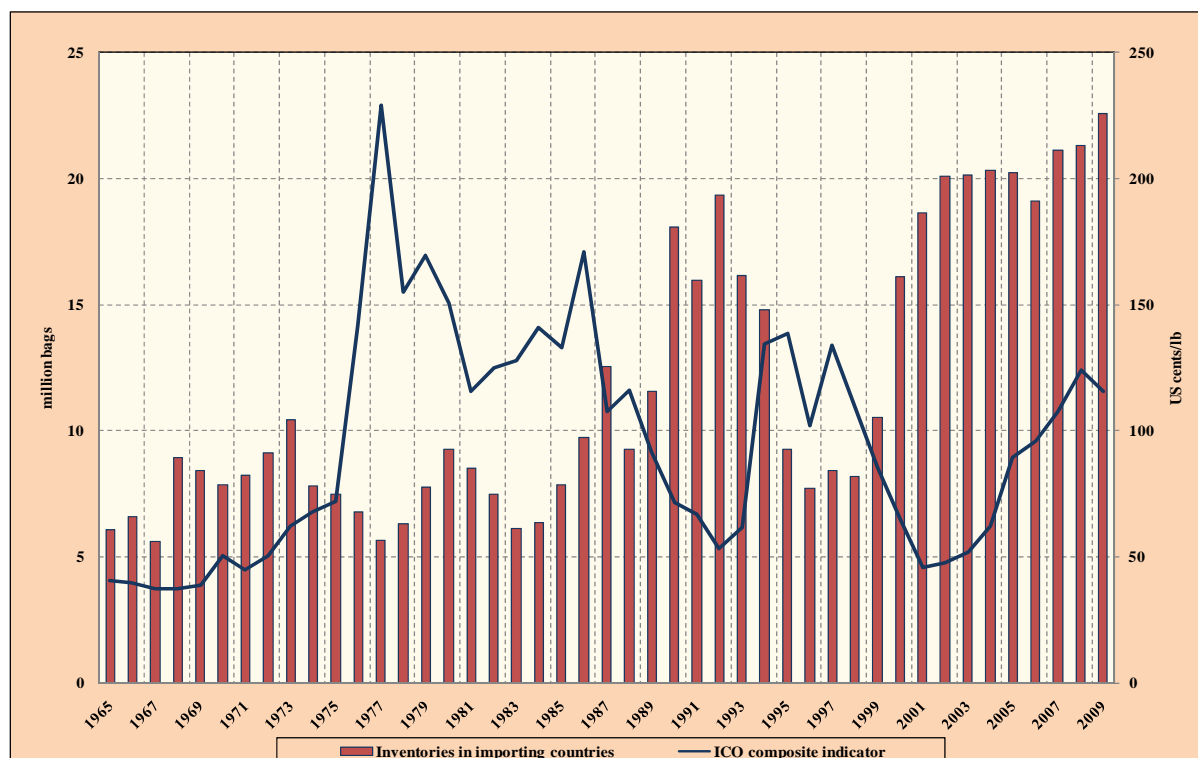
Graph 5: ICO composite indicator price and opening stocks/consumption ratios



IV. CORRELATION BETWEEN ICO PRICES AND INVENTORIES IN IMPORTING COUNTRIES

16. The average level of inventories in importing countries increased from 8 million bags during the period 1965 – 1989 to 16.4 million bags for 1990 – 2009. This means that stock levels in importing countries doubled during the free market period in comparison with the years when the market was controlled (Table 3). Changes in ICO composite indicator prices and inventories in importing countries are shown in Graph 6.

Graph 6: ICO composite indicator prices and inventories in importing countries



17. Graph 6 confirms that high stock levels in importing countries correspond to weak price levels. Correlation tests show, however, that the inverse correlation between prices and inventories was not significant during the regulated market period. This inverse correlation became more marked during the free market period. By contrast, recent developments during the period 2000 to 2009 show significant positive correlation coefficients, indicating that prices and inventories in importing countries have since been moving in the same direction (Table 9). This situation could be explained by the combination of recent production setbacks in some countries and increased consumption, which could have led importing countries to build up their stocks.

Table 9: Correlation coefficients: ICO prices and inventories in importing countries

	1965-2009	1965-1989	1990-2009	2000-2009
ICO composite	-0.24	-0.11	-0.41	0.57
Colombian Milds	-0.14	-0.06	-0.43	0.50
Other Milds	-0.13	-0.06	-0.45	0.53
Brazilian Naturals	-0.28	-0.10	-0.51	0.42
Robustas	-0.36	-0.14	-0.42	0.52

18. Analysis of the impact of the inventories/consumption ratio shows a negative correlation with prices during the free market period. This influence, which was relatively weak during the export quota period (1965 to 1989), increased after 1990 (Tables 10 and 11).

Table 10: Correlation coefficients: prices and inventories in importing countries/world consumption ratio

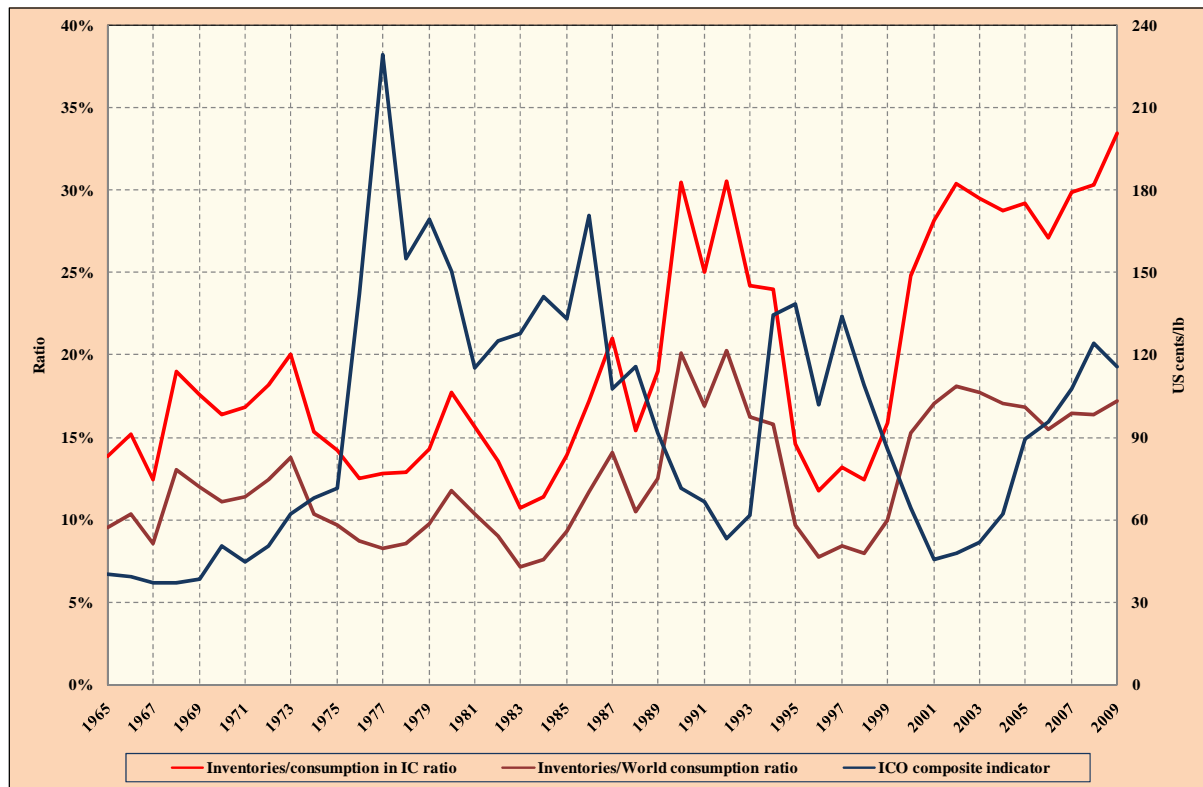
	1965-2009	1965-1989	1990-2009	2000-2009
ICO composite	-0.40	-0.41	-0.57	-0.37
Colombian Milds	-0.32	-0.36	-0.60	-0.36
Other Milds	-0.32	-0.38	-0.61	-0.39
Brazilian Naturals	-0.40	-0.36	-0.63	-0.51
Robustas	-0.46	-0.43	-0.51	-0.37

Table 11: Correlation coefficients: prices and the inventories/consumption ratio in importing countries

	1965-2009	1965-1989	1990-2009	2000-2009
ICO composite	-0.33	-0.36	-0.45	0.42
Colombian Milds	-0.23	-0.31	-0.46	0.45
Other Milds	-0.24	-0.33	-0.48	0.40
Brazilian Naturals	-0.34	-0.30	-0.54	0.26
Robustas	-0.42	-0.38	-0.44	0.36

19. Table 10 shows some relatively high negative correlation coefficients, which indicate that during the free market period the inventories/world consumption ratio had a significant influence on prices. The inversion in these coefficients during the recent short period from 2000 to 2009 could be attributable to the impact of considerably reduced production in some countries. On the other hand, Table 11 shows weak and even positive coefficients for the recent period. A possible explanation could lie in the whole concept of consumption by importing countries, which only takes into account ICO Member countries. World consumption figures may, therefore, provide a more relevant measure of consumption. Graph 7 shows changes in ICO composite indicator prices and ratios for inventories/consumption.

Graph 7: ICO composite indicator prices and inventories/consumption ratios



V. IMPACT OF LOCATION OF STOCKS

20. During the quota system prices were strongly influenced by stock levels in exporting countries since correlation coefficients were negative and very high. In the case of the influence of stocks in importing countries, correlation coefficients were weak during the regulated market period and became relatively high during the free market period. But correlations between prices and inventories could also be dependent on the location of these inventories. Consequently, analysis of the location of inventories in importing countries was carried out on the basis of the share of inventories held by selected importing countries. Table 12 shows the average share of inventories held by selected importing countries during the broader period and sub-periods under observation. It can be seen that there was an increase in the share of European Union countries as a whole, while the share of the United States fell. Japan's share increased slightly. During the free market period from 1990 to 2009 the largest shares of world coffee inventories were located in Belgium, Germany, and Italy in the case of the European Union. For the remaining importing countries, the largest volume of coffee inventories are found in the United States of America and Japan.

Table 12: Share of inventories in selected importing countries

Location of stocks by country	Average				Increase/decrease	
	1965-2009	1965-1989 (1)	1990-2009 (2)	2000-2009 (3)	(2) to (1)	(3) to (1)
	percentage share					
European Union	55.1	48.7	59.1	62.4	10.4	13.6
Belgium	10.9	2.5	16.2	22.6	13.8	20.2
France	3.5	4.5	2.9	2.7	-1.6	-1.8
Germany	15.0	12.7	16.5	16.1	3.9	3.4
Italy	8.4	5.6	10.2	10.5	4.5	4.9
Netherlands	6.1	7.1	5.5	3.8	-1.6	-3.3
Spain	2.9	3.7	2.3	2.5	-1.4	-1.3
Japan	8.9	8.7	9.1	9.3	0.5	0.6
USA	33.0	38.4	29.6	26.8	-8.8	-11.7
All others (including other EU)	11.1	16.9	7.6	5.8	-9.3	-11.0
Total	100.0	100.0	100.0	100.0		

21. Correlation tests carried out subsequently for selected importing countries gave some indication of the influence of location of inventories on prices (Tables 13a to 13d). For the period from 1965 to 2009, there was a strong positive correlation coefficient for share of inventories held by Japan. During the quota period (1965 to 1989), tests showed weak positive correlation coefficients except in the case of Spain, which recorded negative coefficients. Prices were sensitive to stocks held in the United States where the correlation coefficients were negative. Prices were generally less sensitive to the location of stocks in other countries during the regulated market period.

Table 13a: Correlation coefficients: ICO prices and share of inventories in selected importing countries (1965-2009)

1965-2009	Share of total inventories	ICO Composite indicator	Colombian Milds	Other Milds	Brazilian Naturals	Robustas
European Union	55.1	0.15	0.29	0.29	0.11	0.00
Belgium	10.9	-0.09	0.01	0.02	-0.14	-0.23
France	3.5	0.12	0.07	0.04	0.18	0.21
Germany	15.0	0.35	0.43	0.42	0.32	0.27
Italy	8.4	0.16	0.28	0.32	0.13	0.02
Netherlands	6.1	0.20	0.22	0.24	0.20	0.19
Spain	2.9	-0.34	-0.35	-0.39	-0.31	-0.28
Japan	8.9	0.57	0.60	0.59	0.54	0.52
USA	33.0	-0.34	-0.46	-0.45	-0.29	-0.20
All others (including other EU)	11.1	0.17	0.06	0.04	0.19	0.30

Table 13b: Correlation coefficients: ICO prices and share of inventories in selected importing countries (1965-1989)

1965-1989	Share of total inventories	ICO Composite indicator	Colombian Milds	Other Milds	Brazilian Naturals	Robustas
<i>European Union</i>	<i>48.7</i>	<i>0.33</i>	<i>0.37</i>	<i>0.38</i>	<i>0.29</i>	<i>0.30</i>
Belgium	2.5	0.40	0.43	0.43	0.33	0.36
France	4.5	0.10	0.17	0.11	0.14	0.09
Germany	12.7	0.56	0.58	0.55	0.53	0.59
Italy	5.6	0.34	0.40	0.43	0.32	0.28
Netherlands	7.1	0.30	0.35	0.37	0.26	0.26
Spain	3.7	-0.55	-0.54	-0.58	-0.52	-0.52
Japan	8.7	0.63	0.64	0.61	0.58	0.63
USA	38.4	-0.53	-0.57	-0.55	-0.48	-0.51
All others (including other EU)	16.9	0.08	0.07	0.02	0.01	0.09

22. During the free market period, inventories held in the United States showed a strong correlation coefficient with prices (Table 13c). Other countries with positive coefficients were Japan, Spain and Germany. However, developments since 2000 indicate strong negative coefficients in most of the countries holding the bulk of inventories in importing countries (Table 13d).

23. During the free market period from 1990 to 2009, the United States was the only importing country whose share of stocks had a strong negative correlation with prices. The others had either positive or negligible coefficients indicating the absence of a direct correlation between prices and stocks (Table 13c). Analysis of recent developments in the market (2000 to 2009) shows that there were strong correlation coefficients in many countries (Table 13d).

Table 13c: Correlation coefficients: ICO prices and shares of inventories in selected importing countries (1990-2009)

1990-2009	Share of total inventories	ICO Composite indicator	Colombian Milds	Other Milds	Brazilian Naturals	Robustas
<i>European Union</i>	<i>59.1</i>	<i>0.21</i>	<i>0.32</i>	<i>0.31</i>	<i>0.23</i>	<i>0.01</i>
Belgium	16.2	-0.07	-0.08	-0.08	-0.17	-0.20
France	2.9	-0.20	-0.15	-0.13	-0.13	-0.21
Germany	16.5	0.33	0.35	0.35	0.37	0.30
Italy	10.2	0.02	0.15	0.11	0.08	-0.09
Netherlands	5.5	-0.13	-0.05	-0.06	-0.02	-0.11
Spain	2.3	0.26	0.41	0.38	0.32	0.10
Japan	9.1	0.45	0.53	0.55	0.53	0.31
USA	29.6	-0.28	-0.40	-0.39	-0.32	-0.08
All others (including other EU)	7.6	0.15	0.18	0.19	0.26	0.19

Table 13d: Correlation coefficients: ICO prices and share of inventories in selected importing countries (2000-2009)

2000-2009	Share of total inventories	ICO Composite indicator	Colombian Milds	Other Milds	Brazilian Naturals	Robustas
<i>European Union</i>	62.4	0.58	0.59	0.62	0.58	0.43
Belgium	22.6	0.56	0.45	0.55	0.48	0.45
France	2.7	-0.63	-0.61	-0.60	-0.61	-0.68
Germany	16.1	-0.33	-0.24	-0.30	-0.23	-0.26
Italy	10.5	-0.18	-0.10	-0.19	-0.18	-0.14
Netherlands	3.8	-0.37	-0.21	-0.32	-0.25	-0.34
Spain	2.5	0.16	0.29	0.21	0.25	0.17
Japan	9.3	0.45	0.36	0.43	0.53	0.53
USA	26.8	-0.67	-0.64	-0.70	-0.72	-0.56
All others (including other EU)	5.8	-0.66	-0.60	-0.62	-0.52	-0.63

CONCLUSION

24. Correlations between stocks and prices should be viewed from a number of perspectives and over different time periods. On the whole, there is a strong negative correlation between world prices and stocks. The relationship was strong both when the market was regulated and during the free market period operating since 1990. Recent market developments since 2000 show an even stronger negative relationship. The correlation of changes in the world stocks/world consumption ratio with prices was confirmed by the strong correlation coefficients. In the case of opening stocks in exporting countries, the results of correlation tests based on the available information show a strong negative correlation with prices during all the periods covered. The strongest relations were established during the export quota period. Although these relations were somewhat diminished during the free market period as a whole, recent market developments show an increasing firmness. Relations established between opening stocks and prices following recent developments in the market could be of circumstantial origin, attributable to reduced production in some exporting countries.

25. In the case of the impact of inventories held in importing countries, there is no evidence of a direct relationship with prices during the export quota period but the free market period shows negative correlation coefficients. Correlation coefficients are globally positive during the recent period from 2000 to 2009. Analysis through inventories/consumption ratios confirms these results. The location of inventories in importing countries, and particularly the size of each country's share, also had an influence on prices.

26. Finally, it should be noted that some of the test results should be treated with caution since they make use of the available statistical data, which may be deficient in some cases. An accurate picture of the market is strongly dependent on a reliable information system that can help to reduce discrepancies in estimates. Moreover, in the absence of a stock verification system it is becoming increasingly difficult to obtain consistent estimates of some statistical aggregates such as opening stocks in exporting countries.